

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

CISCO SYSTEMS, INC.,
Petitioner

v.

ORCKIT IP, LLC.
Patent Owner

IPR2023-00714
U.S. Patent No. 6,680,904

**PETITION FOR *INTER PARTES* REVIEW
UNDER 35 U.S.C. § 312 AND 37 C.F.R. § 42.104**

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PETITIONER’S EXHIBIT LIST

1001	U.S. Patent No. 6,680,904 to Cohn et al. (“’904 patent)
1002	Prosecution History of U.S. Patent No. 6,680,904
1003	Declaration of Dr. Henry Houh
1004	<i>Curriculum Vitae</i> of Dr. Houh
1005	International Patent Publication No. WO 91/14324 (“Vink”)
1006	U.S. Patent No. 5,790,541 (“Patrick”)
1007	U.S. Patent No. 6,631,136 (“Chowdhury”)
1008	U.S. Patent No. 5,425,026 (“Mori”)
1009	ATM Volume I: Foundation for Broadband Networks
1010	First Amended Docket Control Order, <i>Orckit Corporation v. Cisco Systems, Inc.</i> , Civil Action No. 2:22-cv-276-JRG-RSP (E.D. Tex, January 15, 2023)
1011	Scheduling Order in <i>Orckit Corp. v. Cisco Systems, Inc.</i> , Case No. 2:22-cv-00276 (E.D. Tex. October 18, 2022)

*** Unless indicated otherwise, all annotations in figures and emphases in quoted material have been added throughout the Petition.

Pursuant to 35 U.S.C. §§ 311, 314(a), and 37 C.F.R. § 42.100, Cisco Systems, Inc. (“Petitioner”) respectfully requests cancellation of claims 1-26 (“Challenged Claims”) of U.S. Patent No. 6,680,904 (“’904 patent,” Ex-1001) as unpatentable under (pre-AIA) 35 U.S.C. § 103(a).

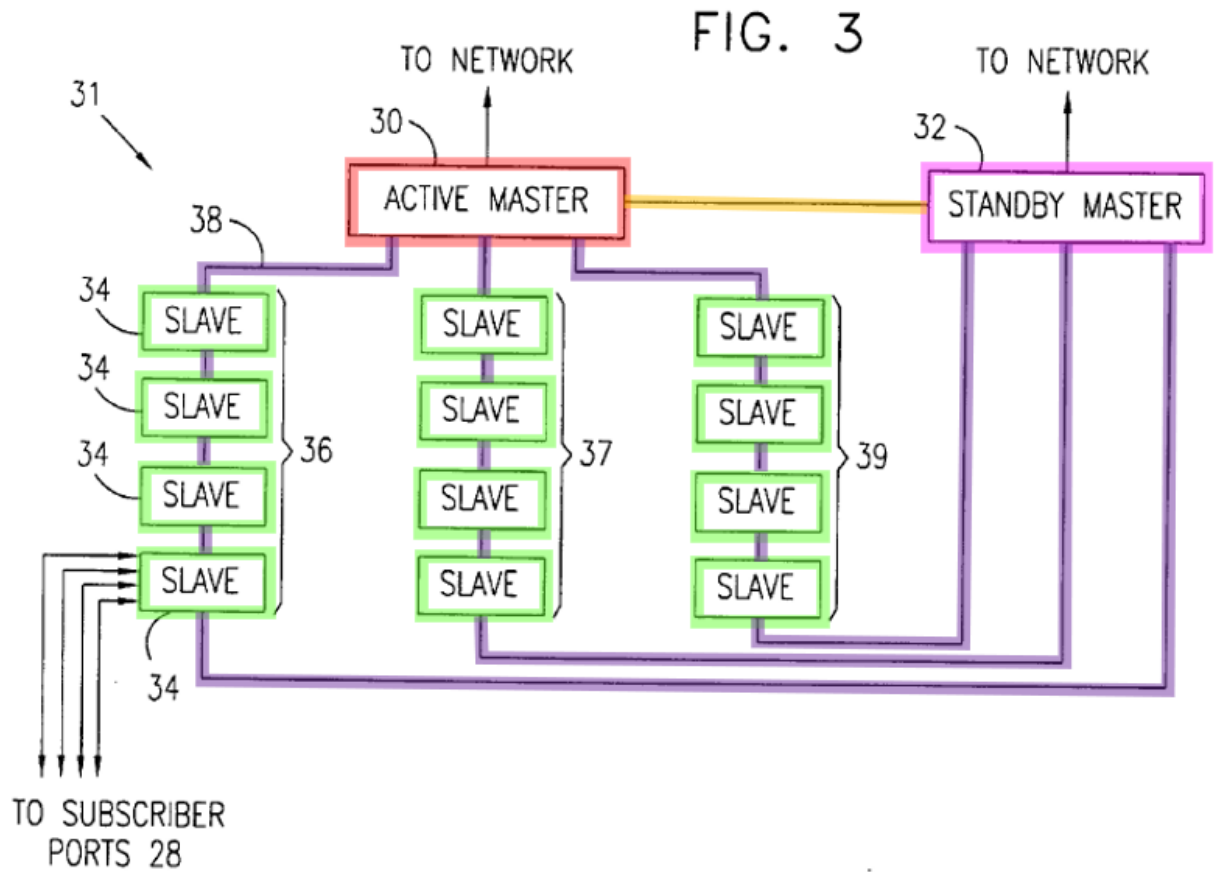
I. GROUNDS FOR STANDING

Petitioner certifies that the ’904 patent is eligible for IPR and that Petitioner is not barred or estopped from requesting IPR challenge. 37 C.F.R. § 42.104(a).

II. SUMMARY OF THE ’904 PATENT

A. Overview

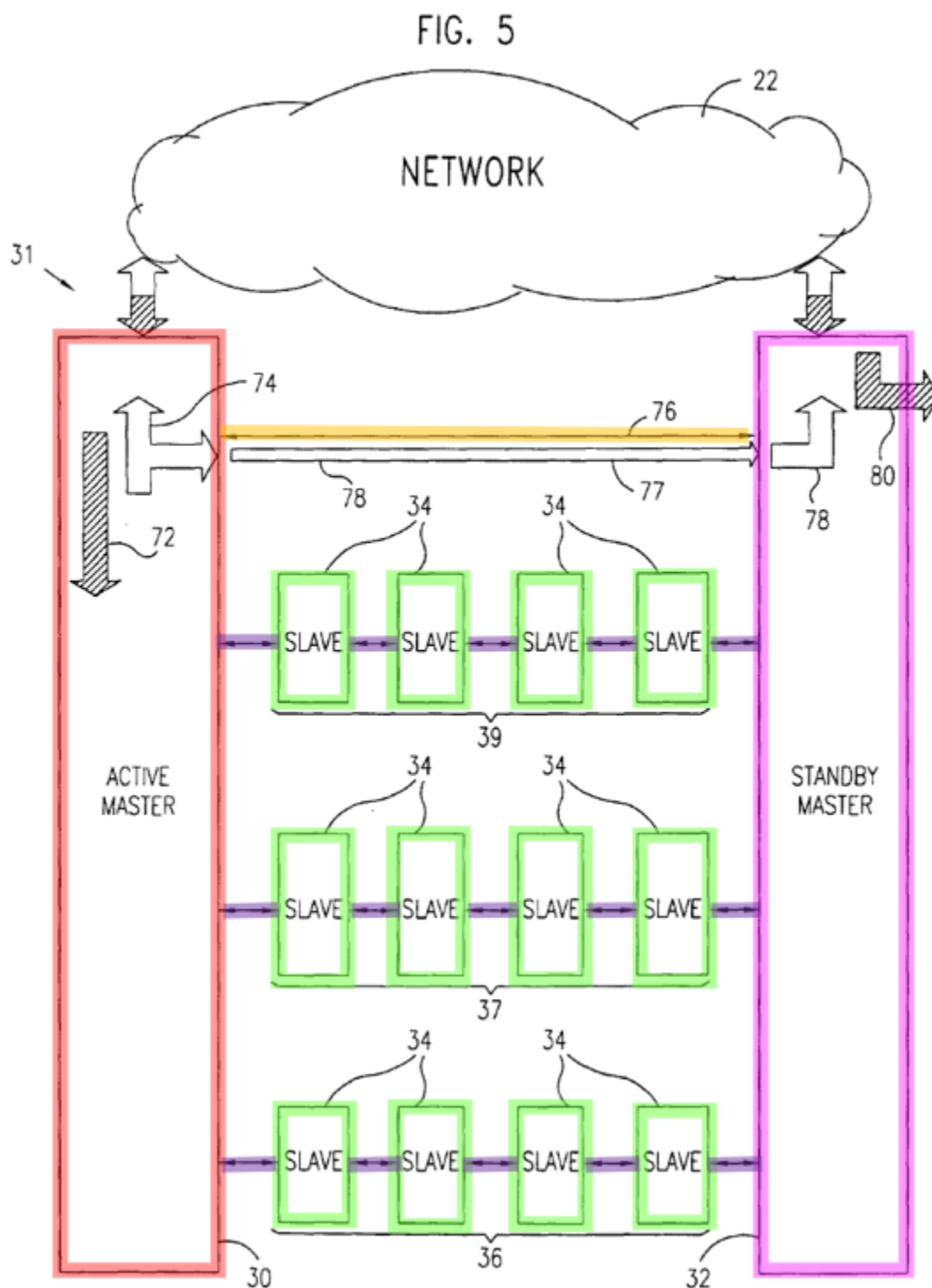
The ’904 patent relates to “high speed data communication systems.” Ex-1001, Abstract. Figure 3, below, illustrates the disclosed network access system topology:



Ex-1001, Figure 3. As shown, a “plurality of **slaves 34** are connected between **master[] 30** and **[master] 32** by **lines 38** in a number of daisy chains 36, 37, and 39.” Ex-1001, 6:26-28. “Each **slave** comprises multiple subscriber ports 28, which link system 31 to respective subscriber locations.” *Id.*, 6:28-29.

Under normal conditions (Figure 5 below), downstream data flows down from network 22 to **slaves 34** in each of daisy chains 36, 37, and 39 by passing through **active master 30** (hatched arrow 72). In contrast, the downstream data passing through **standby master 32** is discarded (hatched arrow 80). See Ex-1001,

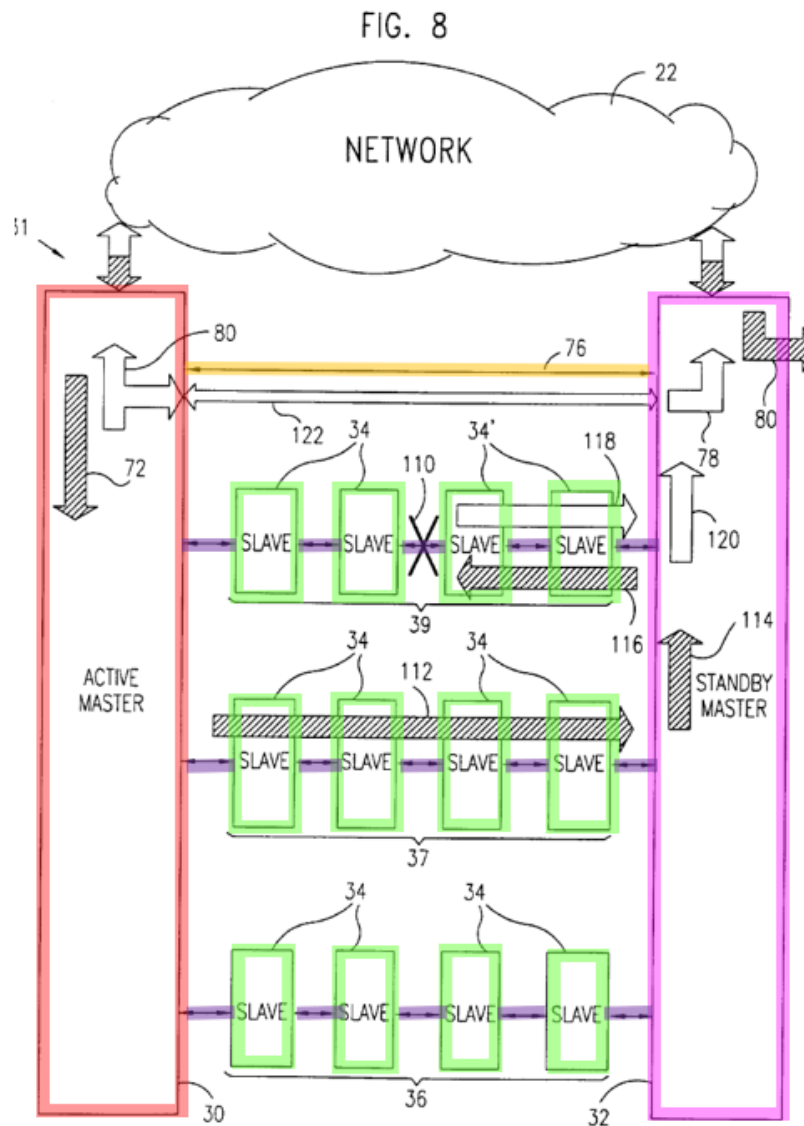
8:31-41. Moreover, upstream data (data flowing from the **slaves** to network 22) is passed through the **active master 30**, which sends it up to network 22 and also to **standby master 32** (open arrow 77) over **protection interface 76**, which in turn also sends the upstream data up to the network (open arrow 78). *See id.*, 8:42-49. “This redundancy in transmission is in accordance with fault protection mechanism ... known in the art.” *Id.*, 8:49-52.



When a fault occurs in one daisy chain 39 (see "X" in Figure 8 below),
active master 30 reroutes downstream data packets to the next daisy chain 37

(dashed arrow 112), and **standby master 32** switches that traffic back onto daisy chain 39 (dashed arrow 116) towards **slaves 34'**. See Ex-1001, 9:38-57.

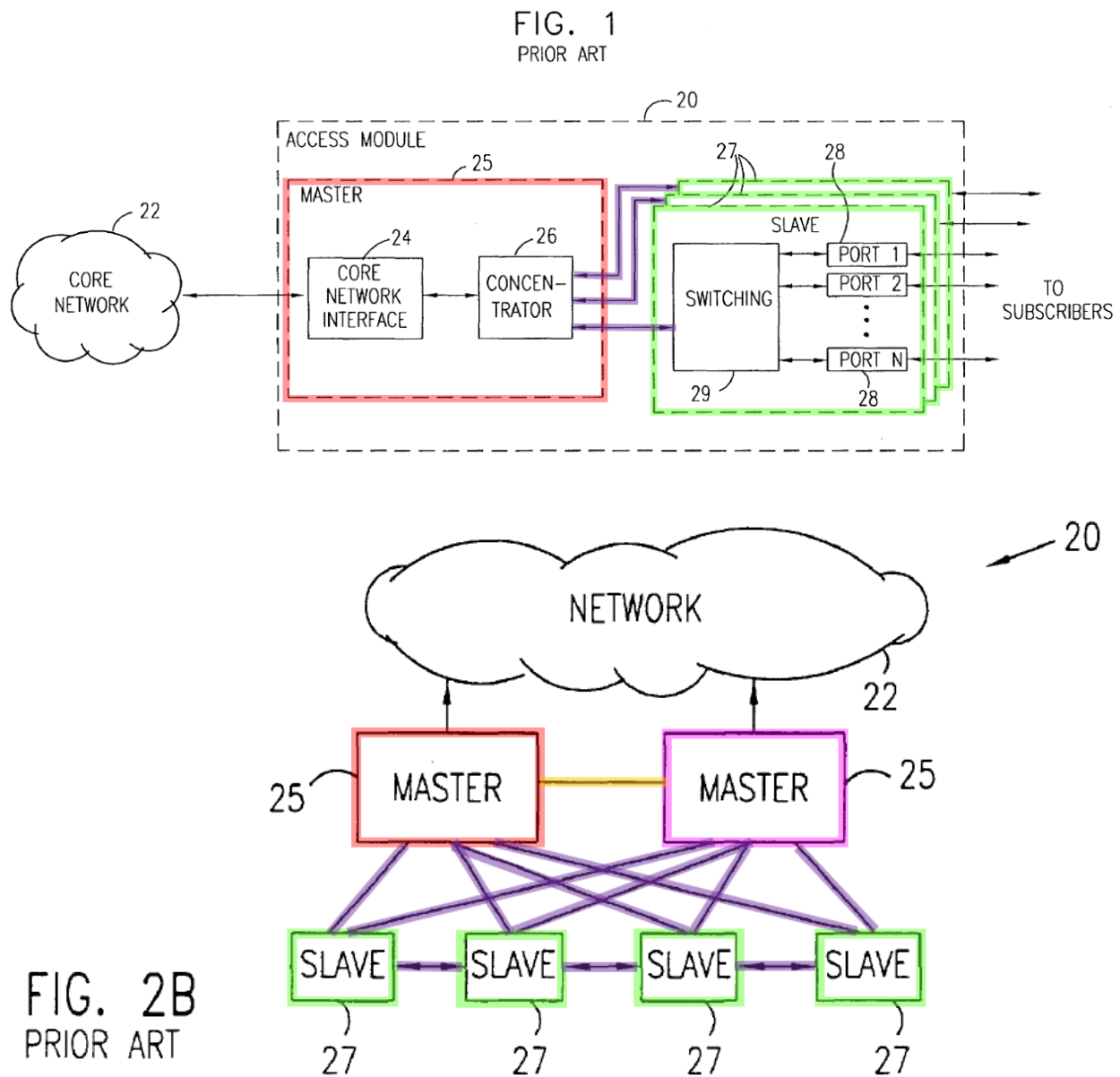
Upstream data from **slaves 34'** is similarly routed to **standby master 32** (open arrow 118). *See id.*, 9:57-65.



Ex-1001, Figure 8; Ex-1003, ¶¶34-37.

B. Prosecution History

The '904 Patent was filed on December 27, 1999, with 26 original claims. Ex-1002, 28-91. The Examiner rejected claims 1 and 12 over Applicant Admitted Prior Art (“AAPA”), citing Figures 1 and 2B. *Id.*, 158-160.



The Examiner further rejected dependent claim 13 by combining AAPA with U.S. Patent No. 6,181,715 (“Phillips”), holding that it would have been obvious to employ a DSLAM unit connecting to an IP network. *Id.*, 160-161. The Examiner held that claims 14 and 19-26 are allowed and that claims 2-11 and 15-18 would be allowable. *Id.*, 161.

In response, Applicant amended claim 1 to recite “a second slave unit connected to the first slave unit but not connected to the first or second master unit” (Ex-1002, 172) and amended claims 2, 7 and 9, which issued as independent claims 4, 9 and 11. *Id.*, 172-175. Original independent claims 14 and 19 were not amended. *Id.*, 176-179. The patent issued on January 20, 2004. Ex-1001, 1; Ex-1003, ¶¶38-46.

III. LEVEL OF ORDINARY SKILL IN THE ART

A Person of Ordinary Skill In The Art (“POSITA”) would have had a bachelor’s degree in computer science, computer engineering, electrical engineering, or equivalent training, or approximately two years of experience working in the field of information technology and networking as of December 27, 1999. Lack of professional experience can be substituted by additional education, and vice versa. Ex-1003, ¶¶59-60.

IV. CLAIM CONSTRUCTION

Claim terms in IPRs are construed according to their “ordinary and customary meaning” to those of skill in the art. 37 C.F.R. § 42.100(b).

A. “second master unit”

Petitioner submits that, for the purposes of this proceeding, the claim term “second master unit” should be construed as “a standby master that receives upstream packets from the first master unit during normal operations.”

The term “second master unit” appears in claims 1-13 and 19-26. These claims additionally recite a “first master unit” and “slave units,” which presumably have different meaning. *See Bancorp Servs., LLC v. Hartford Life Ins. Co.*, 359 F.3d 1367, 1373 (Fed. Cir. 2004) (“[U]se of both terms in close proximity in the same claim gives rise to an inference that a different meaning should be assigned to each.”). However, because the Board “need only construe terms ... only to the extent necessary to resolve the controversy,” construing the term “second master unit” is sufficient to provide clarity to the different meanings assigned to these three terms. *See Nidec Motor Corp. v. Zhongshan Broad Ocean Motor Co.*, 868 F.3d 1013, 1017 (Fed. Cir. 2017).

Beginning with the claims, the claims do not explicitly assign different meanings to “second master unit” and “first master unit.” For example, the independent claims 1, 4, 9 and 11 merely require the “first master unit” and the

“second master unit” to each have “a physical interface to a packet-switched network.”

Turning to the specification, the '904 patent describes “two mutually-linked masters 30 and 32.” Ex-1001, 6:22-26. “Master 30 is termed the active master,” and master 32 is termed the “standby master 32.” Ex-1001, 6:38-44. While the dependent claims suggest that the “second master unit” corresponds to the standby master, (*see, e.g.*, claims 5-8, 12, and 20-23), the specification notes that (1) the active and standby masters are “structurally substantially identical” to each other, (Ex-1001, 9:8-9), and (2) the standby master can be “treated as an additional slave on one of the chains.” Ex-1001, 9:24-27.

Hence, properly assigning different meanings to the claim terms requires ascertaining the function performed by the standby master. The standby master’s function that distinguishes it from the active master (“first master unit”) and the “slave units” is the *receipt of upstream packets from the active master (“first master unit”) during normal operations*. *See* Ex-1001, 8:44-47 (“The active master... send[s] [these packets]... to standby master 32....”); *see also id.*, 2:23-24 (“upstream packets are bicast by the active master to both the core network and to the standby master.”), 6:43-44 (“Active master 30 bicast upstream packets to the network and to standby master 32.”), 9:16-22 (“Upstream data packets received by the standby master... from active master 30....”). To be clear, other functions

are performed by the standby master during normal operations, such as “transmit[ing] the upstream packets to the core network.” Ex-1001, 2:25-26. But that function is performed by both the active and standby master. The function of receiving, from the active master, upstream packets that is sent by the slave units during normal operation is only performed by the standby master. Hence, to provide clarity to the claim terms, the “second master unit” should be construed as “a standby master that receives upstream packets from the first master unit during normal operations.” Ex-1003, ¶¶61-71.

V. RELIEF REQUESTED

Petitioner asks that the Board institute a trial for *inter partes* review and cancel the Challenged Claims in view of the analysis below.

VI. IDENTIFICATION OF HOW THE CLAIMS ARE UNPATENTABLE

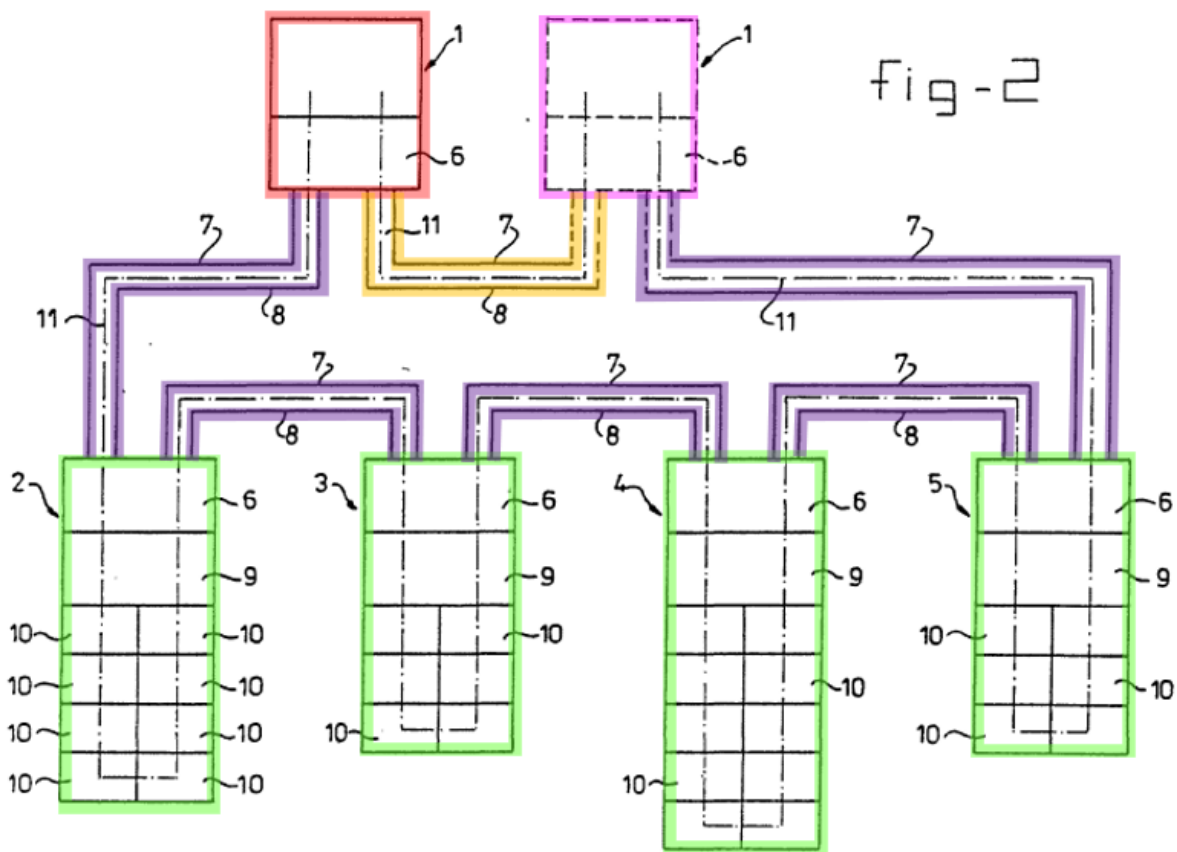
A. Challenged Claims And Statutory Grounds For Challenge

Grounds	Claims	Basis
#1	1-26	Vink with Patrick
#2	1-26	Vink with Patrick and AAPA

1. Vink

WO 91/14324 (“Vink,” Ex-1005) published on September 19, 1991, and qualifies as prior art under §102(b).

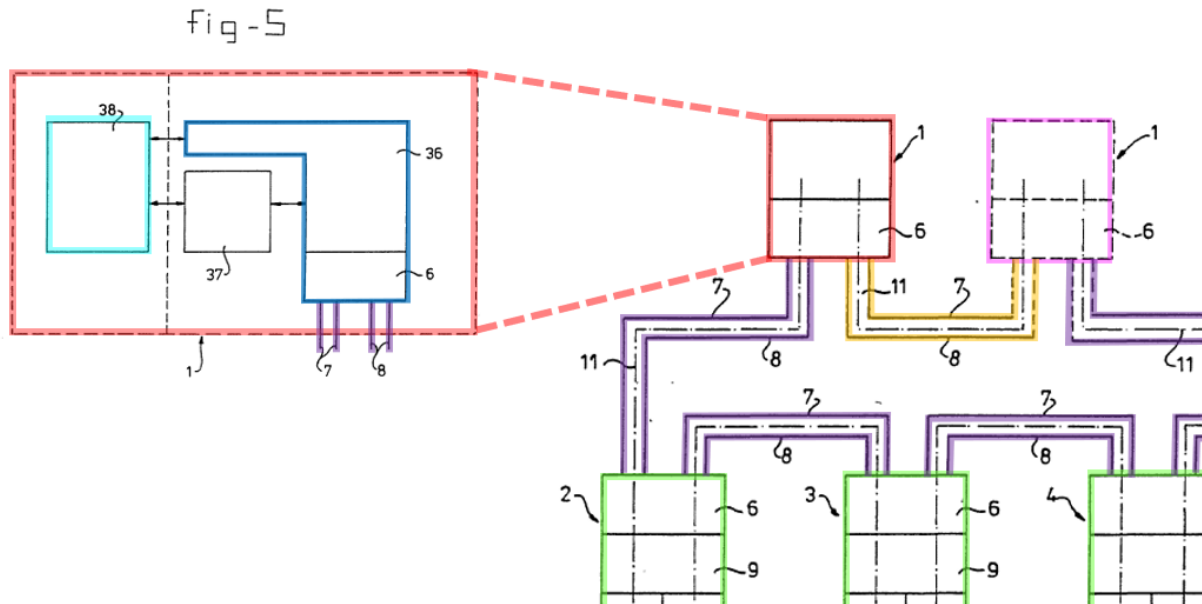
As shown below (Figure 2), Vink is directed to a communication system that exchanges data across a network in serial form under the control of at least one **master station**. Ex-1005, 1. Vink's communication system has two **master stations** and **substations (slaves 2, 3, 4, and 5)** that are connected to each other in series via the **transmission lines 7, 8**. See Ex-1005, 15:28-35. The two **master stations** are also connected to each other via **transmission lines 7, 8**.



Ex-1005, Figure 2.

Figures 3-4 and 5 provide additional details regarding the **slave** and **master** components, respectively. As shown below, the **master** includes

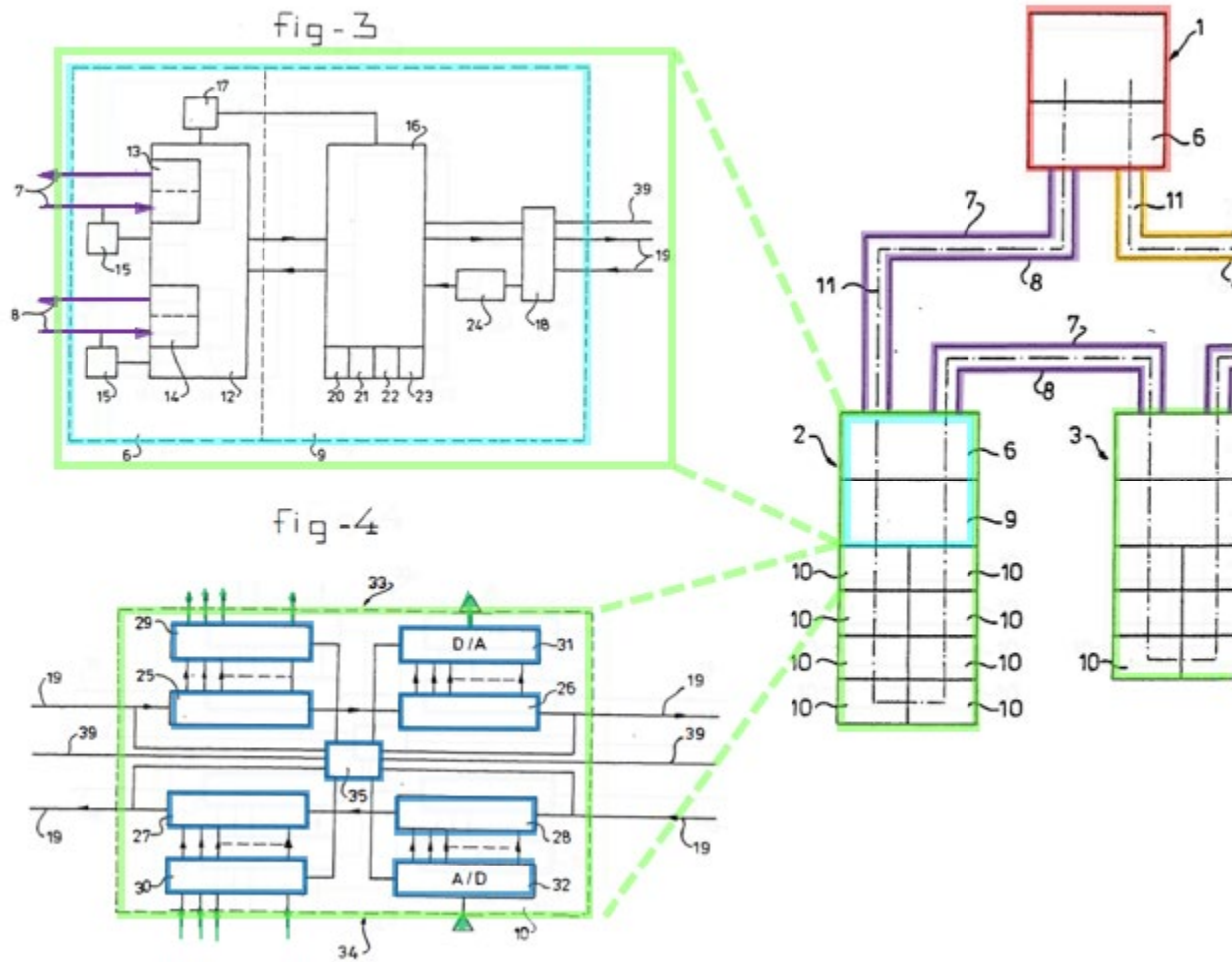
transmitting/receiving unit 6, control unit 36, memory 37, and control computer 38.



Ex-1005, Figures 2 and 5. **Control computer 38** determines the slaves to/from which data packets should be delivered/are received from. *See* Ex-1005, 21:4-7.

Control unit 36 and transmission/receiving unit 6 transmit/receive the data packets via **transmission lines 7, 8** as dictated by **control computer 38**. *See* Ex-1005, 20:30-21:4.

As shown below, each **slave** contains **transmitting/receiving unit 6**, **control module 9** (Figure 3), and one or more **I/O modules** (Figure 4).



Ex-1005, Figures 2-4. The **transmitting/receiving unit 6** transmits/receives data packets to/from **transmission lines 7, 8** and the components within **transmitting/receiving unit 6** and **control module 9** determine whether the current slave should receive the data packets. *See* Ex-1005, 11:38-12:4, 14:12-14, 25:8-24. If the data packets are intended for a next subsequent slave, they are forwarded onto the next slave. *See* Ex-1005, 17:3-18:33. If the data packets are intended for one of the **I/O modules** in the current slave, they are passed serially

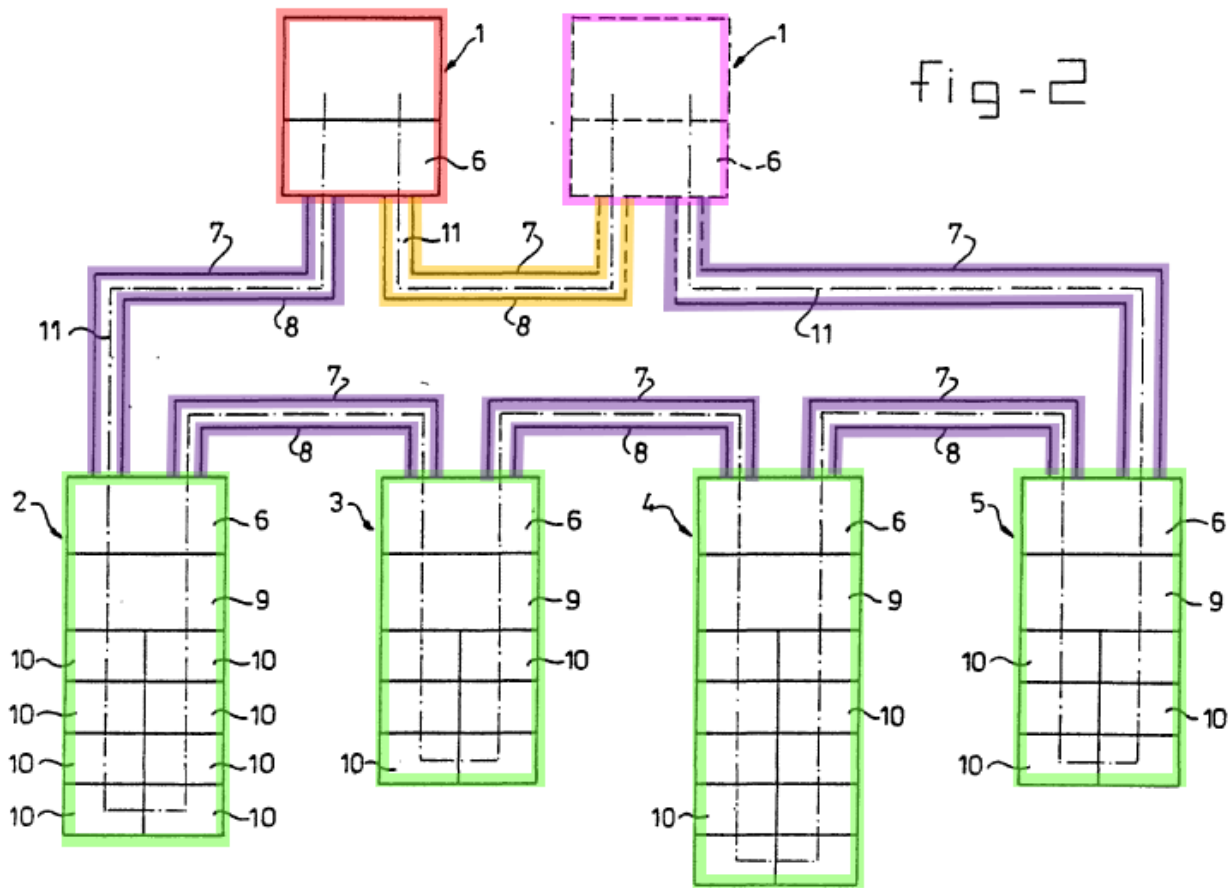
onto the **I/O modules** and **control means 35**, the **shift registers 25, 26, 30, and 32**, and **buffers 29 and 30** in the correct I/O modules route the data packets to **output side 33**. *See* Ex-1005, 19:1-20:29, 7:9-16, 23:14-21. These **I/O modules** further include **input side 34** that accepts data packets from the devices connected to the **I/O module**. *See id.*

B. Grounds 1-2: Claims 1-26 Are Obvious Over Vink With Patrick (Ground 1) Or Over Vink With Patrick And AAPA (Ground 2).

1. Independent Claims 1, 4, 9, and 11

a) [1pre/4pre/9pre/11pre] Network access apparatus, comprising:

To the extent limiting, Vink with Patrick (and AAPA for Ground 2) suggests the preambles. Vink discloses “a communication system [e.g., Local Area Networks (LANs)] for exchanging data ... under the control of at least one **master station** (master).” Ex-1005, 1:6-15. As shown below, a plurality of **substations (slaves) 2, 3, 4, 5** are connected in series to two different **master units**. *See* Ex-1005, Abstract. Ex-1003, ¶¶74-75.



Ex-1005, Figure 2.

Although Vink does not explicitly teach that **master 1** accesses a network, **master stations** connected to networks were well-known. For example, as shown below, Patrick discloses a “communication system ... characterized by a topology having a **primary node** connected to a first network, such as the Internet.” Ex-1006, Abstract. And although only a single **primary station** is depicted in Figure 1, Patrick teaches “**more than one primary station.**” Ex-1006, 3:27-32. See Ex-1003, ¶¶76-77.

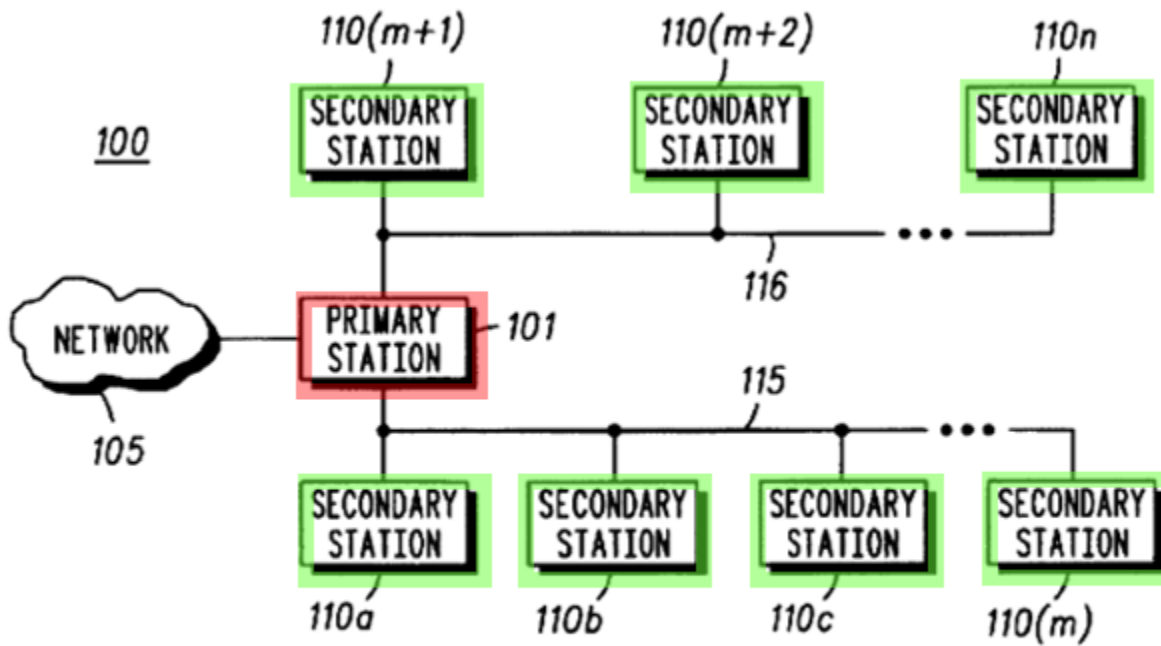
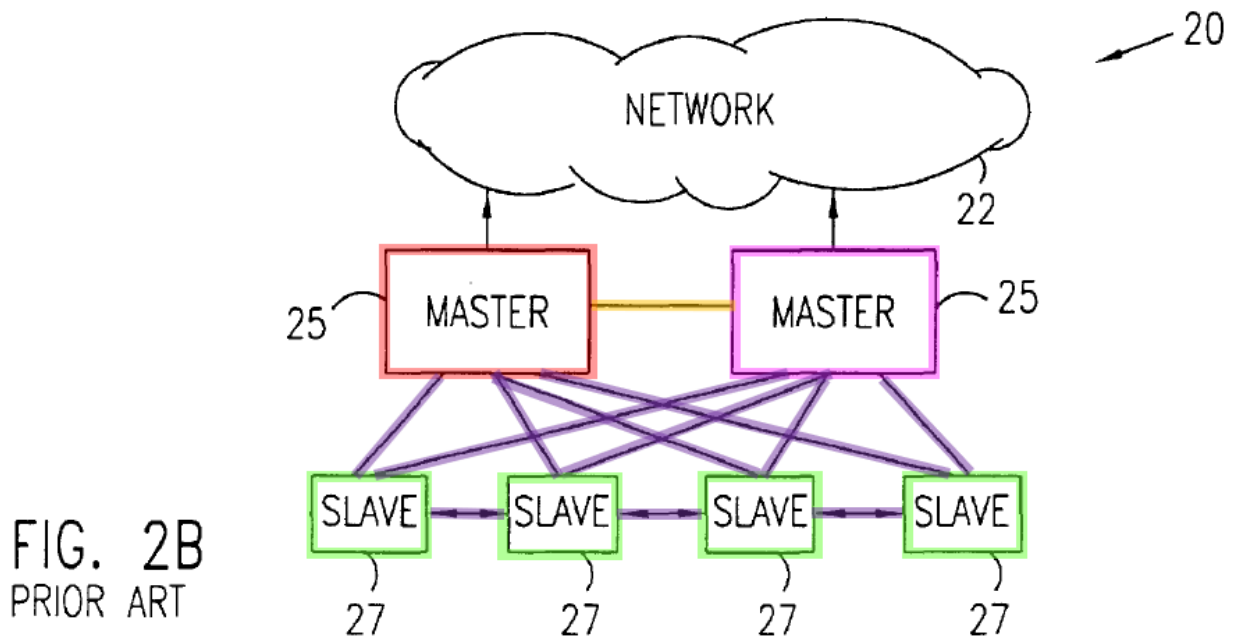


FIG. 1

Ex-1006, Figure 1.

Indeed, Figure 2B of AAPA shows **two masters** connected to a network and to different **slave nodes**. See Ex-1003, ¶¶83-85.



Ex-1001, Figure 2B.

(1) Reasons To Combine Vink With Patrick (And Further With AAPA)

It would have been obvious to combine the teachings of Vink with Patrick (and AAPA for Ground 2). Vink discloses a communication system that is “known per se,” such as “Local Area Networks (LAN’s),” Ex-1005, 1:11-15, but Vink is not limited to a LAN. *See* Ex-1005, 22:10-14; Ex-1003, ¶¶74-79.

One well-known exemplary communication system is CableComm™, taught by Patrick, in which the master node can connect to a network, “such as the Internet, online services, telephone and cable networks, and other communication systems.”. Ex-1006, 1:19-28, 3:20-24. Ex-1003, ¶80.

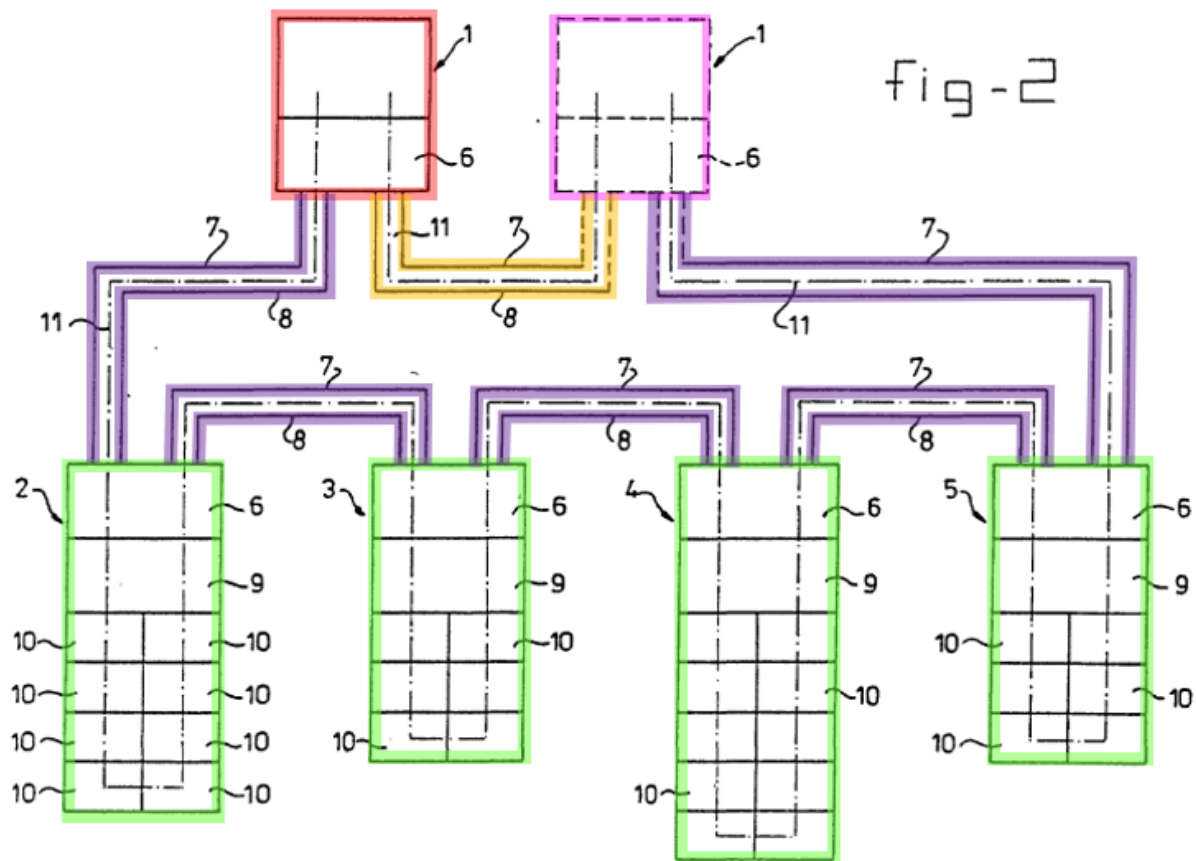
Another admittedly well-known communication system includes Digital Subscriber Line (DSL) which “is the type of infrastructure that links most home and small business subscribers to their telephone service providers.” Ex-1001, 1:10-14. As AAPA teaches, “DSL thus opens the most critical bottleneck in local-loop access to high-speed networks, such as Asynchronous Transfer Mode (ATM) and Internet Protocol (IP) networks.” *Id.*, 1:14-20. Ex-1003, ¶86.

It would have been obvious to combine the teachings of Patrick (and AAPA for Ground 2) to Vink’s communication system by connecting Vink’s masters to a known network, such as those taught by Patrick and/or AAPA, to achieve the well-known benefits of gaining access to an external network. *See* Ex-1006, 3:20-24; Ex-1001, 1:14-20. Connecting masters to an external network, such as the Internet (as taught by Patrick) using a specific protocol like the ATM or IP (as taught by AAPA) would have had the benefit of enabling downstream (i.e., data flowing from the external network “down” to the communication system) and upstream (i.e., data flowing “up” from the communication system to the external network) communications. *See* Ex-1006, 1:34-40. And subscribers connected to Vink’s communication system would have benefitted by gaining access to a wider array of information that is available on the external network, such as information available on other computers/servers. This was done routinely in the art, and a POSITA would have had a reasonable expectation of success in making such a modification

to Vink's masters given the similarities in the references, including the fact that they are all directed to communication systems that allow master and slave units to communicate with each other. Techniques to further allow the communication system to access external networks by connecting the master to an external network were well-known in the art, as evidenced by Patrick and/or AAPA. Ex-1003, ¶¶74-88.

b) [1a/4a/9a/11a] **first [master]** and **second master** units, each comprising a **physical interface to a packet-switched network**;

Vink with Patrick (and AAPA for Ground 2) suggests [1a], [4a], [9a], and [11a]. Vink discloses **two masters**:



Ex-1005, Figure 2. Specifically, left master 1 is an **active master** and the right master 1 is a **passive master**. See Ex-1005, 16:19-24 (“a plurality of masters... illustrated in Figure 2... In such a multi-master concept, one of the masters is in general active in relation to data exchange, while one or more other masters only have a passive role therein.”). Ex-1003, ¶¶94-97.

The **two masters** and the **plurality of slave units** exchange data packets via **transmission lines 7, 8**. See Ex-1005, 14:28-34 (“at least one master and slaves are designed to transmit or receive packets of data bits via a transmission system ring in one and/or the other direction.”), *id.*, 22:1-9, 15:28-35 (“The transmission

lines 7, 8 may, for example, consist of coaxial cable, optical fibre cable and the like.”), 1:11-15. Ex-1003, ¶¶95-96.

Vink with Patrick (and AAPA for Ground 2) suggests masters with a physical interface to an external packet-switched network. As explained above in Section VI.B.1.a [1pre/4pre/9pre/11pre], Patrick teaches that the “**primary station 101** is also coupled to a network 105, which may include networks such as the Internet, on line services, telephone and cable networks, and other communication systems.” Ex-1006, 3:20-24. See Ex-1003, ¶93.

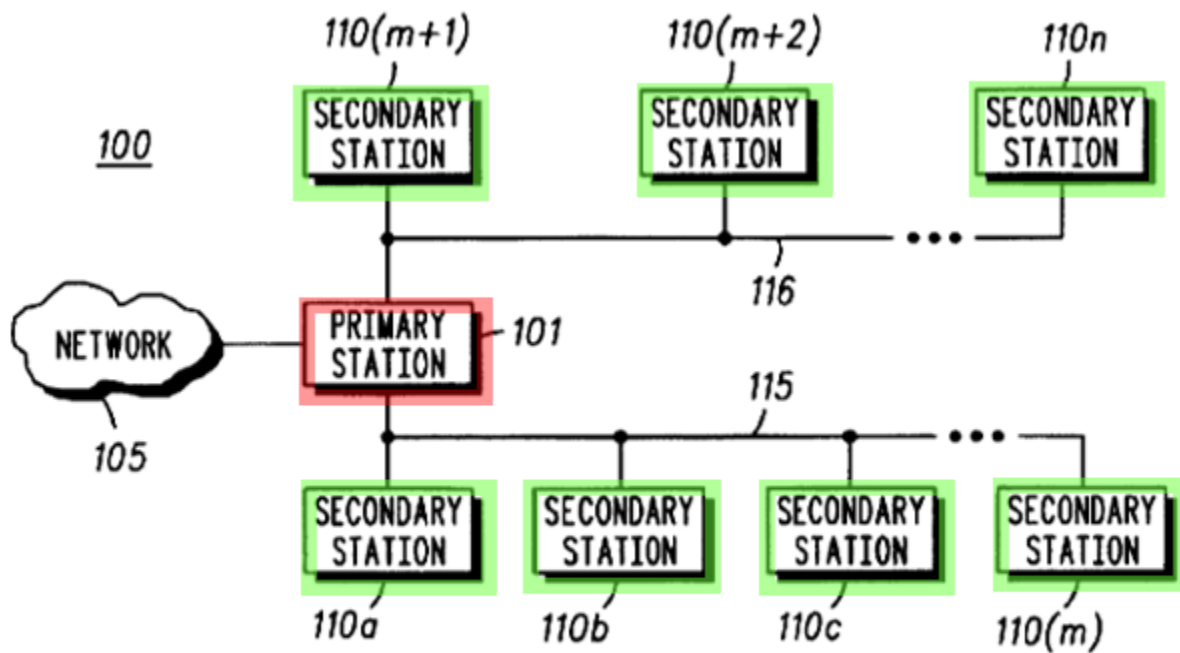
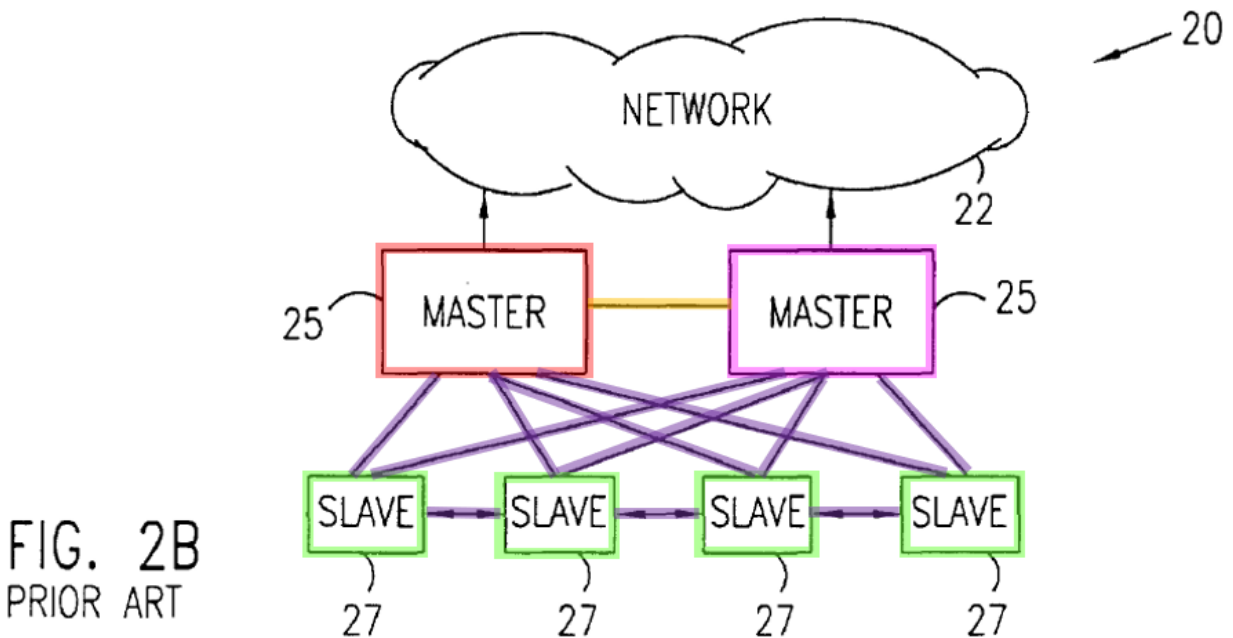


FIG. 1

Ex-1006, Figure 1.

Similarly, AAPA (Figure 2B) shows **two master** nodes connected to a network.¹ Indeed, AAPA teaches that the “**master unit** comprises a core network interface element 24, providing the necessary physical layer (PHY) and data link layer (for example, ATM) functions.” Ex-1001, 1:39-42. Ex-1003, ¶¶86-88.



Ex-1001, Figure 2B.

It would have been obvious to combine the teachings of Vink with Patrick (and AAPA for Ground 2), as more fully discussed in Section VI.B.1.a [1pre, 4pre, 9pre, 11pre].

¹ [1a]/[4a]/[9a]/[11a] were admittedly well-known. Indeed, Applicant acquiesced to the Examiner's rejection that AAPA discloses these limitations. *See* Ex. 1002, 159.

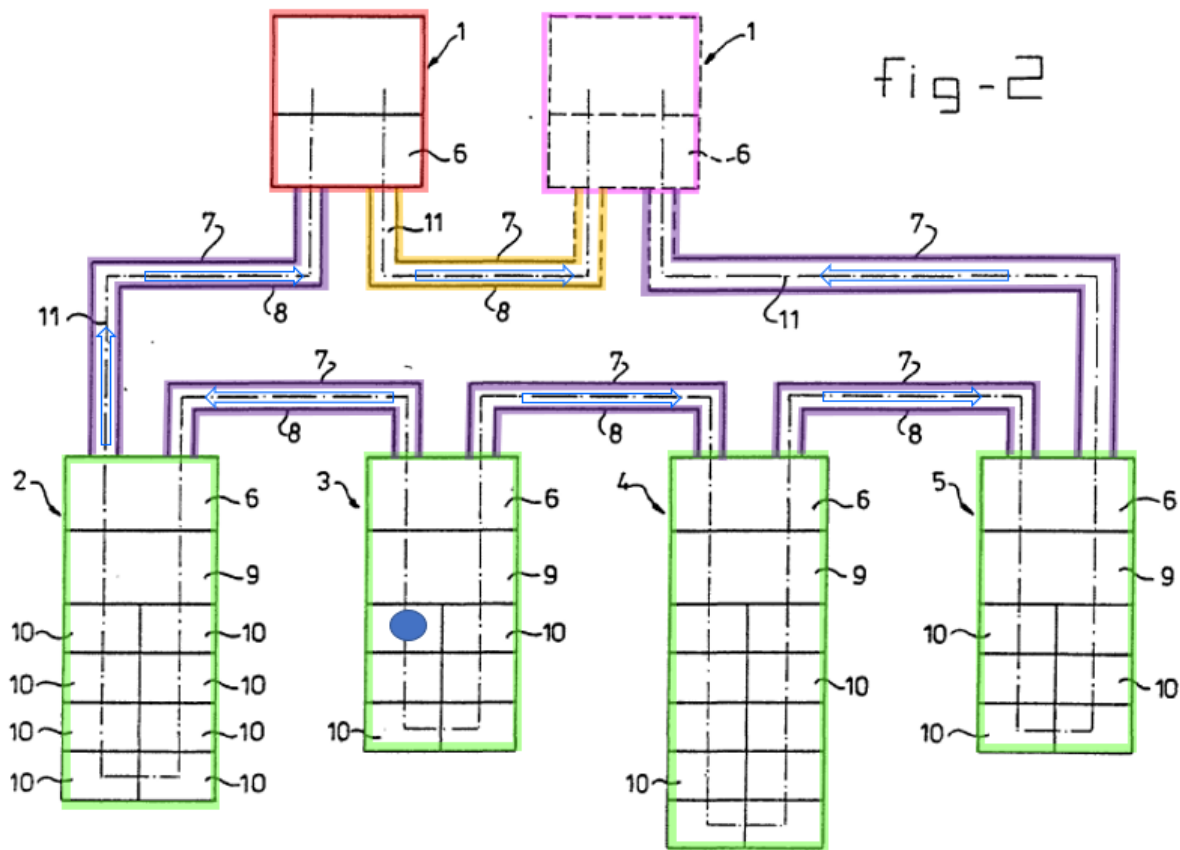
Finally, as explained above in Section IV.A [Claim Construction], the term “**second master unit**” should be construed to mean a “standby master that receives upstream packets from the first master unit during normal operations.” Vink with Patrick (and AAPA for Ground 2) suggests the claimed “**second master unit**” as properly construed. *See* Ex-1003, ¶¶61-70.

Vink teaches that the “**passive masters** ... receive all the information which is intended for the **active master**.” Ex-1005, 16:26-31. Such information includes “receiving from the **slaves (2, 3, 4, 5)** via transmission system (7, 8) the data bits originating from the I/O modules (10) [of the slave units].” Ex-1005, 23:22-36. In other words, Vink with Patrick (and AAPA for Ground 2) suggests both **active** and **passive masters** receiving upstream data from the **slave units**. There are only two possible ways the **passive master** can receive all the upstream packets intended for the **active master**. *See* Ex-1003, ¶¶98-102.

Taking upstream packets originating from **slave 3** as an example (see blue circle and blue arrows below), one way to receive upstream packets from **slave 3** would have been to transmit the upstream packets across **slaves 4** and **5** and up to the **passive master 1**. The other way to receive upstream packets from **slave 3** would have been to transmit the upstream packet from **slave 3** to **slave 2**, which passes the upstream packets to **active master 1**, which then sends the upstream packet to **passive master 1** across the **transmission lines 7, 8**. The latter would

have been merely one of two finite ways of having the **passive master 1** “receive all the information which is intended for the **active master**,” Ex-1005, 16:26-31.

A POSITA would have been able to achieve either transmission of upstream packets given that Vink teaches it is possible to switch the transmission direction. *See, e.g.*, Ex-1005, 14:28-31 (“A very flexible system is obtained ... in that the at least one master and slaves are designed to transmit or receive packets of data bits via a transmission system ring in one and/or the other direction.”). Indeed, this achieves Vink’s stated goal of a “hot stand-by” master which “is of importance ... in which failure ... may ... have serious financial consequences.” Ex-1005, 16:34-37. *See* Ex-1003, ¶¶98-102.

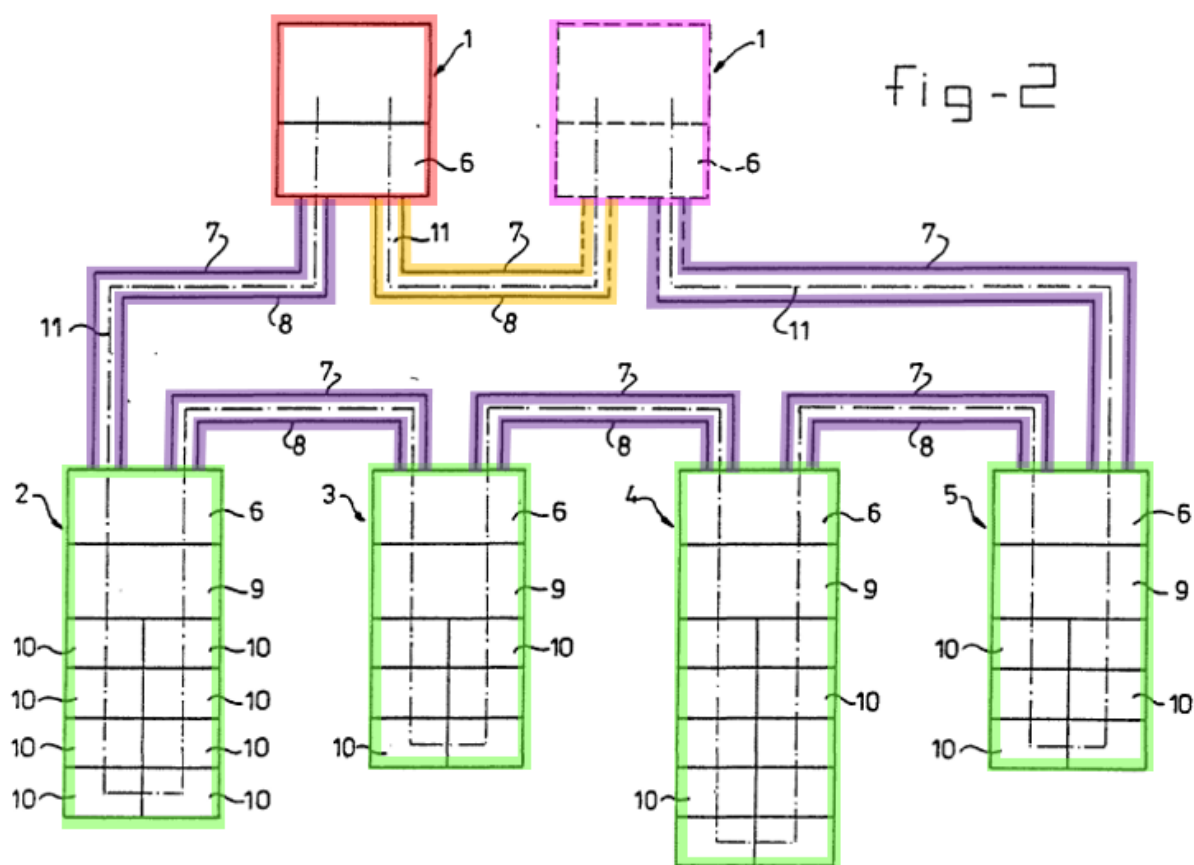


AAPA itself teaches that such “fault protection mechanism” was well-known in the art. The ’904 patent states that “[t]he active master bicast[s] these [upstream] packets, sending them both to network 22 and to standby master 32 over a protection interface 76 between the two masters, as indicated by an arrow 77.” Ex-1001, 8:42-47; *id.*, 8:49-52 (“This redundancy in transmission is in accordance with fault protection mechanisms used in high-speed networks ***known in the art.***”); *see also* Ex-1009, 52-55. Combining such well-known fault protection mechanism in Vink’s communication system, which already has two master stations that has a communication path therebetween, to send upstream

packets during normal operations in an effort to quickly mitigate any fault events would have been a trivial modification that a POSITA would have been motivated to do as well as able to readily implement with a reasonable expectation of success. See Ex-1003, ¶102.

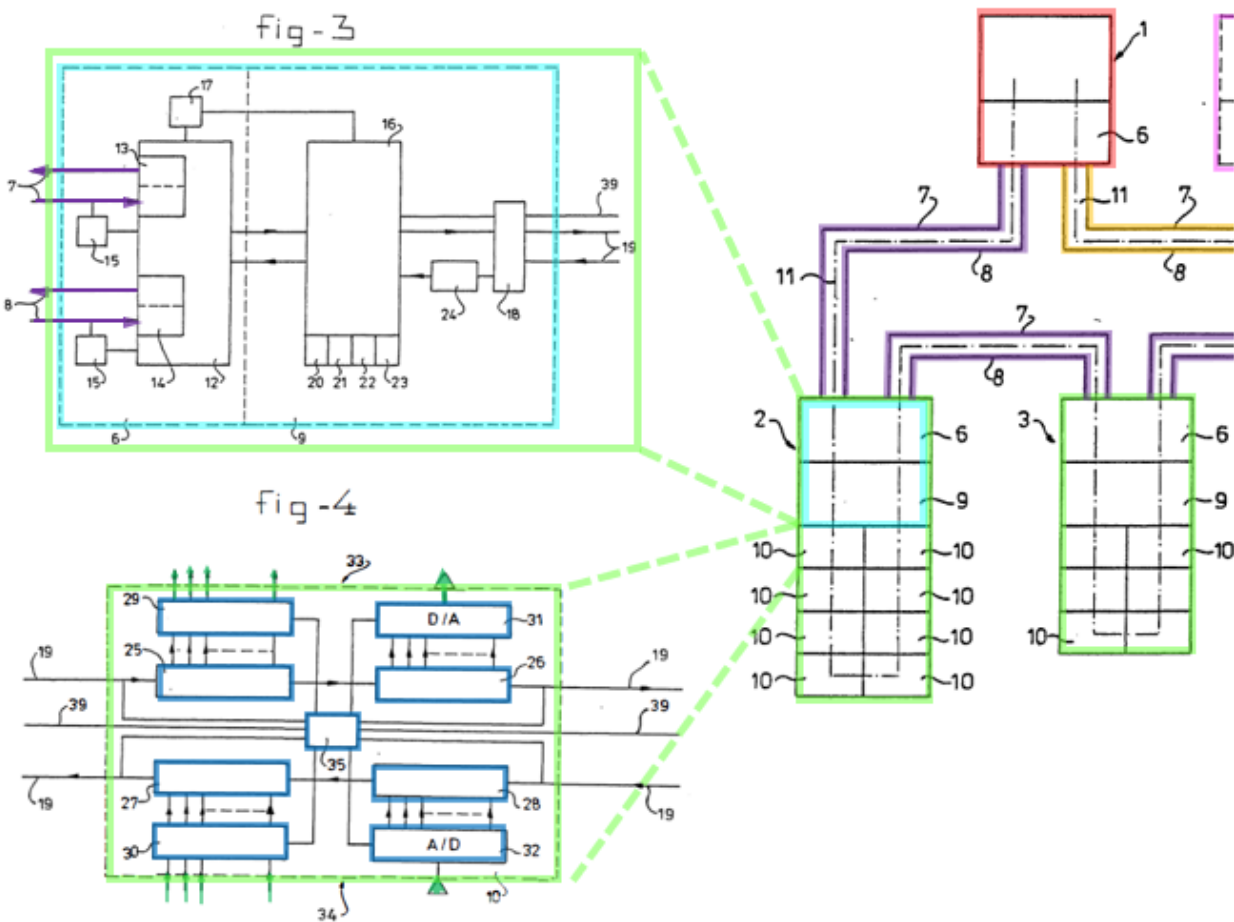
c) [1b/4b/9b/11b] a plurality of **slave units**, each **slave unit** comprising one or more **ports to respective subscriber lines**; and

Vink with Patrick (and AAPA for Ground 2) suggests [1b], [4b], [9b], and [11b]. Vink discloses **slaves 2, 3, 4, and 5**. See Ex-1003, ¶¶105-110.



Ex-1005, Figure 2.

Vink teaches that each of the **slaves 2, 3, 4, and 5** includes a **transmitting/receiving unit 6** and **control module 9**, which in turn is connected to one or more **input/output (I/O) modules 10**. Ex-1005, 15:36-16:1.



Ex-1005, Figures 2-4. Specifically, the I/O modules 10 include **inputs (34)** and **outputs (33)**, such as the parallel set of digital and analog inputs and outputs. See Ex-1005, Abstract (“The I/O modules (10) are provided with control means (35)

for recording data bits at the input side (34) and/or presenting data bits at the output side (33).”), *id.*, 19:19-23. These **inputs and outputs** also include connections to **subscriber lines** because the I/O modules 10 are connected to other devices. *Id.*, 7:9-16 (“The sampling instants of I/O modules or *the devices connected thereto* can be accurately set by means of the control information supplied, as intended.”). Vink further makes clear that data from the **master 1** flows through the communication system to the **output side 33** and that data from the **input side 34** are supplied to the **master 1**. *See* Ex-1005, claim 1 (“supplying control information to the I/O modules (10) to enable the I/O modules (10): to present in a mutually synchronised manner, at their output side (33), the data bits supplied by the at least one master (1), and to record in a mutually synchronised manner, at their input side (34), data bits for supply to the at least one master (1).”). *See* Ex-1003, ¶105.

Both Patrick and AAPA explicitly teach “**subscriber lines**” and “**ports.**” For example, Patrick teaches that the **secondary stations** can be considered “subscriber access units.” Ex-1006, 1:21-27 (“In the CableComm™ system, a hybrid optical fiber and coaxial cable is utilized to provide substantial bandwidth over existing cable lines to secondary stations such as individual, *subscriber access units connected to a personal computer, workstation, other data terminal equipment* (“DTE”), for example, in households having new or preexisting cable

television capability.”), *id.*, 1:34-40 (“With the CableComm™ system, digital data may be transmitted ... in the downstream direction, from the primary station or controller (connected to a network) to the secondary station of an individual user (*subscriber access unit.*”), *id.*, 1:60-64. Indeed, Patrick teaches that the **secondary stations 110a-110n** (i.e., the claimed “slave units”) contain an “interface 170, such as an *ethernet port* or an RS232 interface, *for connection to a computer, workstation, or other data terminal equipment.*” Ex-1006, 4:59-5:1. Hence, Patrick teaches the claimed “**ports**” (e.g., **ethernet port**) and “subscriber access lines” (e.g., **connections to data terminal equipment**) that are connected to the **slave units** (i.e., the **secondary stations** that provide access to subscribers). See Ex-1003, ¶¶106-08.

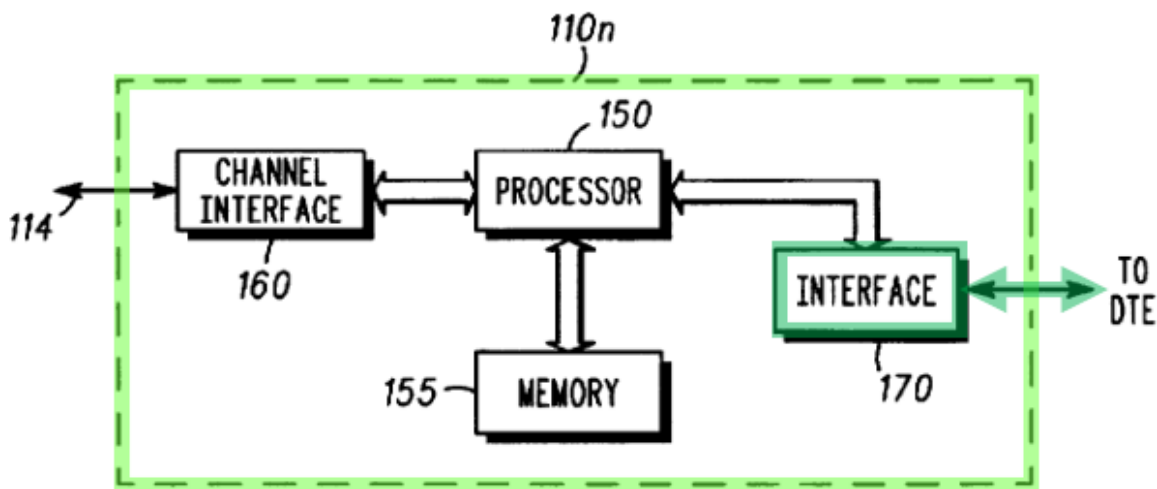


FIG. 3

Ex-1006, Figure 3.

AAPA also teaches [1b], [4b], [9b], and [11b].² For example, AAPA teaches that “[e]ach slave unit typically comprises a switching core 29, coupled to a plurality of ports 28 serving respective subscriber premises via suitable DSL modems.” Ex-1001, 1:45-48. *See* Ex-1003, ¶109.

It would have been obvious to combine the teachings of Vink with Patrick (and AAPA for Ground 2) to include one or more ports to respective subscriber lines. Providing ports to connect one device (e.g., the slave including an I/O module) to other “devices connected [to I/O modules]” (Ex-1005, 7:15) is one of the most fundamental ways to connect two different devices together. For example, ethernet ports were known long before the priority date of the ’904 patent and implementing such ports to the input/output side of Vink’s I/O modules in the slave units would have been a trivial modification a POSITA would have been able to implement with a reasonable expectation of success. And having those “devices connected [to I/O modules]” (Ex-1005, 7:15) be connected to subscriber lines (e.g.,

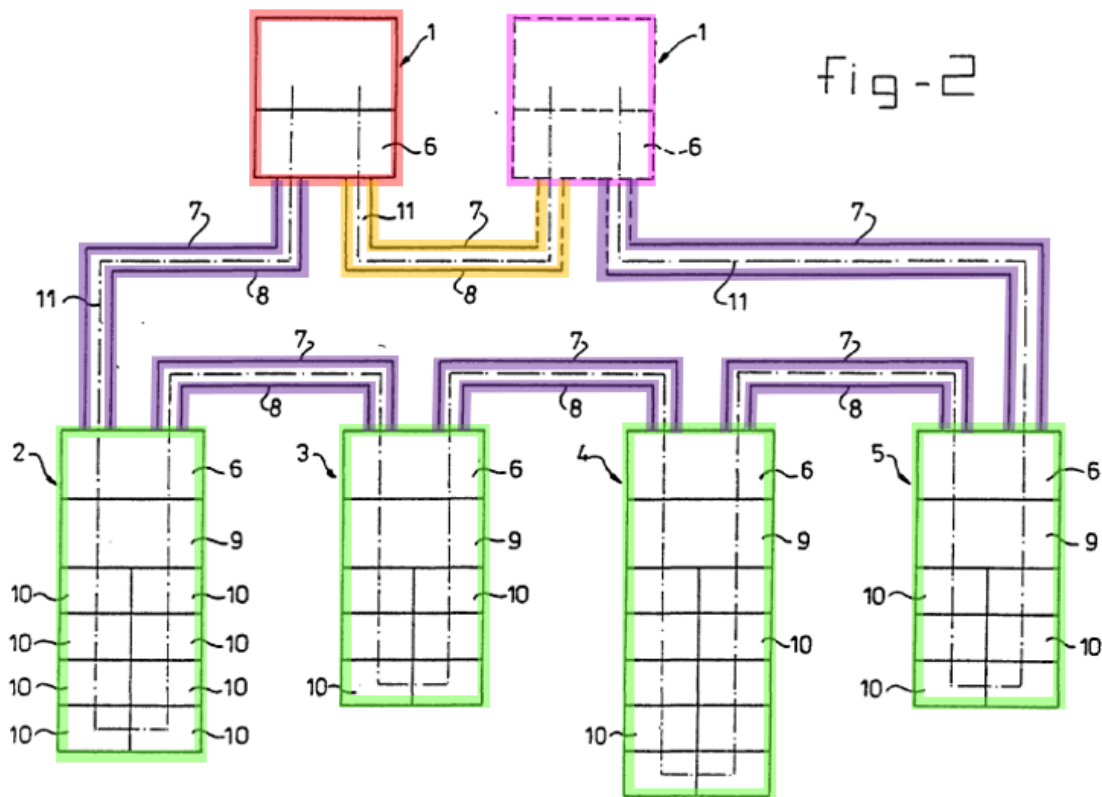
² [1b], [4b], [9b], and [11b] were admittedly well-known. Indeed, Applicant acquiesced to the Examiner’s rejection that AAPA discloses these limitations. *See* Ex. 1002, 159.

devices found at “subscriber premises,” Ex-1002, 159), would have been a trivial modification. *See* Ex-1003, ¶110.

d) [1c/4c/9c/11c] a plurality of **physical interface lines**, which link the **slave units** in one or more daisy chains, in which the **slave units** are mutually connected in series by the **physical interface lines** therebetween, each daisy chain comprising at least a **first slave unit** connected one of the **physical interface lines** to the **first master unit**, [...] and a **last slave unit** connected by another of the **physical interface lines** to the **second master unit**.

Vink discloses [1c], [4c], [9c], and [11c].³ Vink discloses a plurality of **transmission lines 7, 8** made of coaxial cable, optical fiber cable and the like (i.e., claimed “physical interface lines”) which link the **slaves 2, 3, 4, and 5** together. *See* Ex-1005, 15:31-35. *See* Ex-1003, ¶¶112-113.

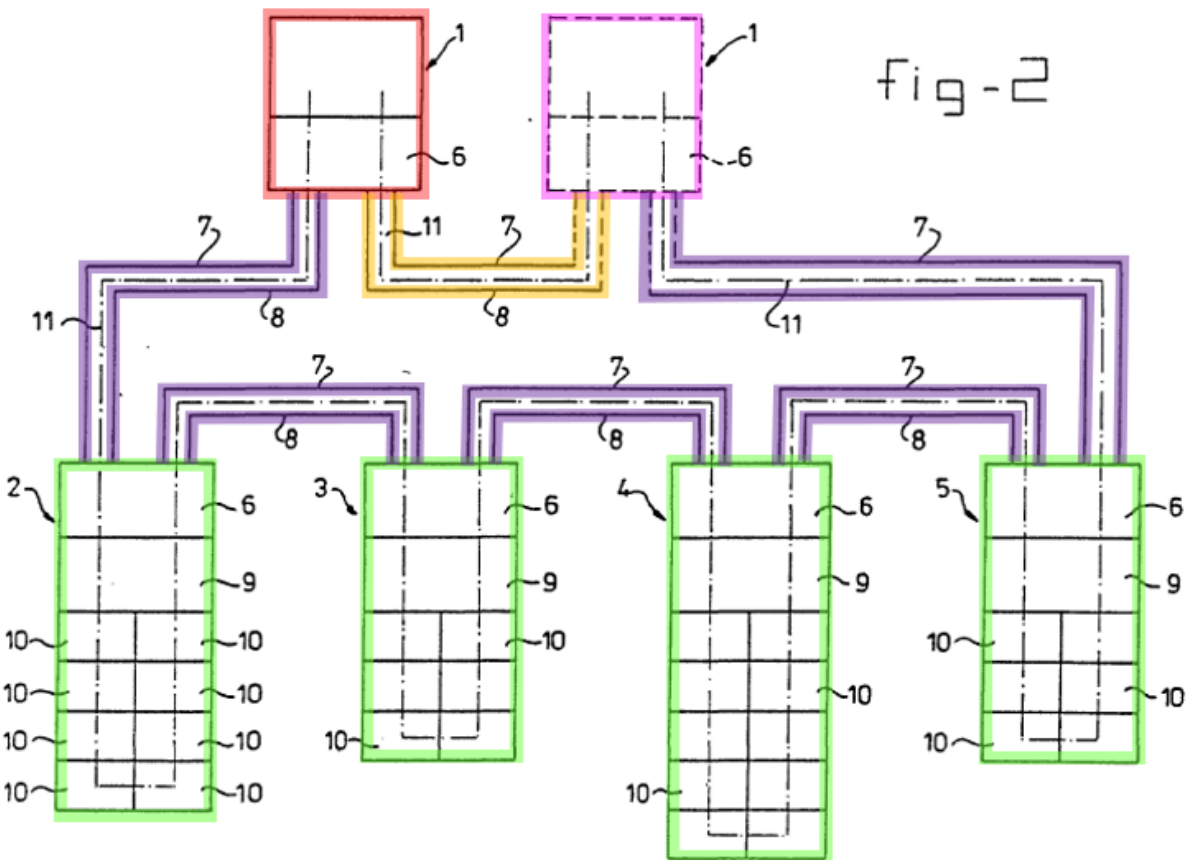
³ [1c], [4c], [9c], and [11c] were admittedly well-known. Indeed, Applicant acquiesced to the Examiner’s rejection AAPA discloses these limitations. Ex. 1002, 159-160.



Ex-1005, Figure 2. As shown, a daisy chain is formed such that the **slaves 2, 3, 4, and 5** are mutually connected in series by the **transmission lines 7, 8** to allow a serial transmission of data. *See id.*, 16:8-10 (“The data bits are serially transferred both in the transmission system 7,8 and to the level of the I/O modules 10.”). Specifically, in the daisy chain shown in Figure 2, the **first master 1** is connected to the **first slave 2** via **transmission lines 7, 8**, and the **second master 1** is connected to the **last slave 5** via another set of **transmission lines 7, 8**. *See* Ex-1003, ¶¶113-115.

e) [1d] a **second slave unit** connected to the **first slave unit** but not to the **first [master unit]** or **second master unit**,

Vink discloses [1d]. As shown below in Figure 2, the **second slave 3** is connected to the **first slave 2**, but not to the **first master** or **second master**.



Ex-1005, Figure 2. See Ex-1003, ¶¶117-119.

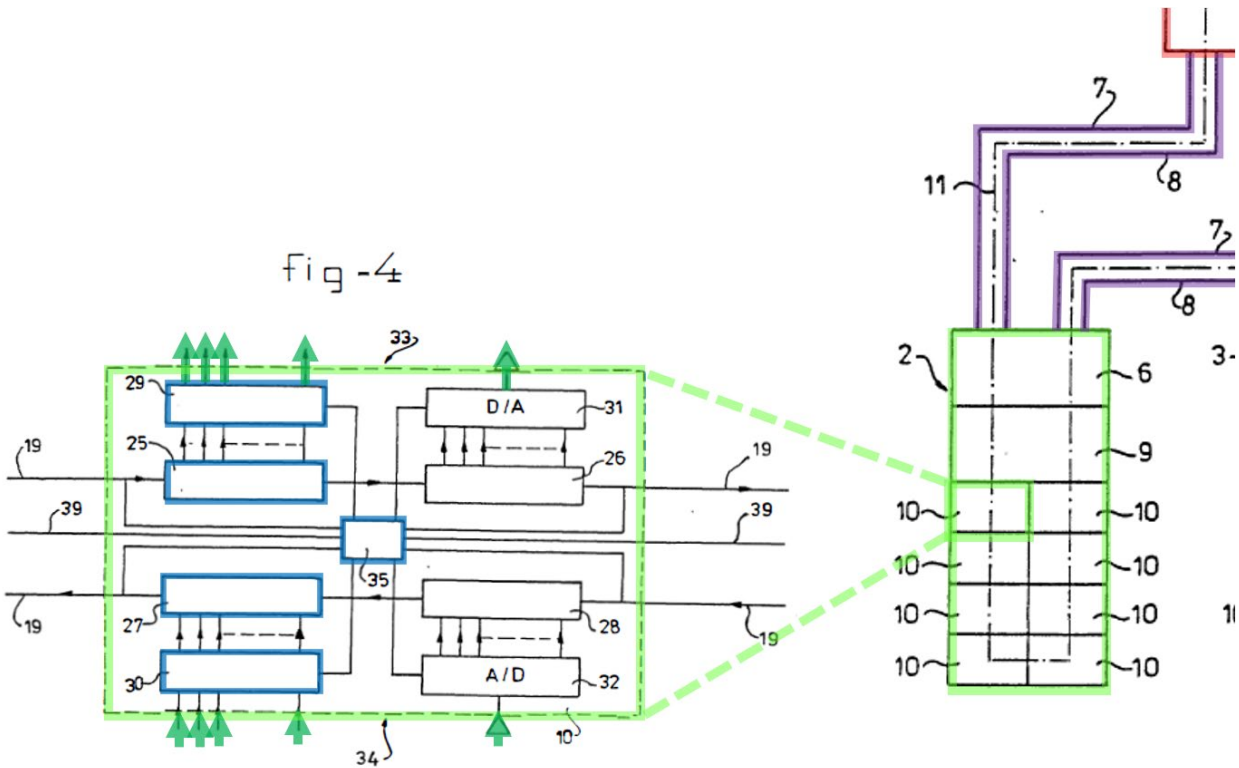
f) [4d] wherein in normal operation, downstream data packets received from the network are passed from the **first master unit** to each of the daisy chains via the **first slave unit** in each chain, and upstream data packets received by the **slaves** in each chain from the **subscriber lines** are passed

via the **first slave unit** in the chain to the **first master unit** for transmission over the network.

Vink with Patrick suggests [4d]. *First*, Patrick teaches the portion of [4d] reciting “wherein in normal operation, downstream data packets received from the network are passed from the **first master unit** ... and upstream data packets received by the **slaves** ... are passed ... to the **first master unit** for transmission over the network.” Patrick teaches that data is normally transmitted in the downstream direction from the network down to the slaves via the master and in the upstream direction from the slave to the network via the master. *See* Ex-1006, 1:34-40 (“With the CableComm™ system, digital data may be transmitted both in the *downstream direction, from the primary station or controller (connected to a network) to the secondary station* of an individual user (subscriber access unit), and in the *upstream direction, from the secondary station to the primary station (and to a network).*”), *id.*, 1:60-64. *See* Ex-1003, ¶¶121-122.

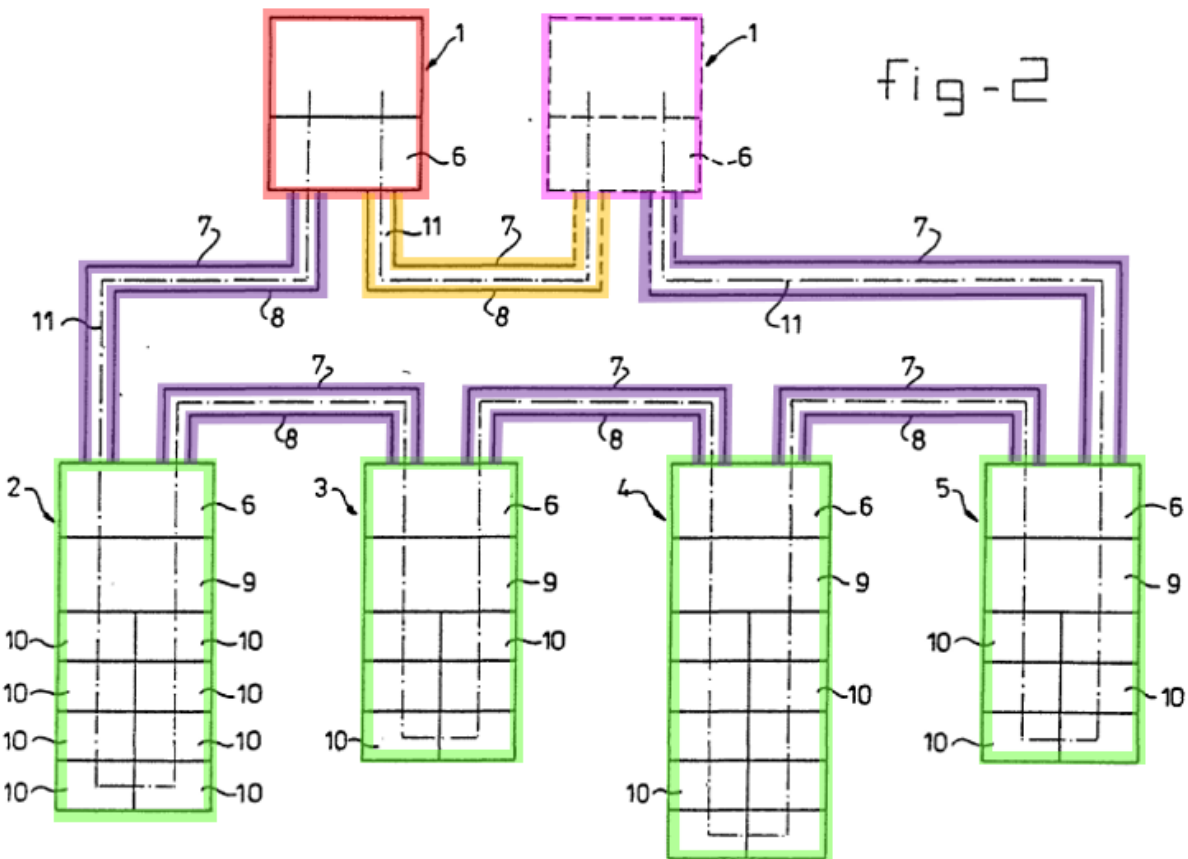
Second, Vink teaches that “data packets ... are passed from the **first master unit** to each of the daisy chains via the **first slave unit** in each chain.” Vink teaches that data from the **master 1** is supplied to the **output side 33** of the I/O modules 10 (i.e., the ports to the subscriber lines) in each of the **slave units**. *See* Ex-1005, claim 1 (“supplying control information to the I/O modules (10) to enable the I/O modules (10): to present in a mutually synchronised manner, at their

output side (33), the data bits supplied by the at least one master (1), ...”). See Ex-1003, ¶121-123.



Hence, a POSITA would have understood that downstream data packets received from the external network (as modified according to the teachings of Patrick) would have been passed from the **first master** into the communication network via the **first slave 2**, shown in Figure 2, to enable a serial bit transfer of the data through the **transmission lines 7, 8** that forms a daisy chain of **slaves 2, 3, 4, and 5**. See Ex-1005, Abstract (“Method and communication system for serially exchanging data... The I/O modules (10) can be connected in groups to the at least

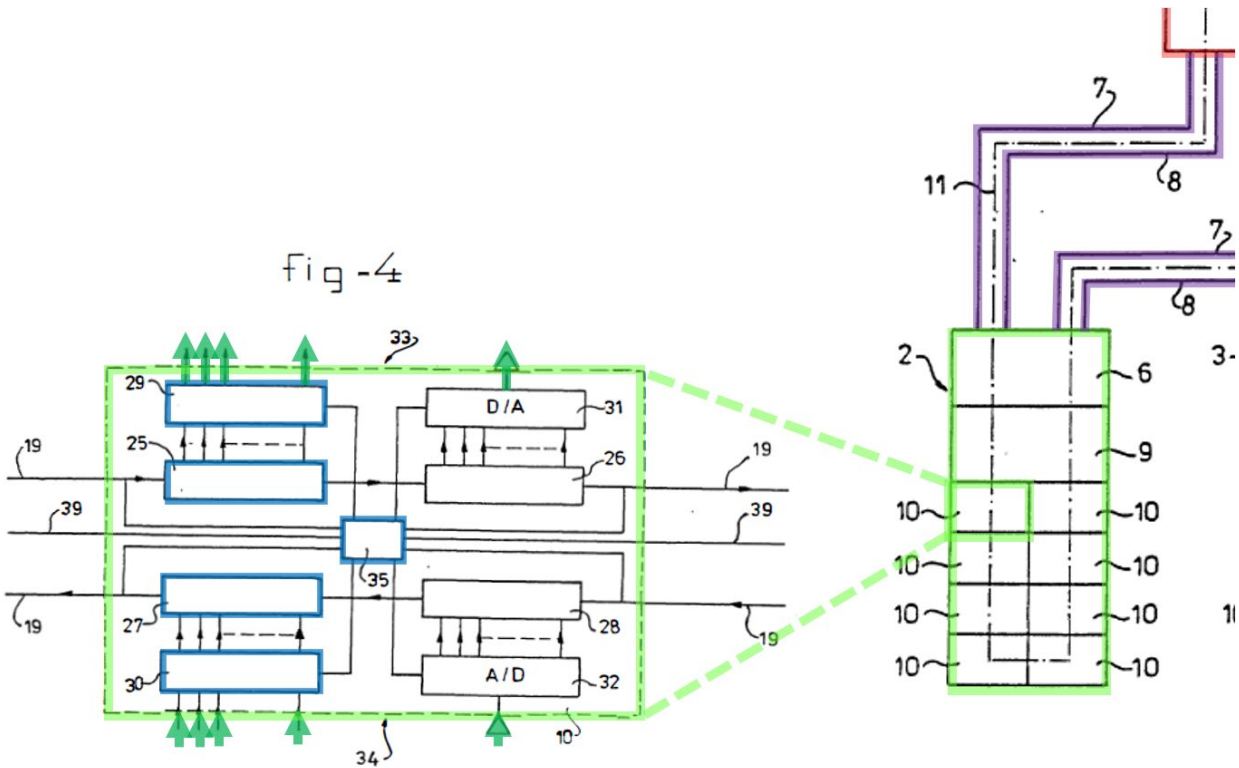
one master (1) via one or more substations (slave) (2, 3, 4, 5) and a transmission system (7, 8) for serial bit transfer.”). See Ex-1003, ¶¶121-123.



Ex-1005, Figure 2.

Third, Vink teaches that “data packets received by the **slaves** in each chain from the **subscriber lines** are passed via the **first slave unit** in the chain to the **first master unit**.” Vink teaches that data from the **input side 34** of the I/O modules 10 (i.e., the ports from the subscriber lines) are supplied to the **master 1**. See Ex-1005, claim 1 (“supplying control information to the I/O modules (10) to enable the I/O modules (10): ... to record in a mutually synchronised manner, at

their input side (34), data bits for supply to the at least one master (1).” See Ex-1003, ¶121.



Ex-1005, Figure 4. A POSITA would have understood that upstream data packets to be sent to the external network (as modified according to the teachings of Patrick) would have been passed from the **first slave unit 2** to the **first master**. Because Vink’s communication system, which can transmit data in any direction, transmits data serially from the **slaves** to the **master**, upstream data packets to be sent to the external network (as modified according to the teachings of Patrick (and AAPA for Ground 2)) would have been passed from the **first slave unit 2** to the **first master**. See Ex-1005, 14:28-31 (discussing that Vink’s communication

system is “designed to transmit or receive packets of data bits via a transmission system ring in one and/or the other direction.”), *id.*, 11:9-11 (“The master station and the substations of said communication system each form a node between which information is bit-serial exchanged.”), *id.*, 16:8-10 (“The data bits are serially transferred both in the transmission system 7, 8 ...”). *See* Ex-1003, ¶¶121-123.

Indeed, a POSITA would have readily recognized that it would have been obvious to send downstream data from Vink’s **active first master** to the **first slave 2** and upstream data from Vink’s **first slave 2** to the **active first master** in Vink’s bit serial transmission scheme. It is merely one of a finite number of ways downstream and upstream data can be transmitted across a communication system that utilizes bit-serial transfer of data. And implementing such downstream and upstream data flow would have been an obvious choice with a reasonable expectation of success. *See* Ex-1003, ¶¶121-123.

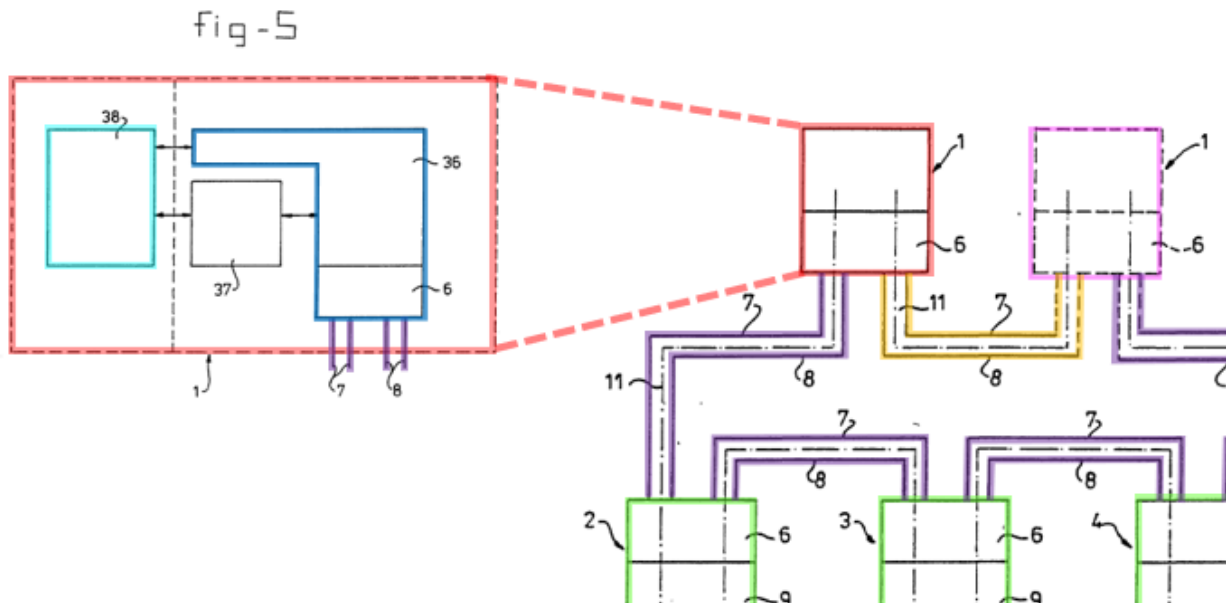
It would have been obvious to combine the teachings of Vink with Patrick to provide downstream and upstream data, in which data flows between an external network and into Vink’s communication system through the **master/primary station** and the **slaves/secondary stations** that are connected in series in a daisy chain. Given the daisy-chain configuration taught by Vink in which data is transmitted serially, it would have been obvious to send downstream data from an

external network to the **active first master** through the **first slave 2** during normal operation. Similarly, given the daisy-chain configuration taught by Vink in which data is serially transmitted, it would have been obvious to send upstream data from one of the slave units into the external network by passing the data through **first slave 2** and into the **master** during normal operation. Sending downstream and upstream data in this manner, in which the master and slaves are connected in serial to transmit data serially, would have been a trivial modification that facilitates transport of data into and out of the network. And a POSITA would have been able to implement such traffic flow of data with a reasonable expectation of success. *See* Ex-1003, ¶¶121-123.

g) [9d] wherein each of the **first and **second master units** comprises:**

Vink discloses [9d]. Figure 5 of Vink shows the additional components contained in each of the **active master** and **passive master**—namely **transmitting/receiving unit 6**, **control unit 36**, memory 37, and **control computer 38**. *See* Ex-1005, 20:30-38 (“The software for controlling the communication system ... is essentially concentrated in the master 1 which comprises, ... as shown in Figure 5, a control unit 36 for controlling the data flow via the transmission system 7, 8, with an associated memory 37 for storing and exchanging information with a control computer 38 which contains the

calculations and background information necessary for the process to be controlled via the I/O module.”). See Ex-1003, ¶125.



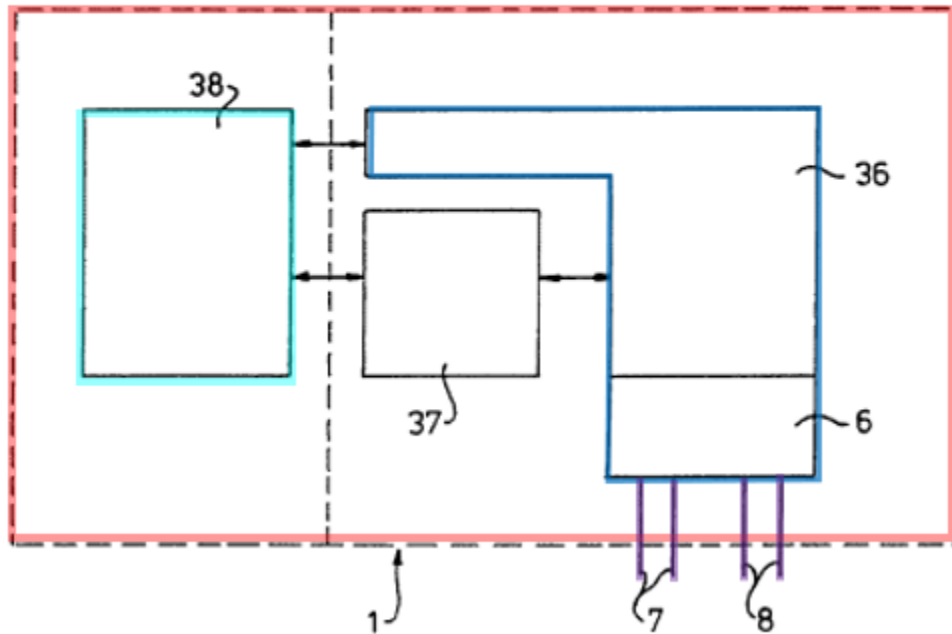
Ex-1005, Figures 2 and 5. Although annotated above to illustrate the components included in only the **active master**, the **passive master** also has the same components. Ex-1005, 16:24-26 (“All the masters are so designed that they can assume the function of the active master, for example in the event of faults.”). See Ex-1003, ¶125.

h) [9e] a switch⁴, configured to route data packets between the respective **physical interface** and the one or more daisy chains; and

Vink discloses [9e]. Vink discloses that the “**masters**... are capable of functioning as a switching centre.” Ex-1005, 14:31-33; *see also id.*, 21:10-14. Specifically, the control unit 36 and transmitting/receiving unit 6, located in each of the **active master** and **passive master**, function as the claimed “switch.” *See* Ex-1003, ¶¶128-130.

⁴ The switch/pre-switch for the **master units** are underlined. The **switch / pre-switch** for the **slave units** are *not* underlined.

fig - 5



Ex-1005, Figure 5.

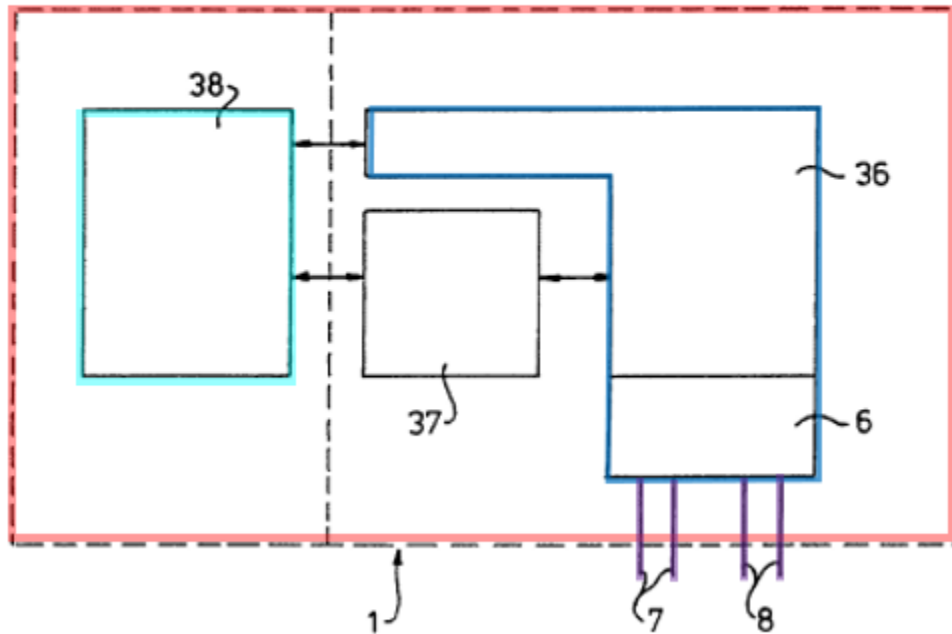
The control unit 36 and transmitting/receiving unit 6 are “configured to route data packets between the respective physical interface and the one or more daisy chains.” For example, Vink explains that the control unit 36 “extract[s]” information about the particular slave located along the daisy chain the data packets should be sent to and controls the data flow via the transmission lines 7, 8. See Ex-1005, 21:3-9 (“[T]he control computer 38 provides for and monitors the correct sequence of the data bits for a relevant slave... . The information about this sequence is extracted by the control unit 36 from the status information

received from the relevant slaves.”); *id.*, 20:33-34 (“[A] control unit 36 for controlling the data flow via the transmission system 7, 8,”). Moreover, the “transmitting/receiving unit 6 provides for the monitoring of the transmission” and “the transmitting/receiving unit 6 also provides for the switching of the **transmission ring** or of the communication direction of the data flow.” Ex-1005, 21:3-14. *See* Ex-1003, ¶¶128-130.

- i) [9f] a pre-switch, which in the event of a fault at a location in one of the daisy chains, re-routes at least a portion of the data packets exchanged with one or more of the **slaves** in the daisy chain in which the fault has occurred through another one of the daisy chains.

Vink with Patrick suggests [9f]. Vink discloses a control computer 38, which functions as a pre-switch, in each of the **active master** and **passive master**. *See* Ex-1003, ¶¶131-141.

fig - 5



Ex-1005, Figure 5.

Vink teaches that the [control computer 38](#) “re-routes at least a portion of the data packets exchanged with one or more of the slaves in the daisy chain in which the fault has occurred through another one of the daisy chains.”

Specifically, Vink explains that “the [control computer 38](#) provides for and monitors the correct sequence of the data bits for a relevant slave, related to the sequence in which the I/O modules are arranged.” Ex-1005, 21:4-7. In other words, the [control computer 38](#) determines the routing of data packets to the

correct slave unit based on where the I/O modules are located in the daisy chain.

See Ex-1003, ¶133.

Vink also discloses that data packets are re-routed in the event of a fault at a location in one of the daisy chains (e.g., switch direction of data flow). *See* Ex-1005, 14:28-34 (“A very flexible system is obtained ... in that the at least one master and slaves are designed to transmit or receive packets of data bits via a transmission system ring in one and/or the other direction. Master and/or slaves constructed in this way are capable of functioning as a switching centre so that, for example, the master is able to reach as many connected slaves as possible in a fault situation.”); *id.*, 9:4-7 (“It is furthermore possible, in the event of malfunctions in the transmission system, for example during the switching of transmission or communication directions, nevertheless to exchange the correct data bits with the correct slave.”); *id.*, 21:10-16. *See* Ex-1003, ¶¶138-140.

Vink further teaches that the communication system can have more transmission lines and slaves than those explicitly shown in Figure 2. *See* Ex-1005, 16:14-17 (“Although a double-ring transmission system is shown, it will be clear that it is possible to work with either a single-ring transmission system or with a transmission system containing more than two rings. Of course, more or fewer slaves can be used.”). Although Vink does not explicitly teach two separate daisy chains of slave units, adding a second daisy chain of slave units to that

shown in Figure 2 of Vink would have been a trivial modification. For example, Patrick discloses secondary stations 110a through 110n that are “connected to the primary station 101 on two segments or branches of a communication medium, such as communication media 115 and 116.” Ex-1006, 3:24-27. Patrick further teaches that the secondary stations 110a through 110n “may be connected to more than one primary station.” Ex-1006, 3:27-29. *See* Ex-1003, ¶¶134-137.

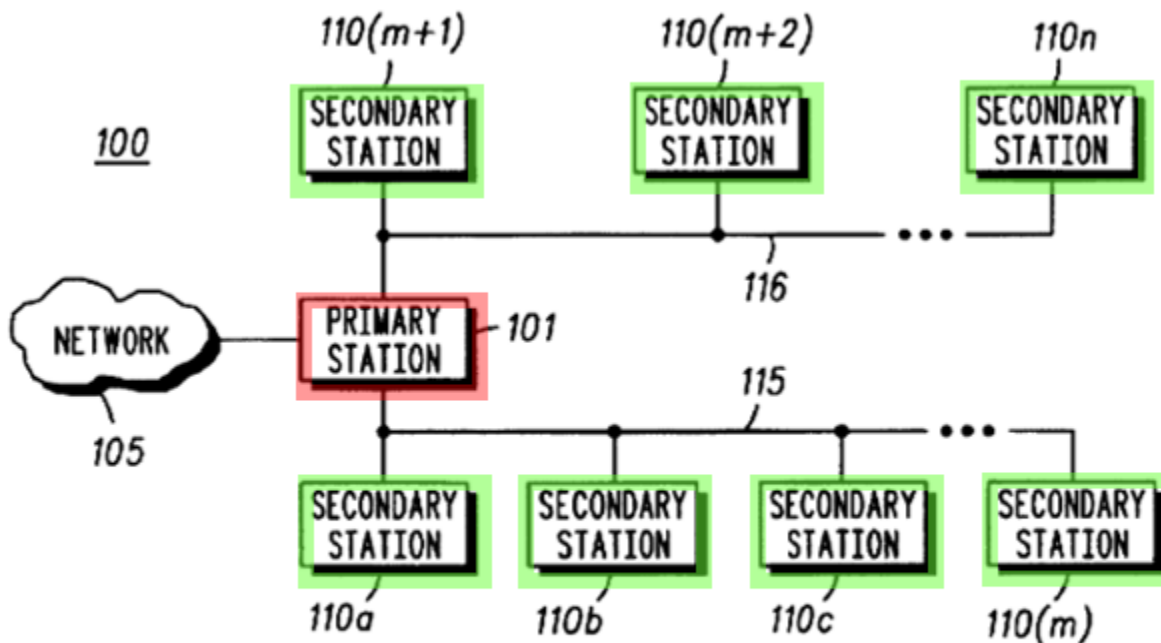
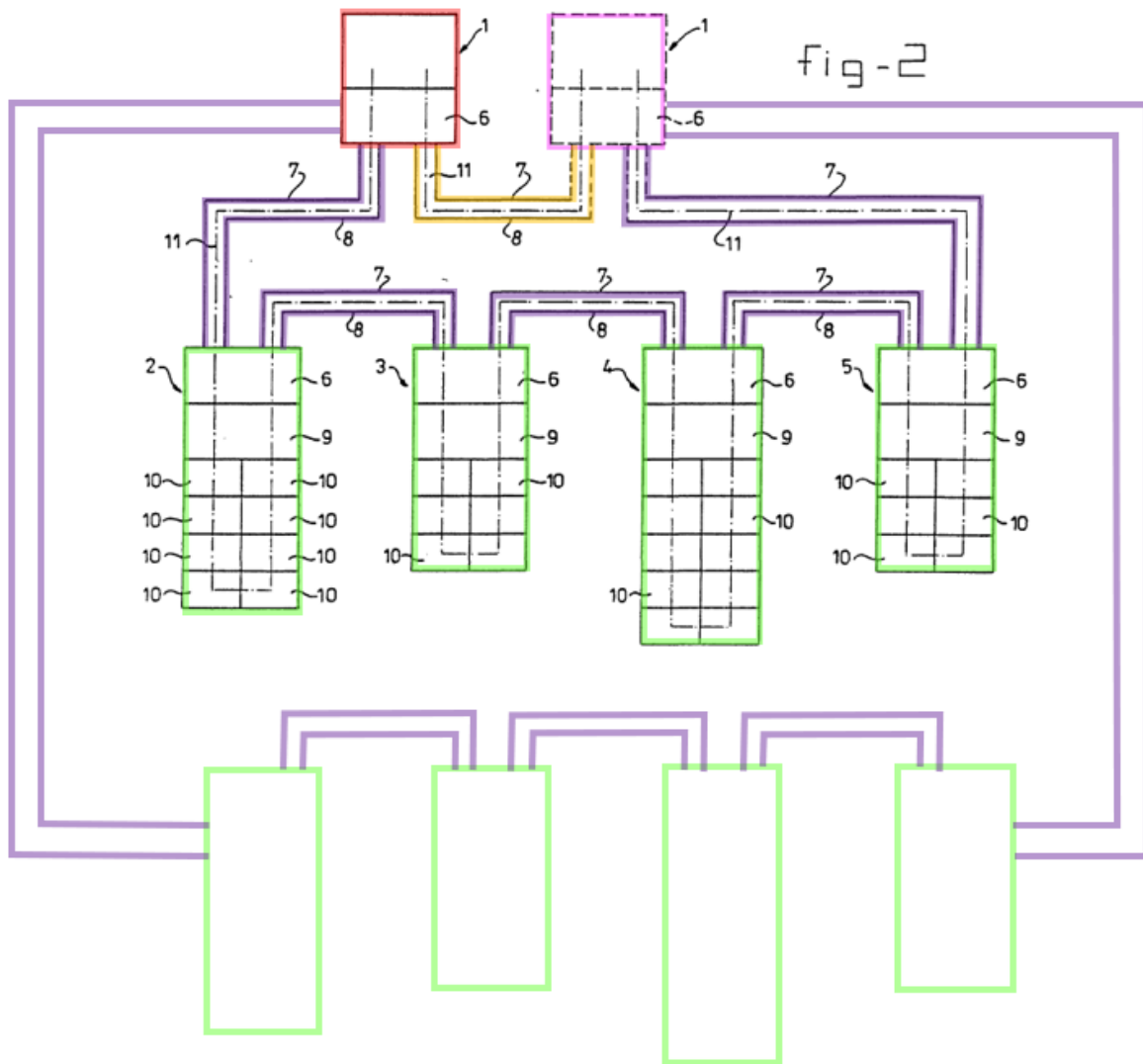


FIG. 1

Ex-1006, Figure 1. Specifically, it would have been obvious to modify Vink to connect additional slaves on additional daisy chains, as schematically illustrated

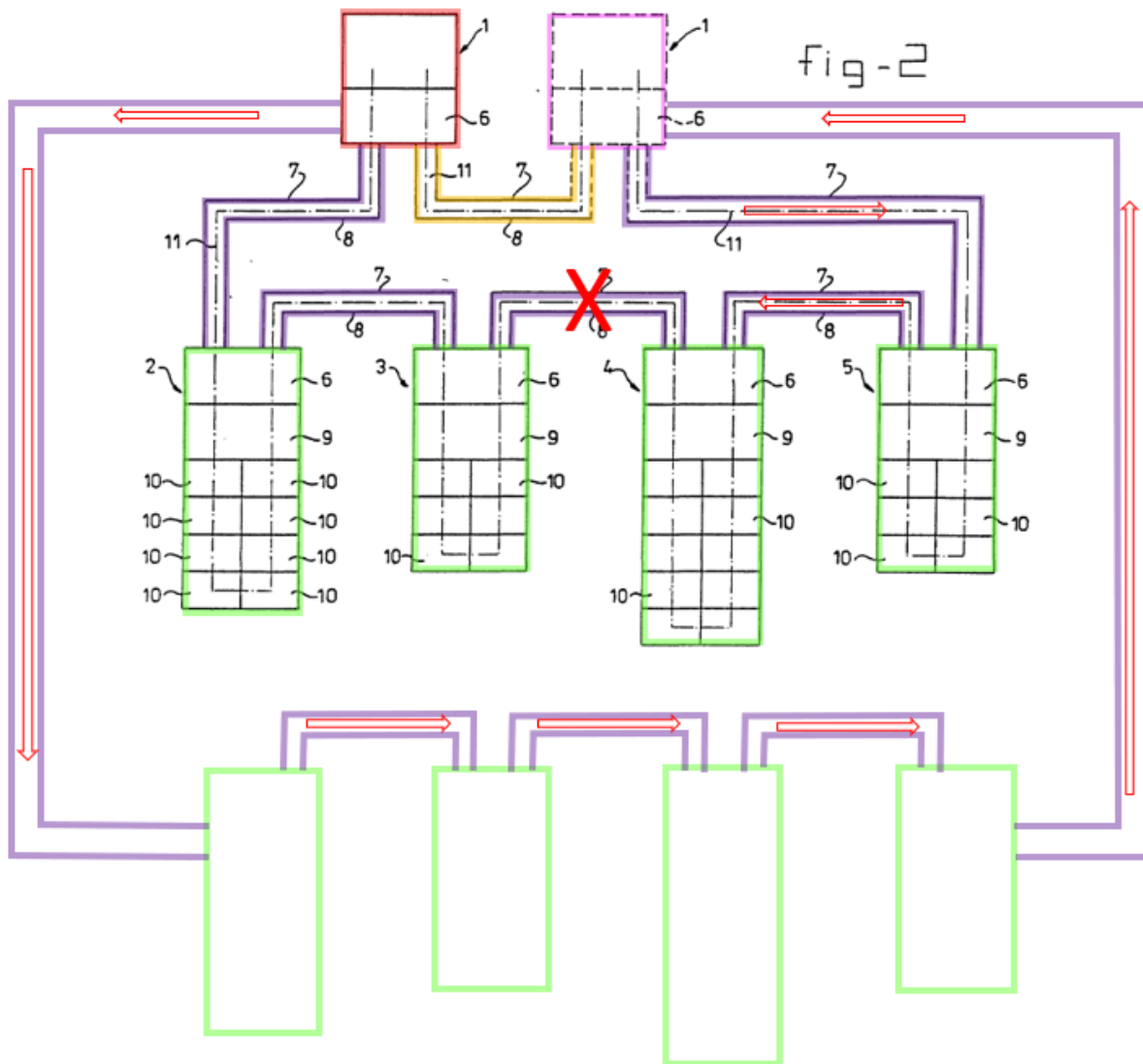
below, in which a second daisy chain of slaves was added to the communication system. For example, POSITA would have been motivated to re-arrange the slaves to decrease the maximum transport delay to slaves located furthest away from the active master. Taking the four slave units shown in Figure 2 as an example, if four more slave units were added to the existing daisy chain, the maximum transport delay for a data packet sent from the active master to the last slave on the daisy chain would be eight hops (i.e., the number of distinct physical interface links the data packet has to traverse). However, if the eight slaves were arranged in two daisy chains, as illustrated in modified Figure 2 below showing four slaves per daisy chain, the maximum transport delay for a data packet sent from the active master to the last slave on each of the daisy chains would be four hops. A POSITA therefore would have understood that such rearrangement of the slaves into multiple daisy chains optimizes and balances the considerations between reducing data packet transport delay and further reduce the possibility of a node failure affecting the chain while simultaneously realizing the benefits associated with the serially connected daisy chain of slaves. *See* Ex-1003, ¶¶134-140.



Ex-1005, Figure 2 (modified). The modification amounts to nothing more than providing additional slaves on one additional “segment[] or branch[] of a communication medium,” (Ex-1006, 3:26), to allow connections to additional slaves. A POSITA would have been able to readily modify/program the [control computer 38](#) so that “the correct sequence of the data bits for a relevant slave, related to the sequence in which the I/O modules are arranged,” Ex-1005, 21:4-7,

can be sent on either of the transmission lines of the two different daisy chains, such that a data packet can reach the intended slave in the appropriate daisy chain. And because the direction of data flow can be switched in transmission lines 7, 8 as desired, (*see* Ex-1005, 26:4-8 (“Communication system... wherein the at least one master (1) and the slaves (2, 3, 4, 5) are arranged to transmit or receive data bits via a transmission ring (7,8) in one and/or the other direction.”)), a POSITA would have been able to program the [control computer 38](#) to route data to the intended slave across a different daisy chain. This is schematically illustrated below in which “X” denotes a potential fault across the first daisy chain, and the red arrows indicate the direction of downstream data flow, in which the downstream data is routed to slave 4. Indeed, transmission of data across the other daisy chain is merely one out of two possible re-routing of data packets that is possible,⁵ and it would at least have been obvious to try to transmit data in either one of the two possible re-routing paths. *See* Ex-1003, ¶¶134-141.

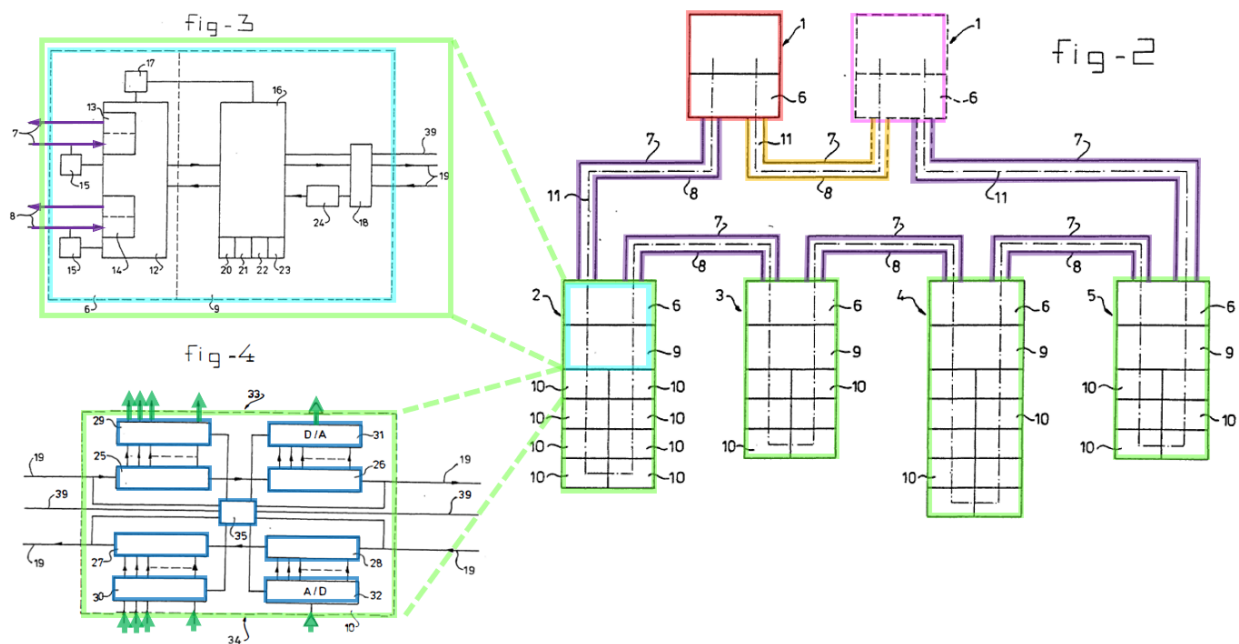
⁵ The other possible re-routing involves sending the downstream data from **active master** to **passive master** across **transmission lines 7, 8**. *See* Section VI.B.2.b [5a].



Ex-1005, Figure 2 (modified). And a POSITA would have been able to make such a modification with a reasonable expectation of success because Patrick teaches that “utilizing more or fewer branches, segments or sections of any communication medium,” (Ex-1006, 3:30-32), were well within the skill of a POSITA. *See* Ex-1003, ¶135.

j) [11d] wherein each of the **slave units** comprises:

Vink discloses [11d]. Figures 3 and 4 of Vink show the additional components contained in one of the **slave units**—namely **transmitting/receiving unit 6**, **control module 9**, and **I/O module 10**. See Ex-1005, 17:3-4, 15:11-12. See Ex-1003, ¶¶142-143.

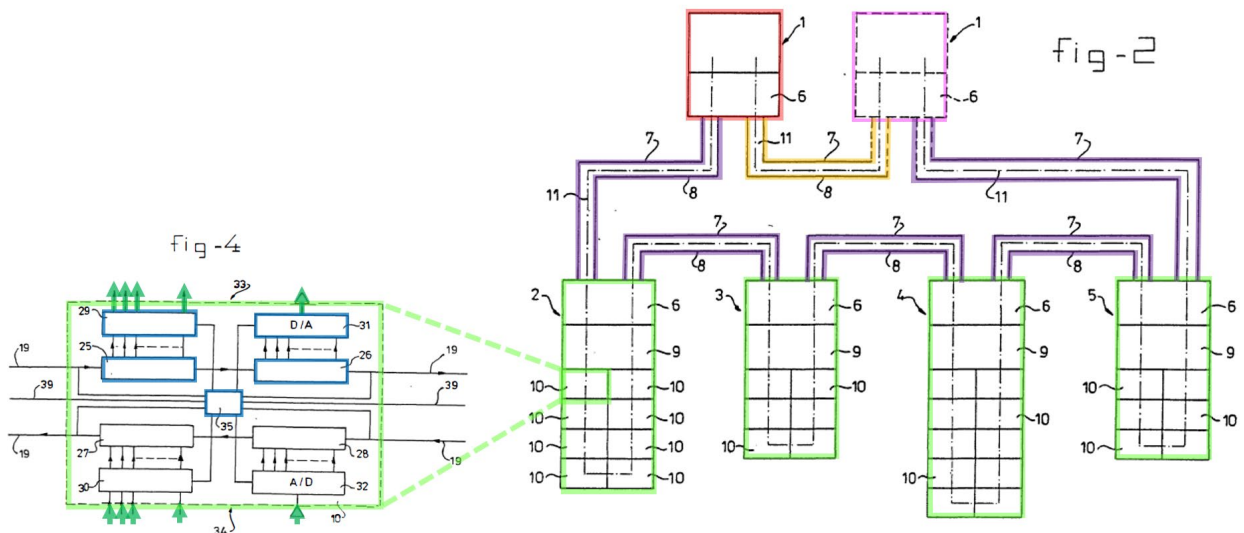


Ex-1005, Figure 2-4.

k) [11e] a switch fabric comprising one or more **switches**, which convey data packets to respective **ports** on the **switch** to which the packets are addressed; and

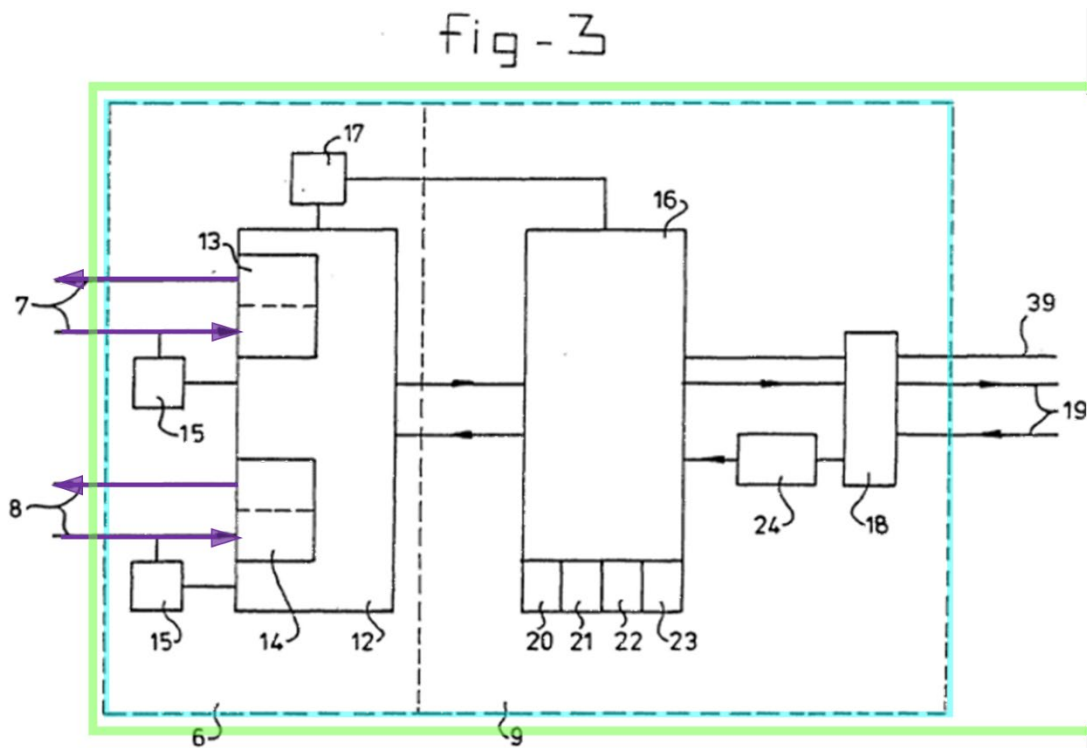
Vink discloses [11e]. Vink discloses that the “**slaves** ... are capable of functioning as a **switching centre**...” Ex-1005, 14:31-33; see also *id.*, 21:10-14. Specifically, **shift registers 25/26**, **buffers 29/30**, and **control means 35** located in

the I/O module 10 of each **slave** together function as the claimed “**switch**” that “convey data packets to respective ports on the switch to which the packets are addressed.” See Ex-1003, ¶¶145-146.



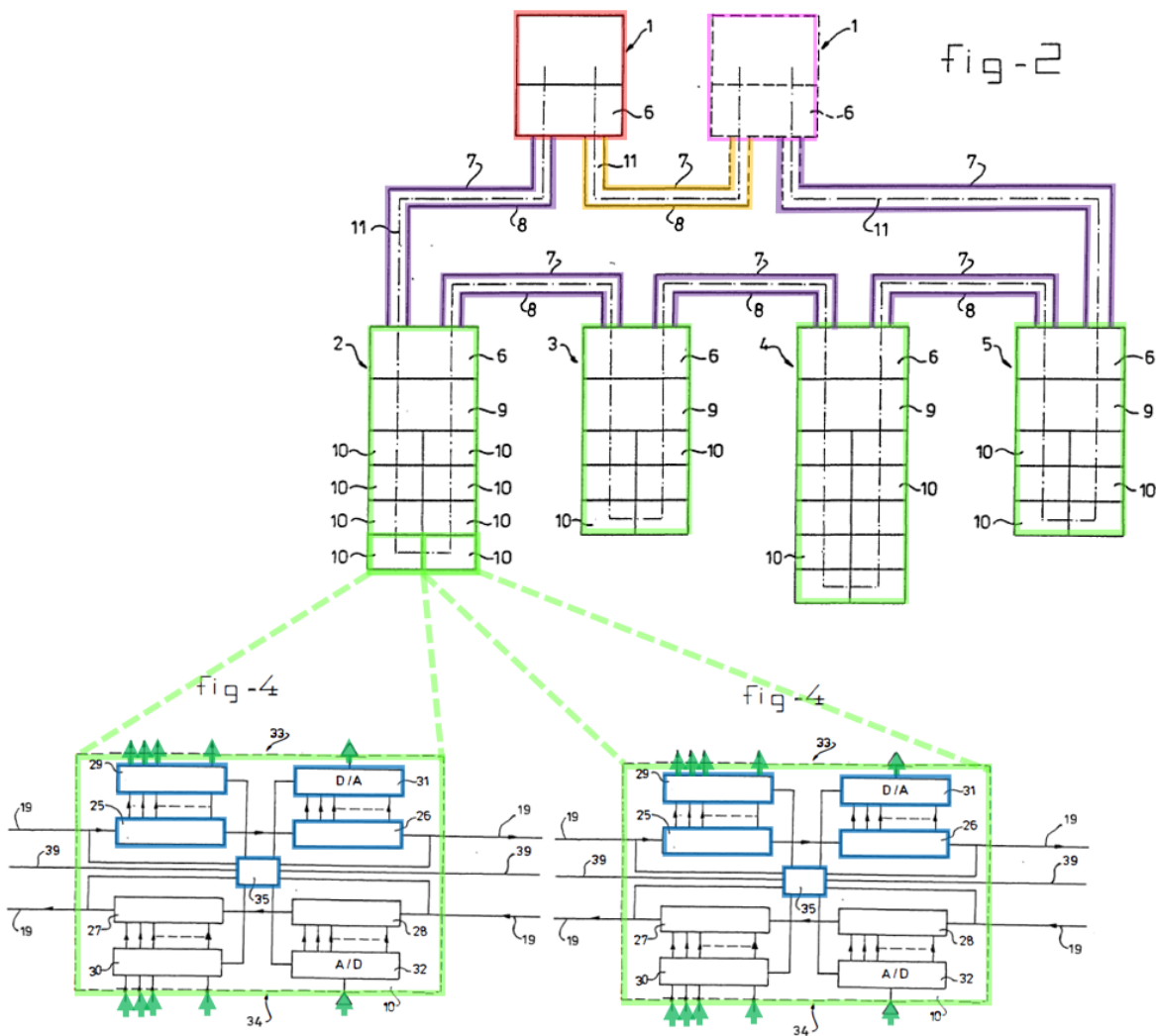
Ex-1005, Figures 2, 4.

To illustrate how these particular components in each I/O module serves as the claimed switches, data flow across the entire slave is illustrated first. As illustrated above, each **slave** (2, 3, 4, 5) includes a **transmitting/receiving unit 6**, **a control module 9**, and one or more **I/O modules 10** (one of which is illustrated to identify the components making up the claimed “**switch**”). As shown below, data packets from **transmission line 7, 8** enter each **slave units** (2, 3, 4, 5) through the **transmitting/receiving unit 6**, which in turn conveys data packet to **control module 9**. See Ex-1003, ¶147.



Ex-1005, Figure 3; *see also* Ex-1005, 17:5-8 (“The transmitting/receiving unit 6 comprises a multiplexer 12 consisting of two modems 13, 14 which are respectively connected to the first transmission ring 7 and to the second transmission ring 8.”); *id.*, 17:13-15 (“After demodulation by one of the modems 13, 14, the data received are fed to the control module 9 connected to the multiplexer 12 which ... is arranged to exchange information with the master...”); *id.*, Figure 3. The **control module 9** then conveys data to each of the **I/O modules 10** via local data bus 19. Ex-1005, 15:36-16:1 (“Each slave 2, 3, 4, 5 comprises a control module 9 which is connected to the associated transmitting/receiving unit 6 and to which one or more input (I) and/or output (O) module(s) are connected.”);

id., 17:32-34 (“The respective I/O modules 10 are connected in cascade to a said local data bus 19 (not shown in Figure 3).”). Such a cascade is shown below across two I/O modules in which data is conveyed onto the next **I/O module** via local bus 19. In addition, the **I/O modules** are controlled by control line 39. Ex-1005, 17:34-35 (“A control line 39 is provided for controlling the I/O modules 10.”). See Ex-1003, ¶¶147-149.



Ex-1005, Figures 2 and 4.

Vink teaches that when data is intended for a particular I/O module 10, the data on local data bus 19 is conveyed to the **output 33** of the I/O module 10. Specifically, within each I/O module 10, **shift registers 25/26** and **buffers 29/30** provide data from the local data bus 19 to the **output 33** of the I/O module 10, under the direction of **control means 35**, e.g., through a control signal line 19 to **buffers 29/30**. Ex-1005, 19:4-8 (“When the data bits intended for the relevant I/O module are all, for example, received in the shift register, the relevant information can be read out, if necessary in parallel, by means of a control signal without disrupting the bit transfer.”) ; *id.*, 19:14-18 (“The shift registers 25 and 26 are located in cascade at the output side 33 ... Data bits are transmitted from and to the relevant I/O module via the connections, provided with an arrow, to the local data bus 19.”). *See* Ex-1003, ¶¶150-152.

Specifically, the signal on control line 39 controls the I/O modules 10 to present data at their **output side 33**. Ex-1005, 17:35-37 (“Control information received is transmitted via said control line 39 to the I/O modules 10 to present them at their output side and/or record data bits at their input side.”); *id.*, 19:28-32 (“Connected to the buffers 29, 30 and the converters 31, 32 are control signal lines which are activated from the control module 9 via the control line 39 and the control means 35, respectively, for the presentation of data bits at the output side 33...”); *see also, id.*, 8:25-34. Accordingly, **shift registers 25/26**, **buffers 29/30**,

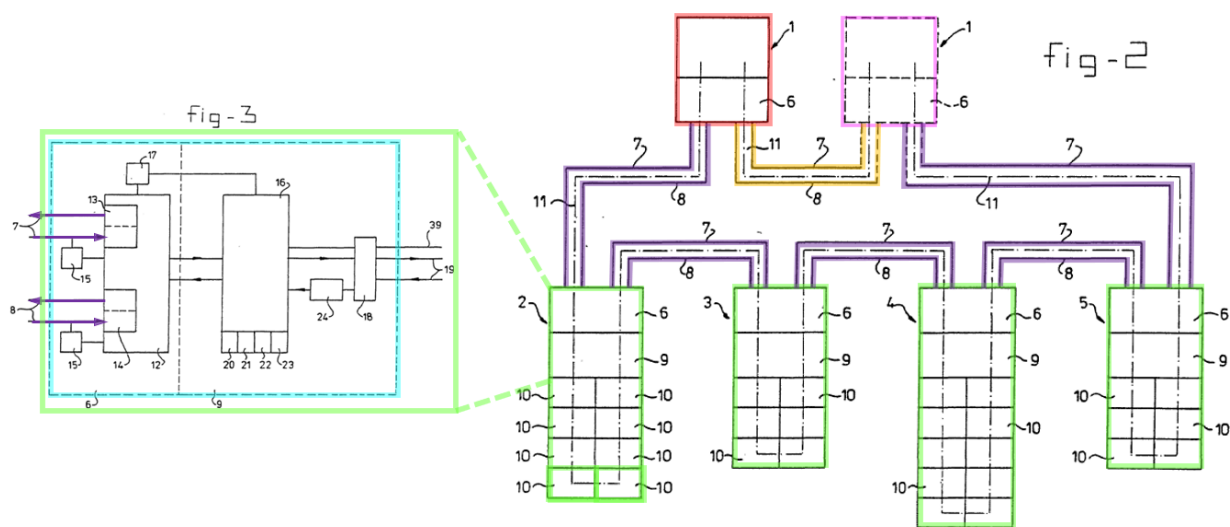
and **control means 35** convey the data packets to the ports on the particular I/O module to which the packets are addressed. Accordingly, Vink discloses the claimed “switch” by the combination of **shift registers 25/26**, **buffers 29/30**, and **control means 35**. See Ex-1003, ¶¶150-152.

Moreover, because each I/O module includes its own **shift registers 25/26**, **buffers 29/30**, and **control means 35**, these collection of switches in each I/O module meets the claimed “switch fabric.” See Ex-1003, ¶152.

I) [11f] a **pre-switch**, which receives the data packets from one of the **physical interface lines** connected to the **slave unit** and passes those of the data packets that are addressed to any of the **ports** on the **slave unit** to the switch fabric, while passing packets not addressed to any of the **ports** on the **slave unit** for output through another of the **physical interface lines**.

Vink discloses [11f]. Vink discloses a **transmitting/receiving unit 6** and **control module 9** (claimed “**pre-switch**”) which receives data packets that are addressed to the I/O modules 10 in the **slave unit** from one of the **transmission lines 7, 8** (claimed “**physical interface lines**”). See Ex-1005, 15:36-16:10 (“Each slave 2, 3, 4, 5 comprises a control module 9 which is connected to the associated transmitting/receiving unit 6 and to which one or more input (I) and/or output (O) module(s) are connected. ... A dash-dot line 11 diagrammatically shows the data flow in the communication system. The data bits are serially transferred both in the transmission system 7, 8 and to the level of the I/O modules 10.”), 25:1-7 (“the

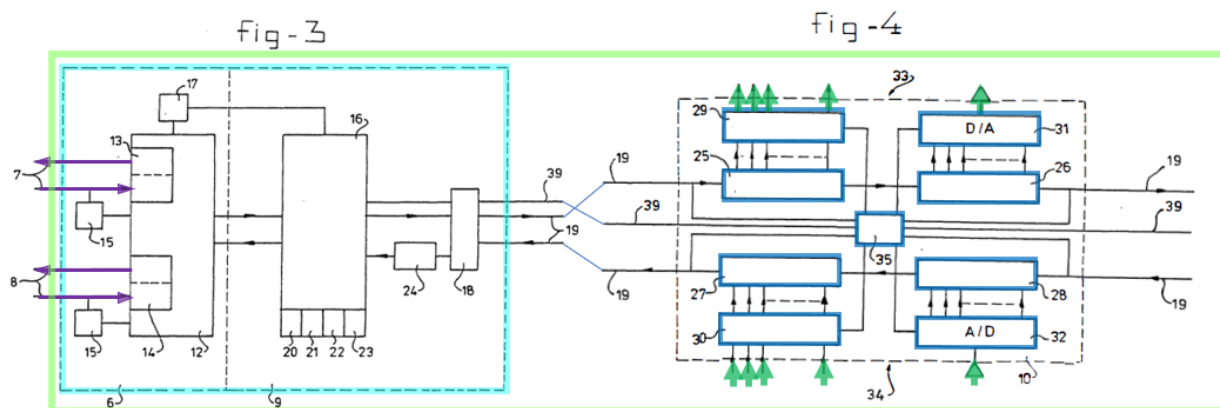
I/O modules (1) being provided with control means (35) and the control module (9) being provided with means (16), coupled to the control means (35), for controlling in a synchronised manner, in response to control information received from the at least one master (1), the inputting and/or outputting of data bits by the connected I/O modules (10).”). See Ex-1003, ¶155.



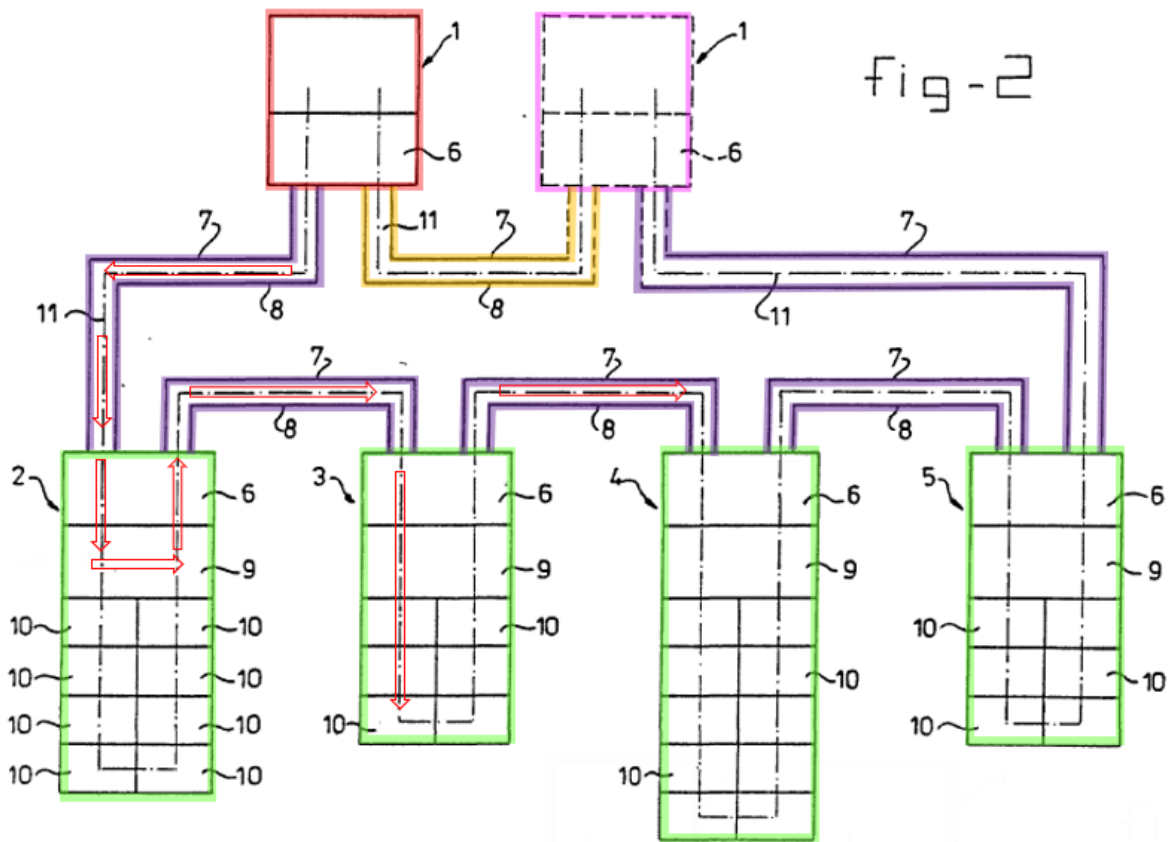
Ex-1005, Figures 2 and 3.

After receiving the data packets, the **transmitting/receiving unit 6** and **control module 9** of a particular **slave** retain only data packets addressed to the **ports (e.g., output 33)** of any I/O module 10 of the particular **slave**, while passing data packets addressed to other **slaves** onto the other **slaves** through the next **transmission lines 7, 8**. See Ex-1005, 8:25-34 (“Yet a further embodiment of the method according to the invention, with which **only the data bits intended for,** and originating from[,] the I/O modules connected to a **local data bus** are

transferred on said data bus, comprises the steps of: adding address information, under the control of the at least one master (1), to the data bits intended for the I/O modules (10) connected to a respective slave (2, 3, 4, 5), and detecting the address information by the slaves (2, 3, 4, 5) **and only exchanging with the connected I/O modules (10) the data bits intended therefor.**"); *id.*, 19:28-32 ("Connected to the buffers 29, 30 and the convertors 31, 32 are control signal lines which are activated from the control module 9 via the control line 39 and the control means 35, respectively, for the presentation of data bits at the output side 33 and the recording of data bits at the input side 34."); *id.*, 25:20-24 ("Communication system ... wherein the control module (9) is provided with selection means (20-22) for only transmitting data bits intended for, or originating from the I/O modules (10) connected to said control module (9) via the local data bus (19)."). See Ex-1003, ¶¶157-158.



Ex-1005, Figures 3 and 4. In other words, Vink discloses that only the data bits intended for a particular I/O module in one **slave** (e.g., **slave 2**) are transferred on local data bus 19/39 to be directed to, for example, **output 33** of that particular I/O module 10 through the **shift registers 25/26**, **buffers 29/30**, and **control means 35**, whereas the data bits intended for other **slaves** (e.g., **slave 3**) are passed on to the **transmission lines 7, 8** between **slaves 2** and **3**. The figure below illustrates how data (in red arrows) intended for one of the **I/O modules 10** in **slave 3** passes through **slave 2** through the **transmitting/receiving unit 6** and **control module 9** of **slave 2**, without passing through the **I/O modules 10** of **slave 2**. See Ex-1003, ¶156.



Ex-1005, Figure 2.

2. Dependent Claim 5

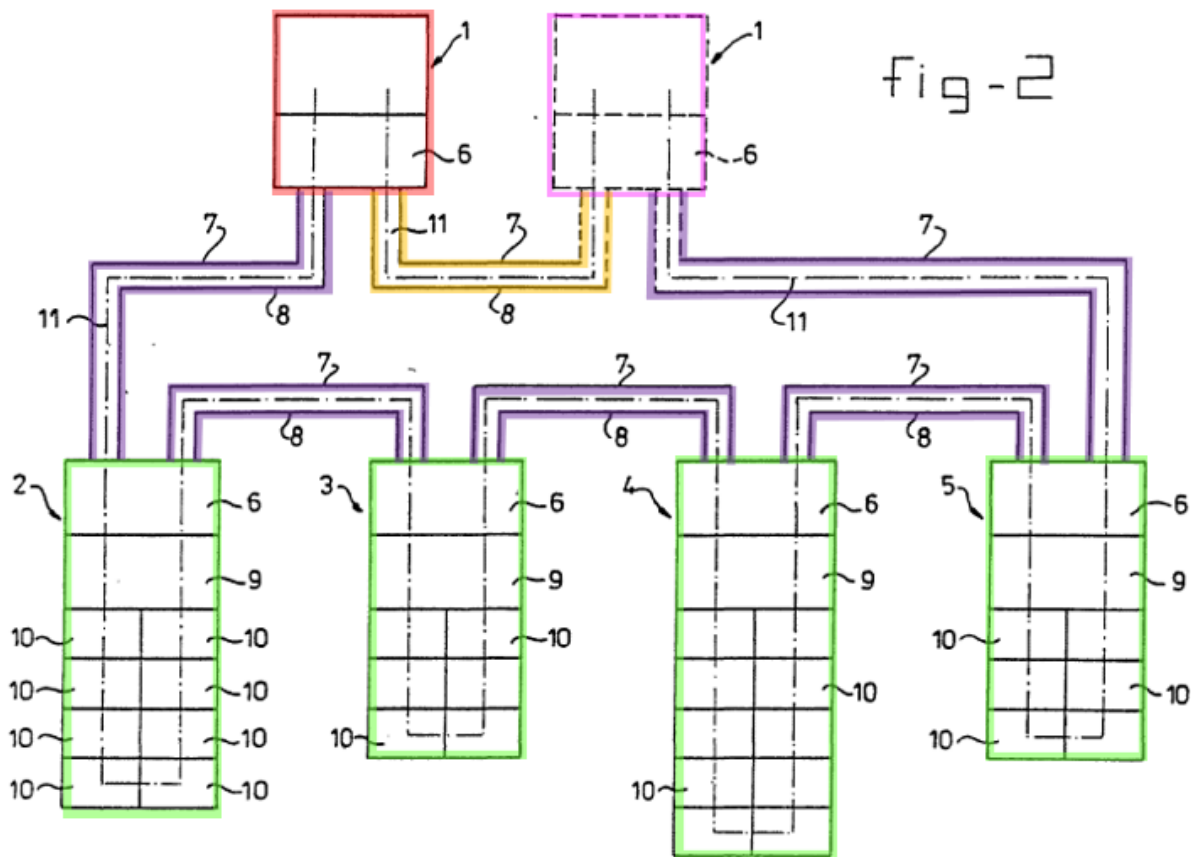
a) [5pre] Apparatus according to claim 4, and

Vink with Patrick (and AAPA for Ground 2) renders obvious claim 4. See Section VI.B.1.

b) [5a] comprising a **protection interface**, which couples the **second master unit** to the **first master unit**, and over

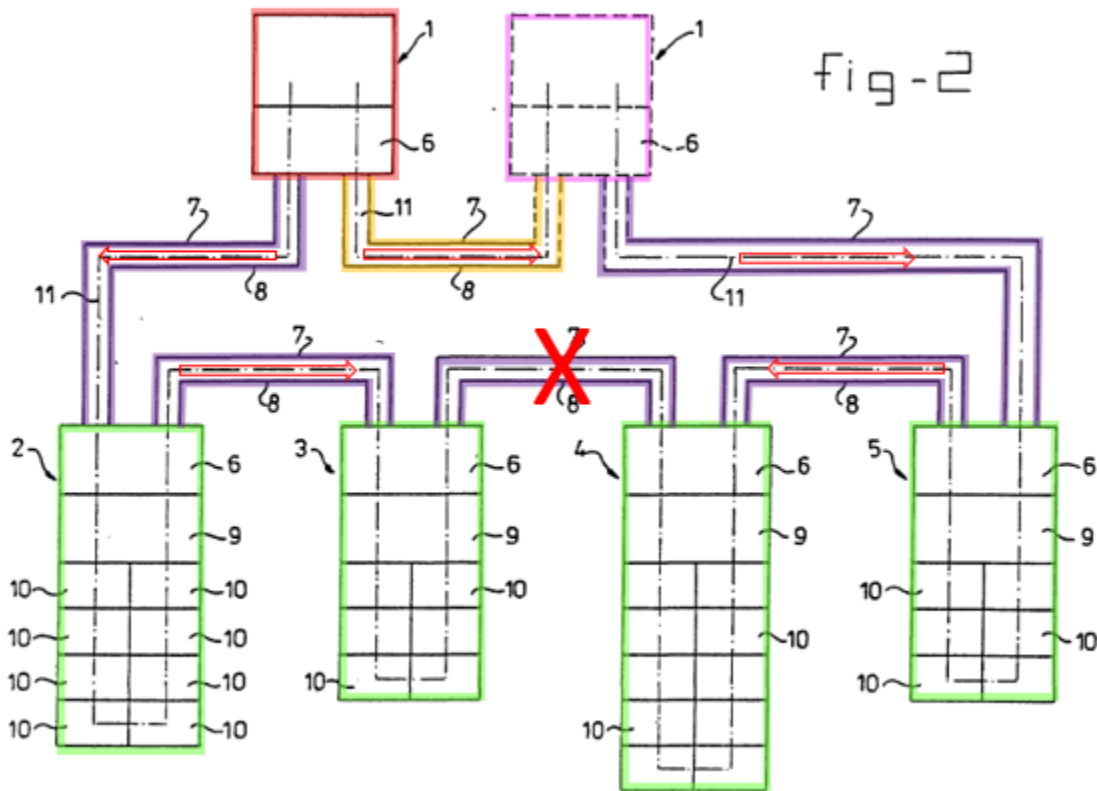
which **interface** data packets are conveyed between the **first** and **second master units** in case of a fault.

Vink alone or Vink with AAPA suggests [5a]. As shown below, Figure 2 of Vink shows **transmission lines 7, 8** that couple the **active master 1** and **passive master 1** together. See Ex-1003, ¶¶160-161.



Ex-1005, Figure 2. Vink teaches that the **passive master 1** is designed such that it can assume the role of the **active master 1** when a fault occurs by receiving all the data that the **active master 1** receives. Ex-1005, 16:21-31 (“In such a multi-master concept, one of the masters is in general active in relation to data exchange, while

one or more other masters only have a passive role therein. All the masters are so designed that they can assume the function of the **active master**, for example *in the event of faults*. The **passive masters** are easily able to detect errors of the active master because, as a consequence of their cascade arrangement and the serial transfer of data bits in the communication system ..., *they receive all the information which is intended for the active master.*"); *id.*, 24:24-34 ("Method ... comprising under the control of the at least one master (1): forming a packet of data bits ... via the **transmission system (7,8)** between the at least one master (1) ... information can be exchanged, between packets of data bits and/or control information."). As such, to the extent not explicitly taught, Vink suggests data packets are conveyed between the **active master** and the **passive master** over the **transmission lines 7, 8** in the event of a fault. Such a fault event is schematically illustrated below, with the red arrows depicting the direction of downstream data flow and "X" denoting a fault in **transmission lines 7, 8** between **slaves 3** and **4**. See Ex-1003, ¶¶161-164.



Ex-1005, Figure 2. As shown, to send data packets intended for **slaves 4 and 5**, it would have been obvious to send data between **active master** and the **passive master** over **transmission lines 7, 8** to allow transmission of data to all of the **slaves (2, 3, 4, 5)** in the daisy chain. Having recognized that a fault exists in the **transmission lines 7, 8** between **slaves 3 and 4**, one way to ensure that the **passive master** “receive[s] all the information which is intended for the active master” so that the **passive master** “can assume the function of the active master,” (Ex-1005, 16:24-31), is to transmit the data packets across the **transmission lines 7, 8** located

between **active master** and the **passive master**. This would have merely been one of a finite number of ways to transmit data between the **active master** and the **passive master** and a POSITA would have had a reasonable expectation of success in achieving such a delivery of data based on the teachings of Vink. *See* Ex-1003, ¶¶161-164.

To the extent Vink does not explicitly teach [5a], Vink with AAPA suggests this limitation. The '904 patent states that “[t]he active master bcasts these packets, sending them both to network 22 and to standby master 32 over a protection interface 76 between the two masters, as indicated by an arrow 77. The standby master also transmits the upstream packets over network 22, as indicated by an arrow 78.” Ex-1001, 8:42-49. The '904 patent admits that this is a well-known feature that is commonly used in fault protection mechanisms. *See id.*, 8:49-52 (“This redundancy in transmission is in accordance with fault protection mechanisms used in high-speed networks known in the art, such as the standard ‘1+1 APS’ (automatic protection switching) technique used in SONET.”); *see also* Ex-1009, 52-55. A POSITA would have been motivated to implement such 1+1 APS fault protection mechanism between the two masters and between the two masters and the network in case one of the links between the masters or the links from the masters to the network fails. Combining such well-known fault protection mechanism in Vink’s communication system, which already has two

master stations that has a communication path therebetween, and as modified with Patrick/AAPA, which connects the master units to a network, would have been a trivial modification that a POSITA would have been motivated to do as well as able to readily implement with a reasonable expectation of success. *See* Ex-1003, ¶165.

3. Dependent Claim 6

a) [6pre] Apparatus according to claim 5,

Vink with Patrick (and AAPA for Ground 2) renders obvious claim 5. *See* Section VI.B.2.

b) [6a] wherein the **first master unit** bicast the upstream data packets that it receives from the **slave units** to the network and, via the **protection interface**, to the **second master unit**, which transmits the upstream data packets to the network.

As explained in Section VI.B.1.f [4d], Vink with Patrick suggests sending “upstream data packets that it receives from the slave units to the network.”

As explained in Section VI.B.2.b [5a], Vink further suggests that “the first master unit []casts the upstream data packets that it receives from the slave units, via the protection interface, to the second master unit.”

Finally, Vink with Patrick suggests that the **passive master** transmits the upstream data packets to the network because “[a]ll the masters are so designed that they can assume the function of the active master, for example in the event of

faults.” Ex-1005, 16:24-26. Hence, because the **active master** is designed to transmit upstream data (as modified with Patrick) to the network, a POSITA would also have designed the **passive master** to transmit upstream data packets to the network. *See* Ex-1003, ¶168.

Indeed, as explained in Section VI.B.2.b [5a], AAPA teaches [6a] because the ’904 patent admits that this is a well-known feature that is commonly used in fault protection mechanisms. And Vink with Patrick (and AAPA) suggests [6a]. *See* Ex-1003, ¶¶169-170.

4. Dependent Claim 7

a) [7pre] Apparatus according to claim 4,

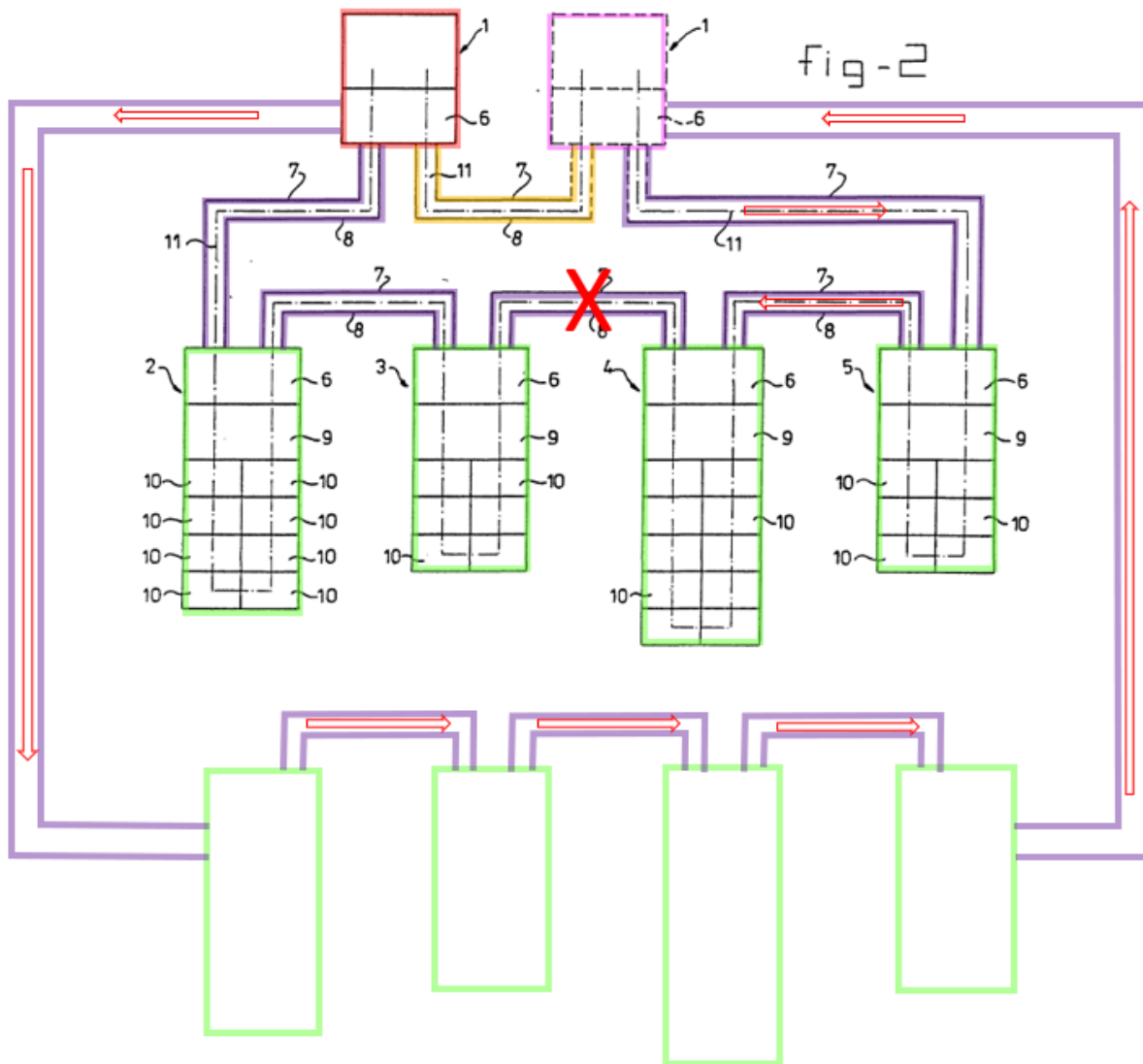
Vink with Patrick (and AAPA for Ground 2) renders obvious claim 4. *See* Section VI.B.1.

b) [7a] wherein in case of a fault at a location in one of the daisy chains, data flow in a portion of the daisy chain between the location of the fault and the **second master unit is reversed, so that the downstream data packets are passed from the **second master unit** to the **slave units** in the portion of the daisy chain via the **last slave unit** in the chain, and the upstream data packets are passed by the **last slave unit** to the **second master unit**.**

As explained in Section VI.B.1.i [9f], Vink with Patrick suggests “wherein in case of a fault at a location in one of the daisy chains, data flow in a portion of the daisy chain between the location of the fault and the **second master unit** is

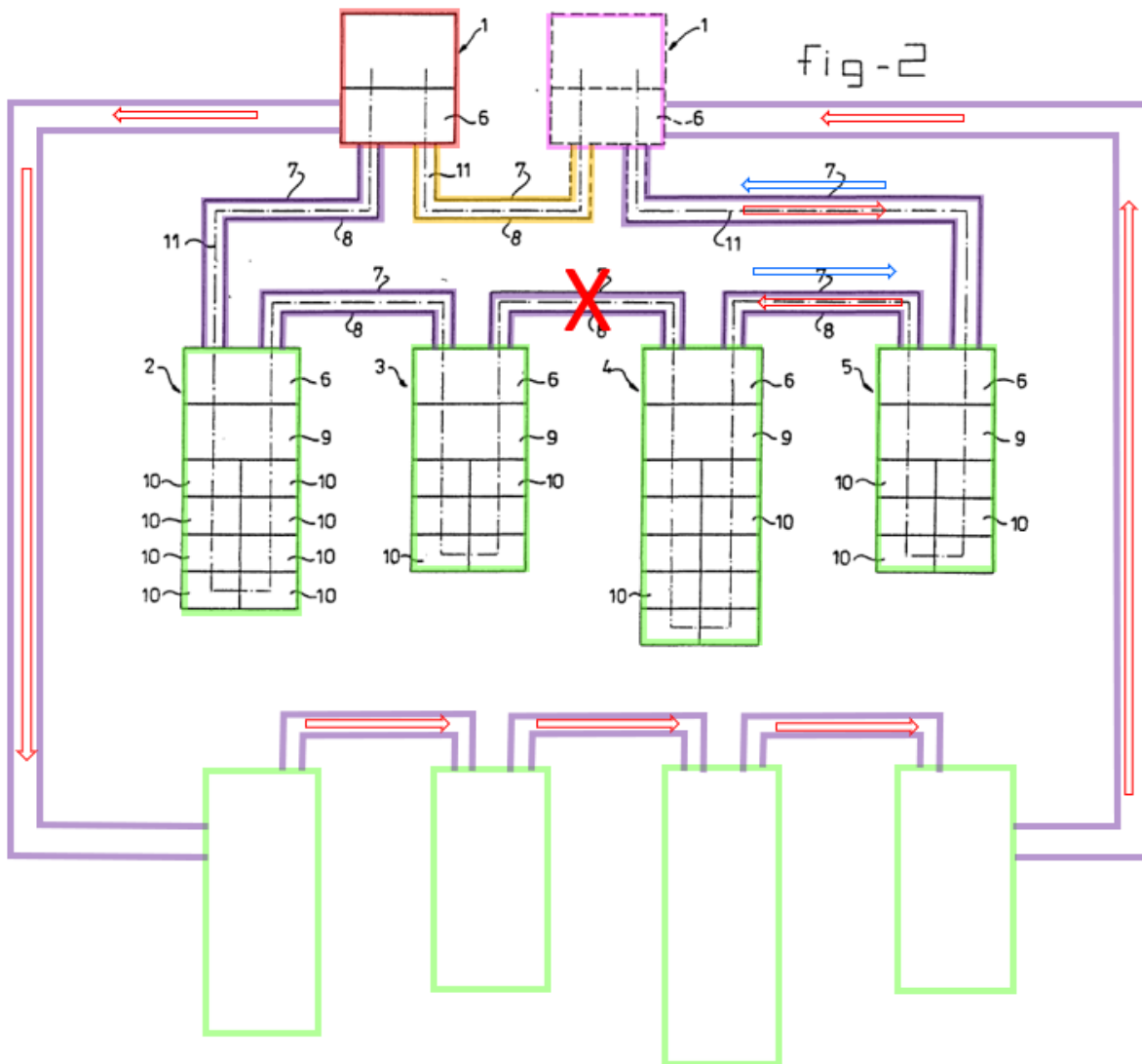
reversed, so that the downstream data packets are passed from the **second master unit** to the slave units in the portion of the daisy chain via the **last slave unit** in the chain.”

Specifically, as schematically illustrated below, after re-routing the data to the second daisy chain, a POSITA would have modified Vink’s system to allow transmission of downstream data to flow from **slave unit 5** and then to **slave unit 4** in the first daisy chain. Indeed, after having transmitted downstream data across the other daisy chain, transmitting the downstream data to **slave unit 4** through **slave unit 5** is merely the only logical choice to re-routing of data packets, and it would at least have been obvious to try to transmit data in this manner to ensure data reaches as many slave units as possible.



Ex-1005, Figure 2 (modified). And a POSITA would have been able to make such a modification with a reasonable expectation of success because Vink tries “to reach as many connected slaves as possible in a fault situation.” Ex-1005, 14:31-34; Ex-1005, 14:29-31 (“[T]he at least one master and slaves are designed to transmit or receive packets of data bits via a transmission system ring in *one and/or the other direction.*”). See Ex-1003, ¶173.

Vink also suggests that “the upstream data packets are passed by the **last slave unit** to the **second master unit**.” Vink further discloses that the **second master** has the same capabilities as the **first master**. *See* Ex-1005, 16:24-26 (“All the masters are so designed that they can assume the function of the active master, for example in the event of faults.”). Accordingly, upon recognizing a fault exists in the daisy chain, a POSITA would have been able to program the **slave units** to send upstream data up to the **second master** (instead of the **first master**) to allow upstream data to be handled by the **second master**, which has the same capabilities as the **first master**, as schematically illustrated below in which the blue arrows indicate the upstream data flow from **slave 4** to the **second master** through the **last slave 5** in the daisy chain.



Ex-1005, Figure 2 (modified). Indeed, Vink teaches that the “passive masters are easily able to detect errors of the active master because ... they receive all the information which is intended for the active master.” Ex-1005, 16:26-31. This modification merely requires a simple re-routing of data after recognizing faults have occurred and a POSITA would have at least found it obvious to try to make

the proposed modification with a reasonable expectation of success. *See* Ex-1003, ¶174.

5. Dependent Claim 8

a) [8pre] Apparatus according to claim 7,

Vink with Patrick (and AAPA for Ground 2) renders obvious claim 7. *See* Section VI.B.4.

b) [8a] wherein the downstream packets for the **slave units** in the portion of the daisy chain between the location of the fault and the **second master unit** are conveyed to the **second master unit** from the **first master unit** via another one of the daisy chains.

As explained in Sections VI.B.1.i [9f] and VI.B.4.b [7a], Vink with Patrick (and AAPA for Ground 2) suggests [8a].

6. Dependent Claim 10

a) [10pre] Apparatus according to claim 9,

Vink with Patrick (and AAPA for Ground 2) renders obvious claim 9. *See* Section VI.B.1.

b) [10a] wherein the pre-switch re-routes the data packets such that substantially no reconfiguration of the switch is required responsive to the fault.

As discussed above in Sections VI.B.1.g [9d], VI.B.1.h [9e], and VI.B.1.i [9f], Vink discloses a switch (i.e., control unit 36 and transmitting/receiving unit 6) and a pre-switch (i.e., control computer 38) in each of the master units.

Vink teaches that when an error occurs, the [control computer 38](#) “re-routes the data packets.” Specifically, although the arrangement of I/O modules within a slave may change, the [control computer 38](#) would still “provide[] for ... the correct sequence of the data bits for a relevant slave, related to the sequence in which the I/O modules are arranged.” Ex-1005, 21:4-7. In other words, Vink teaches that the [control computer 38](#) changes the “calculations” (*see e.g., id.*, 20:35-38) to re-route the data (e.g., provides for the correct sequence of the data bits for a relevant slave, related to the sequence in which the I/O modules are arranged) in view of the error in the transmission system such that “the master is able to reach as many connected slaves as possible in a fault situation.” *Id.*, 14:33-34. *See* Ex-1003, ¶179.

This re-routing of the data packets is performed “such that substantially no reconfiguration of the switch [i.e., [control unit 36](#) and [transmitting/receiving unit 6](#)] is required.” It is the [control computer 38](#) that “provides for and monitors correct sequence of the data bits for a relevant slave, related to the sequence in which the I/O modules are arranged.” Ex-1005, 21:4-7. The [control unit 36](#) simply “control[s] the data flow via the transmission system 7, 8,” (Ex-1005, 20:33-34), based on the newly calculated sequence of the data bits that it “extract[s]” from the control computer 38 and the [transmitting/receiving unit 6](#) simply “monitor[s]” the transmission. Ex-1005, 21:4-9. Hence, no re-

configuration of the control unit 36 and transmitting/receiving unit 6 is required. See Ex-1003, ¶180.

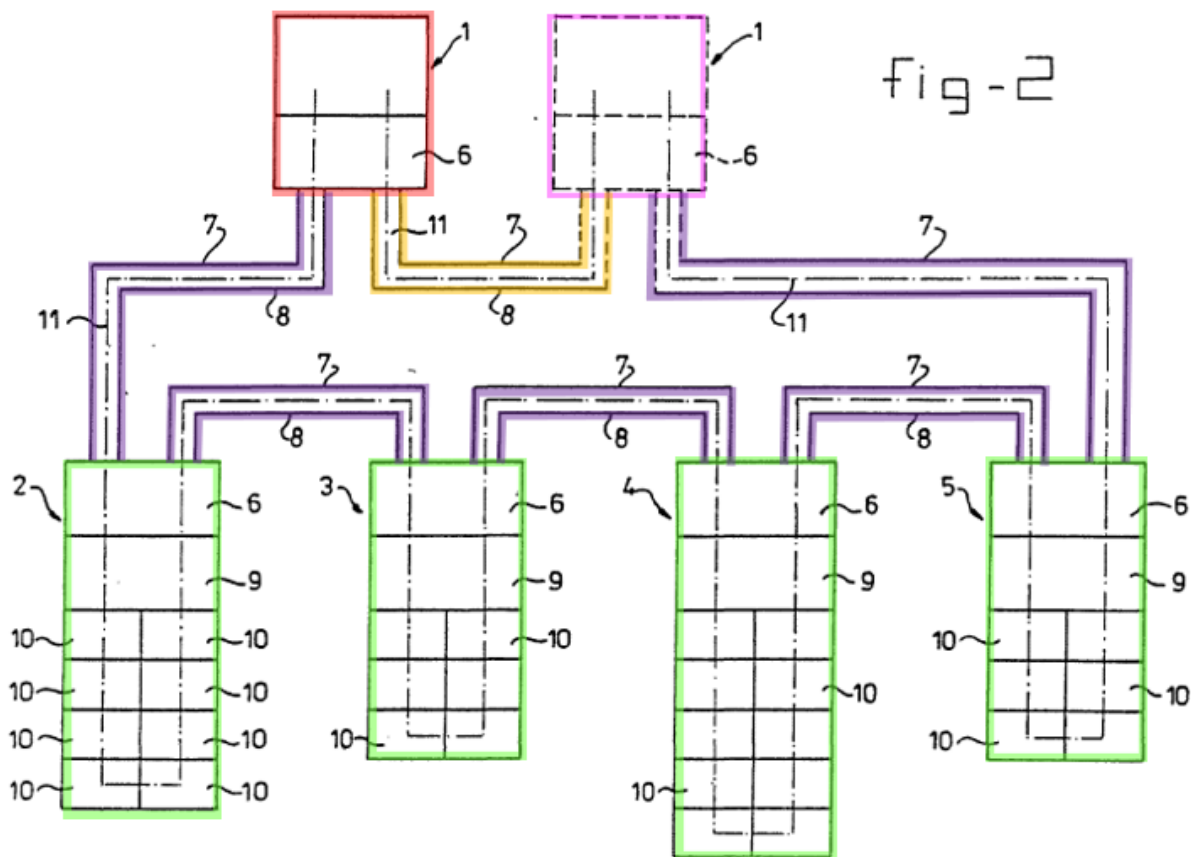
7. Dependent Claim 12

a) [12pre] Apparatus according to claim 11,

Vink with Patrick (and AAPA for Ground 2) renders obvious claim 11. See Section VI.B.1.

b) [12a] wherein each of the **slave units** is coupled to receive packets transferred thereto from the **first [master unit]** and **second master unit]** over **first and second ones of the physical interface lines**, respectively, and

Vink teaches [12a]. For example, Vink teaches that a “very flexible system is obtained ... in that the at least one master and slaves are designed to transmit or receive packets of data bits via a transmission system ring in one and/or the other direction.” Ex. 1005, 14:28-34. Hence, each of the **slave units 2, 3, 4, and 5** is *coupled to* receive packets sent from the **active master 1** and **passive master 1** over the first and second ones of the **transmission lines 7, 8**. See Ex-1003, ¶182.



Ex-1005, Figure 2.

c) [12b] wherein the **pre-switch** passes the packets received through the **first and second physical interface line** and addressed to any of the **ports** on the **slave unit** to respective first and second addresses in the switch fabric.⁶

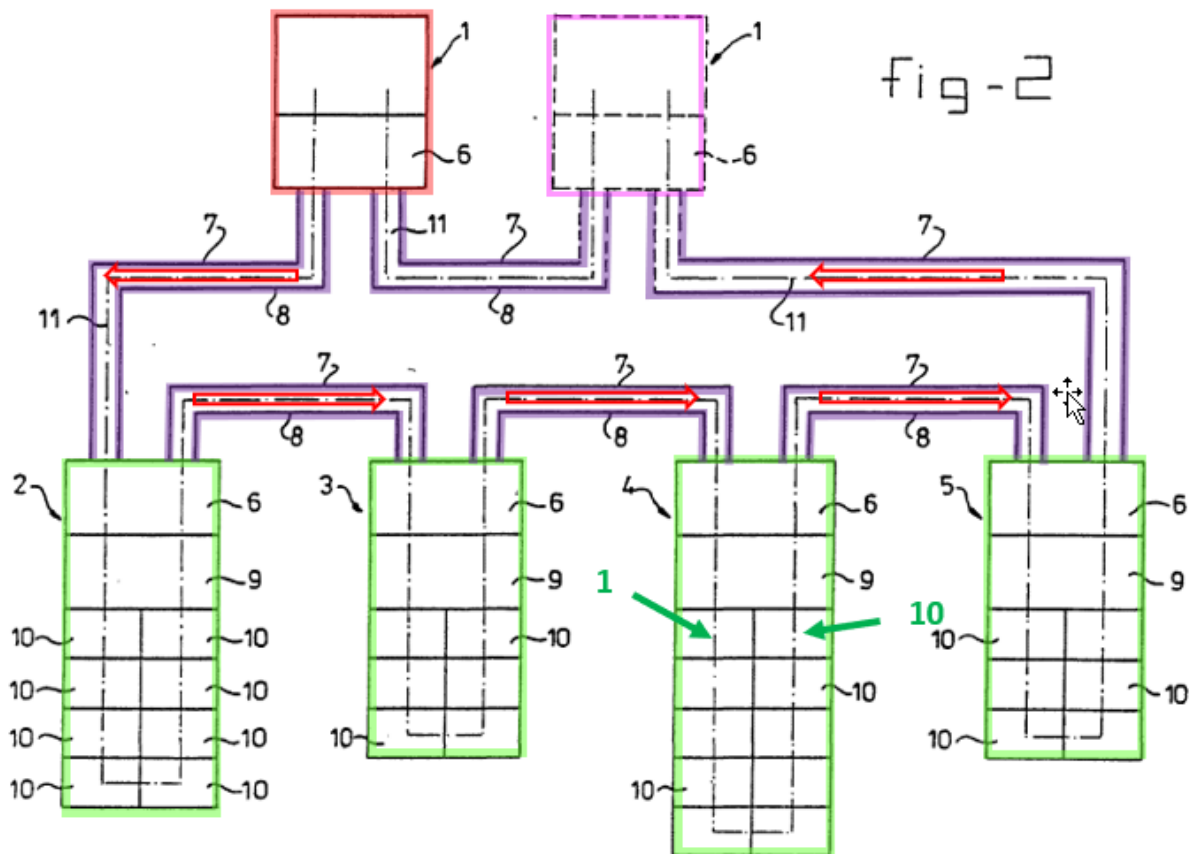
As explained in Sections VI.B.2.b [5a], VI.B.1.k [11e], VI.B.1.l [11f] and VI.B.7.c [12a], Vink discloses [12b]. Specifically, as explained in Sections

⁶ Petitioner reserves the right to challenge claim 12 as lacking written description support in other proceedings.

VI.B.1.k [11e] and VI.B.7.b [12a], taking **slave 4** as an exemplary situation, after receiving the downstream data in **slave 4** through *either* of the **transmission lines 7, 8** on the left (under normal operation) or the right (under a fault event) of **slave 4**, the **transmitting/receiving unit 6** and **control module 9** passes the data packets addressed to the respective **ports (e.g., output 33)** on any of the I/O modules 10 within the switch fabric of **slave 4**. See Ex-1003, ¶¶183-185.

Vink further discloses that the packets are “addressed to respective first and second addresses in the switch fabric.” For example, Vink discloses that “the addressing of the separate I/O modules 10 can take place on the bases of their sequence in the cascade arrangement.” Ex-1005, 18:1-3. Vink’s addressing is carried out based on “the sequence of the data bits [that] correspond[] to the sequence of the I/O modules.” *Id.*, 6:4-5. For example, data packets arriving into the switch fabric of **slave 4** under normal operation would arrive through the **transmission lines 7, 8** on the left side of **slave 4**, in which the I/O modules would be addressed sequentially from, for example, 1 to 10, as shown below. And if a first data packet has as destination the top-left I/O module of **slave 4**, the pre-switch of **slave 4** will receive an address of “1” for the first data packet. If a second data packet has as destination the top-right I/O module of **slave 4**, the pre-switch of **slave 4** will receive an address of “10” for the first data packet, because as illustrated, **slave 4** includes ten I/O modules and because Vink determines the

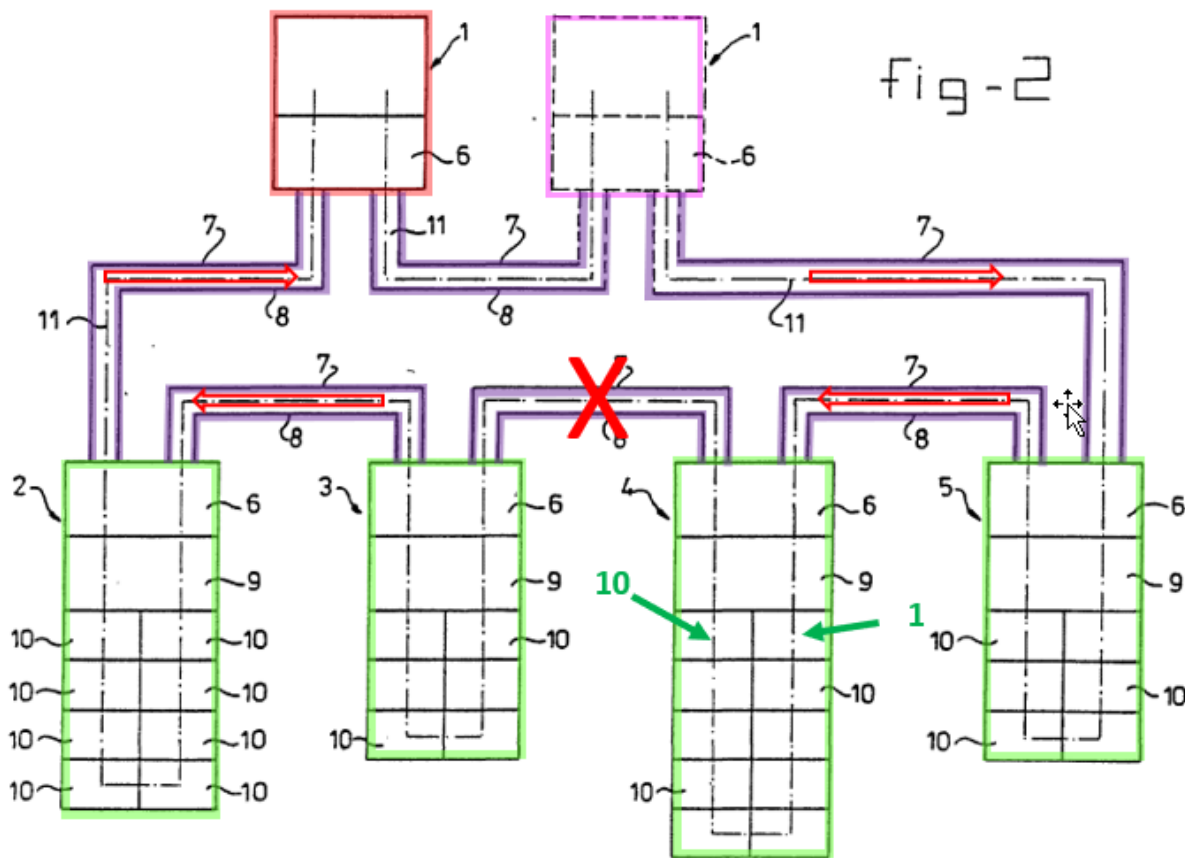
addresses sequentially. Based on the destination addresses of the data packets received at **slave 4**, the pre-switch will pass the data packets to the **slave 4's** switch fabric. See Ex-1003, ¶186.



Ex-1005, Figure 2.

In contrast, data packets arriving at the switch fabric of **slave 4** in the event of a fault would arrive through the **transmission lines 7, 8** on the right side of **slave 4**, in which the I/O modules would be addressed sequentially in the opposite order from, for example, 1 to 10, as shown below. See, e.g., Ex-1005, 8:19-20. Specifically, in the event of a fault, the direction of data flow is reversed (as shown

below), the address of the first data packet (with destination for the top-left I/O module of **slave 4**) that will be received at the pre-switch of **slave 4** will be “10,” because Vink determines the addresses sequentially within a slave. Similarly, the address of the second data packet (with destination the top-right I/O module of **slave 4**) that will be received at the pre-switch of **slave 4** will be “1.” See Ex-1003, ¶187.



Ex-1005, Figure 2.

In other words, the destination addresses of the first and second data packets will be swapped at the pre-switch of **slave 4** (the address for the first data packet

will be swapped at the pre-switch from 1 to 10 and the address for the second data packet will be swapped at the pre-switch from 10 to 1). Based on the swapped destination addresses the pre-switch will pass the data packets to the **slave 4's** switch fabric. *See* Ex-1003, ¶188.

8. Dependent Claim 13

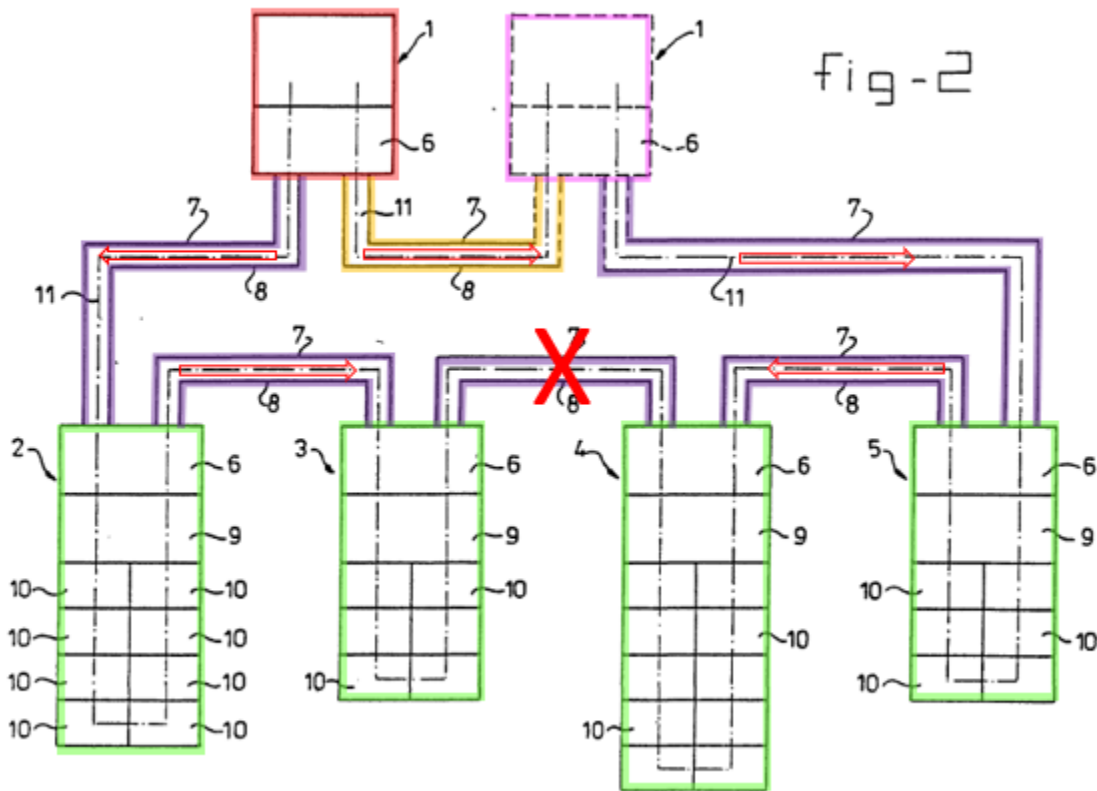
a) [13pre] Apparatus according to claim 12,

Vink with Patrick (and AAPA for Ground 2) renders obvious claim 12. *See* Section VI.B.7.

b) [13a] wherein in response to a reversal of a direction of data flow in the daisy chain, the first and second addresses are swapped in the pre-switch, so that substantially no reconfiguration of the switch fabric is required.

Vink discloses [13a]. As explained in Section VI.B.7 [claim 12], Vink teaches that the **control module 9** and **transmitting/receiving unit 6** control that data packets that are delivered to a serially connected I/O modules 10, each of which include **switches** that together form the claimed switch fabric. Ex-1005, 25:1-7 (“the I/O modules (10) being provided with control means (35) and the control module (9) being provided with means (16), coupled to the control means (35), for controlling in a synchronised manner, in response to control information received from the at least one master (1), the inputting and/or outputting of data bits by the connected I/O modules (10).”). *See* Ex-1003, ¶191.

And since the addresses of the I/O modules are based on the sequence of the I/O modules within the sequence of the substations (slaves), reversing the direction of the data flow would thus reverse the sequence of the slaves containing the I/O modules, as well as the sequence of the I/O modules within each slave. And since the destination addresses are swapped at the pre-switch, no reconfiguration at the switch fabric is required at the switch fabric to allow the data packets to reach the appropriate destination. That is, none of the **shift registers 25/26**, **buffers 29/30**, and **control means 35** located in the I/O modules of **slave 4** requires reconfiguration to identify a data packet addressed for a particular I/O module's outputs 33. Thus, when the direction of data flow is switched, Vink discloses swapping the addresses in the pre-switch and no substantial reconfiguration of the switch fabric will be required to route the data packets to the appropriate I/O module. *See* Ex-1003, ¶192.



Ex-1005, Figure 2.

9. Independent Claim 14

a) [14pre] In a network access multiplexing system, in which a **master unit** is connected by a physical interface to a packet-switched network, a **slave unit** configured to be coupled to the **master unit** in a daisy chain of such **slave units**, the **slave unit** comprising:

To the extent limiting, as explained in Sections VI.B.1.a

[1pre/4pre/9pre/11pre], VI.B.1.b [1a/4a/9a/11a], VI.B.1.c [1b/4b/9b/11b], and

VI.B.1.d [1c/4c/9c/11c], Vink with Patrick (and AAPA for Ground 2) render

obvious [14pre].

And for avoidance of doubt, Vink's communication system is a "multiplexing" system. *See* Ex-1005, 17:5-8 ("The transmitting/receiving unit 6 comprises a multiplexer 12 consisting of two modems 13, 14 which are respectively connected to the first transmission ring 7 and to the second transmission ring 8."), 17:13-17 ("After demodulation by one of the modems 13, 14, the data received are fed to the control module 9 connected to the multiplexer 12 which... is arranged to exchange information with the master in accordance with the known Synchronous Data Link Control (SDLC) protocol."). *See* Ex-1003, ¶¶194-195.

b) [14a] a plurality of **ports, for coupling the **slave unit** to respective **subscriber lines**;**

As explained in Section VI.B.1.c [1b, 4b, 9b, 11b], Vink with Patrick (and AAPA for Ground 2) suggests [14a].

c) [14b] **first and second physical interfaces, coupled to exchange packets with **preceding and succeeding units**, respectively, along the daisy chain;**

As explained in Sections VI.B.1.d [1c, 4c, 9c, 11c] and [4d], Vink discloses [14b].

d) [14c] a **pre-switch, coupled to receive packets from the **first physical interface** and responsive to address data carried by the packets, to sort the packets such that packets addressed to the **slave unit** are retained, and packets**

addressed to the **succeeding units** are passed to the **second physical interface**; and

As explained in Sections VI.B.1.j [11d] and VI.B.1.l [11f], Vink discloses [14c].

e) [14d] a fabric of one or more **switches**, which convey the retained packets to the **ports**, responsive to the address data.

As explained in Sections VI.B.1.j [11d] and VI.B.1.k [11e], Vink discloses [14d].

10. Dependent Claim 15

a) [15pre] The slave unit according to claim 14,

Vink with Patrick (and AAPA for Ground 2) renders obvious claim 14. *See* Section VI.B.9.

b) [15a] wherein the **pre-switch** is further coupled to receive packets transferred thereto from the **second physical interface** and to sort the packets in like manner to the packets received through the **first physical interface**.

As explained in Sections VI.B.1.l [11f], VI.B.7.b [12a], VI.B.7.c [12b], and VI.B.8.b [13a], Vink with Patrick suggests [15a].

11. Dependent Claim 16

a) [16pre] The slave unit according to claim 15,

Vink with Patrick (and AAPA for Ground 2) renders obvious claim 15. *See* Section VI.B.10.

b) [16a] wherein the retained packets that were received from the **first and second physical interfaces** and are passed by the **pre-switch** to the switch fabric are identified by respective **first and second port numbers**, and

As explained in Section VI.B.7.c [12b], Vink discloses [16a]. To the extent “port numbers” are different from “addresses,” a POSITA would have readily recognized that port numbers are often assigned as addresses in a digital communication system. *See e.g.*, U.S. Patent No. 6,631,136 (“Ex-1007”), 13:16-18 (“Destination Address: This field contains the destination address of the Region, Node, **Port ID**.”); *id.*, 20:29-30 (“[A] number of ports contained within each of said nodes, each of said ports being associated with a port address.”); U.S. Patent No. 5,425,026 (“Ex-1008”), Abstract (“In a packet switched network, each network node has line and trunk ports to which LAN user terminals and links are connected and which are *identified by a port address containing a node number plus a port number*”). *See* Ex-1003, ¶203.

c) [16b] wherein in response to a reversal of a direction of data flow in the daisy chain, the **first and second port numbers** are swapped in the **pre-switch**, so that substantially no reconfiguration of the switch fabric is required in response to the reversal.

As discussed in Section VI.B.8.b [13a], Vink discloses [16b].

12. Dependent Claim 17

a) [17pre] The slave unit according to claim 14,

Vink with Patrick (and AAPA for Ground 2) suggests claim 14. *See* Section VI.B.9.

b) [17a] wherein when one of the packets received by the **pre-switch** comprises a multicast packet addressed to one or more of the **ports** on the **slave unit**, the **pre-switch** sorts the multicast packet such that one copy of the packet is retained and another copy of the packet is passed to the **second physical interface**.

As explained in Sections VI.B.1.j [11d], VI.B.1.l [11f], and VI.B.9.d [14c], Vink discloses [17a].

13. Dependent Claim 18

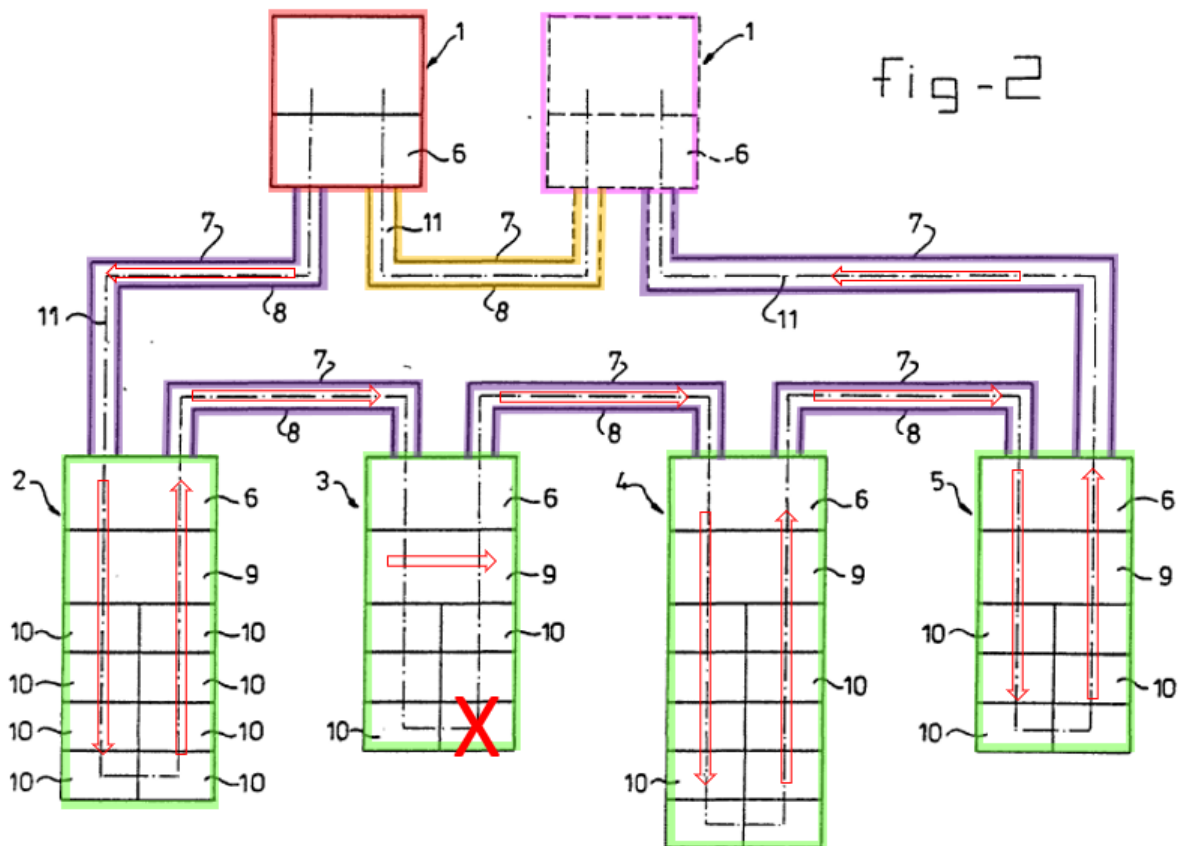
a) [18pre] The slave unit according to claim 14,

Vink with Patrick (and AAPA for Ground 2) renders obvious claim 14. *See* Section VI.B.9.

b) [18a] wherein in the event of a fault in the switch fabric, the **pre-switch** continues to pass the packets addressed to the **succeeding units** on to the **succeeding units** without significant interruption.

Vink discloses [18a]. Vink discloses that “[w]hen a transmission error is detected, the control module of a slave will not accept the data received,” and the “data bits received are then transferred further unchanged” such that the “master then receives back the data bits d[i]spatched, possibly with transmission errors.”

Ex-1005, 14:12-17. In other words, as schematically illustrated below, if one of the I/O modules of slave 3 is determined to be faulty, Vink teaches simply passing the data packets received by the transmitting/receiving unit 6 directly onto the next slave 4 as the control module 9 rejects receipt of that data packets for transmission along the cascade of the I/O modules in slave unit 3. This is possible, for example, but including specific address information bits to the data packets such that data packets can be sent to the specific I/O modules that those data bits were “intended” for without having to through every I/O module. *See also id.*, 8:25-34, 11:29-37, 19:28-32, 21:10-14, 25:20-24. *See* Ex-1003, ¶¶209-210.



14. Independent Claim 19

a) [19pre] A method for providing access to a network, comprising:

Vink “relates to a *method* and a communication system for exchanging data in discrete or digital form with one or more input (I) and/or output (O) modules, by means of serial transfer of data bits, under the control of at least one master station (master).” Ex-1005, 1:6-10. Thus, because Vink describes methods for exchanging data with one or more modules, Vink suggests a “*method* for providing

access to a network” as claimed. *See also* Section VI.B.1.a [1pre, 4pre, 9pre, 11pre]; Ex-1003, ¶211.

b) [19a] coupling first and second master units to interface with the network;

As explained in Section VI.B.1.b [1a, 4a, 9a, 11a], Vink with Patrick (and AAPA for Ground 2) suggests [19a].

c) [19b] linking a plurality of slave units, each slave unit comprising one or more ports to respective subscriber lines, in a daisy chain between the first and second master units;

As explained in Sections VI.B.1.c [1b, 4b, 9b, 11b] and VI.B.1.d [1c, 4c, 9c, 11c], Vink with Patrick (and AAPA for Ground 2) suggests [1b], [4b], [9b], and [11b].

d) [19c] conveying initial downstream data packets, received from the network by one of the master units, along the daisy chain in a first direction, so as to deliver the packets to the ports of the slave units; and

As explained in Sections VI.B.1.f [4d], VI.B.1.h [9e], VI.B.1.k [11e], and/or VI.B.1.l [11f], Vink with Patrick (and AAPA for Ground 2) suggests [19c].

e) [19d] in the event of a fault in the daisy chain, conveying further downstream data packets, received from the network by one of the master units, along the daisy chain in a second direction, opposite to the first direction, so

as to deliver the further packets to the **ports of at least some of the **slave units**.**

As explained in Sections VI.B.2.b [5a], VI.B.4.b [7a], and/or VI.B.1.i [9f], Vink suggests [19d].

15. Dependent Claim 20

a) [20pre] A method according to claim 19,

Vink with Patrick (and AAPA for Ground 2) renders obvious claim 19. *See* Section VI.B.14.

b) [20a] wherein the initial and further downstream packets are received from the network by the **first master unit, and**

As explained in Sections VI.B.1.f [4d], VI.B.1.h [9e], VI.B.1.k [11e], and/or VI.B.1.l [11f], Vink with Patrick (and AAPA for Ground 2) suggests [20a].

c) [20b] wherein conveying the further downstream packets in the second direction comprises conveying the further downstream packets from the **first master unit to the **second master unit**, and then conveying the further downstream packets from the **second master unit** to the daisy chain.**

As explained in Sections VI.B.2.b [5a], VI.B.4.b [7a], and/or VI.B.1.i [9f], Vink suggests [20b].

16. Dependent Claim 21

a) [21pre] A method according to claim 20,

Vink with Patrick (and AAPA for Ground 2) renders obvious claim 20. *See* Section VI.B.15.

b) [21a] wherein conveying the further downstream packets from the **first master unit** to the **second master unit** comprises linking further **slave units** in an additional daisy chain between the **first [master unit]** and **second master unit[]**, and conveying the further downstream packets from the **first master unit** to the **second master unit** over the additional daisy chain.

As explained in Sections VI.B.1.i [9f] and/or VI.B.4.b [7a], Vink with Patrick (and AAPA for Ground 2) suggests [21a].

17. Dependent Claim 22

a) [22pre] A method according to claim 19, and comprising

Vink with Patrick (and AAPA for Ground 2) renders obvious claim 19. *See* Section VI.B.14.

b) [22a] conveying initial upstream data packets, received by the **slave units** from the **subscriber lines**, along the daisy chain in the second direction so as to transmit the upstream data packets via the **first master unit** over the network, and in the event of the fault, conveying further upstream data packets received by one or more of the **slave**

units along the daisy chain in the first direction via the second master unit.

As explained in Sections VI.B.1.f [4d], VI.B.3.b [6a], and VI.B.4.b [7a], Vink with Patrick suggests [22a].

18. Dependent Claim 23

a) [23pre] A method according to claim 22,

Vink with Patrick (and AAPA for Ground 2) renders obvious claim 22. *See* Section VI.B.17.

b) [23a] and comprising bicastig the upstream data packets from the first master unit to the network and to the second master unit, which transmits the bicast upstream data packets over the network.

As explained in Section VI.B.3.b [6a], Vink with Patrick (and AAPA for Ground 2) suggests [23a].

19. Dependent Claim 24

a) [24pre] A method according to claim 19,

Vink with Patrick (and AAPA for Ground 2) renders obvious claim 19. *See* Section VI.B.14.

b) [24a] wherein conveying the initial downstream data packets along the daisy chain comprises pre-switching the packets at each of the slave units, so that packets not addressed to any of the ports on the slave unit are passed to the next slave unit in the daisy chain, while packets that are addressed to one or more of the ports on the slave unit are

**passed to a switch fabric that directs the packets to the
ports to which they are addressed.**

As explained in Section VI.B.1.1 [11f], Vink discloses [24a].

20. Dependent Claims 2 and 25

**a) [2pre/25pre] Apparatus according to claim 1, / A
method according to claim 19,**

Vink with Patrick (and AAPA for Ground 2) renders obvious claims 1 and 19. *See* Sections VI.B.1 and VI.B.14.

**b) [2a/25a] wherein the network comprises an
asynchronous transfer mode (ATM) network.**

Vink with Patrick (and AAPA for Ground 2) suggests [2a] and [25a]. Vink discloses a communication system, such as “Local Area Networks” (LAN’s). *See* Ex-1005, 1:11-15 (“Communication systems of this type are in practice known per se. Examples are the so-called ‘Local Area Networks’ (LAN’s));” *see also, id.*, 1:19-21 (“LAN communication systems are ... designed for communicatively coupling two or more connected stations together.”). Further, Vink discloses using “public networks” for “long-distance connections.” Ex-1005, 1:18-19. *See* Ex-1003, ¶229.

Although Vink does not explicitly teach that the network comprises an ATM network, which can be a public network, and ATM networks were well-known. For example, AAPA discloses that an ATM network could be connected to two

masters. *See* Ex-1001, 1:39-42 (“The master unit comprises a core network interface element 24, providing the necessary physical layer (PHY) and data link layer (for example, ATM) functions.”); *see also* Ex-1002, 159 (“[F]igure 2B of the admitted prior art of the instant application is block diagrams that schematically illustrate topologies ***known in the art ... , wherein the core network 22 is an ATM network (packet-switched network)***, page 2, line 1-4.” *See* Ex-1003, ¶230.

Patrick similarly discloses that its communication system may be connected to a network, where the network “may be a broadcast network such as ***a local area network (‘LAN’)***, or a non-broadcast circuit-oriented network such as ***ATM (asynchronous transfer mode)***, frame relay, or x.25.” Ex-1006, 5:45-49. *See* Ex-1003, ¶231.

Using a specific protocol like ATM, in lieu of LAN, to allow a communication system to gain access to high-speed network was done routinely in the art and are recognized as known equivalents (as evidenced by Patrick). A POSITA would have had a reasonable expectation of success in making such a modification to Vink’s communication system’s network connection to provide access to an ATM network. *See* Ex-1003, ¶232.

21. Dependent Claims 3 and 26

a) [3pre/26pre] Apparatus according to claim 1, / A method according to claim 19,

Vink with Patrick (and AAPA for Ground 2) renders obvious claims 1 and 19. *See* Sections VI.B.1 and VI.B.14.

b) [3a/26a] wherein the network comprises an Internet protocol (IP) network.

Vink with Patrick suggests [3a] and [26a]. Vink discloses a communication system, such as “Local Area Networks” (LAN’s). *See* Ex-1005, 1:11-15.

Although Vink does not explicitly teach that the network comprises an Internet Protocol (IP) network, IP networks were well-known. For example, Patrick discloses that the primary station can be connected to “networks such as the Internet.” Ex-1006, 3:20-24. Internet is an Internet Protocol (IP) network. *See* Ex-1003, ¶235.

Using a specific protocol like the Internet Protocol, in lieu of LAN, to allow a communication system to gain access to high-speed network was done routinely in the art and are recognized as known equivalents (as evidenced by Patrick). A POSITA would have had a reasonable expectation of success in making such a modification to Vink’s communication system’s network connection to provide access to an IP network. *See* Ex-1003, ¶236.

VII. DISCRETIONARY DENIAL WOULD BE INAPPROPRIATE

A. Discretionary Denial Under *Fintiv* Is Not Appropriate

The six factors considered for § 314 denial favor institution. *See Apple Inc. v. Fintiv, Inc.*, IPR2020-00019, Paper 11 (Mar. 20, 2020) (precedential).

1. No Evidence Regarding A Stay

No motion to stay has been filed, so this factor is neutral.

2. Parallel Proceeding Trial Date

While trial is currently scheduled for March 4, 2024 (Ex-1010), the projected trial date—based on median time-to-trial statistics—is in August of 2024, “around the same time” as the Board’s expected Final Written Decision.⁷

3. Investment In Parallel Proceeding

The co-pending litigation is in its early stages, and the investment in it has been minimal. *See* Ex-1010, Ex-1011. The parties have not exchanged preliminary positions on claim construction, and expert discovery has not begun. *See PEAG LLC v. Varta Microbattery GmbH*, IPR2020-01214, Paper 8, 17 (Jan. 6, 2021). Further, the Markman hearing is not scheduled until September 2023, the expected institution decision date by the Board. Ex-1010, 3-4.

⁷ September/October 2024 is 18 months after March/April 2023, when Petitioner expects a notice of accorded filing date for this petition.

4. Overlapping Issues With The Parallel Proceeding

Petitioner stipulates that if the IPR is instituted, Petitioner will not pursue the same grounds in the district court litigation. *Sand Revolution II LLC v. Continental Intermodal Group – Trucking LLC*, IPR2019-01393, Paper 24 at 7 (June 16, 2020) (informative).

5. Identity Of Parties

Petitioner is a defendant in the litigation. This factor should not be a basis for denying institution.

6. Other Circumstances

“[T]he PTAB will not deny institution of an IPR or PGR under *Fintiv* (i) when a petition presents compelling evidence of unpatentability.” Memo, 2. Here, the evidence of unpatentability is compelling, and thus the PTAB should not deny institution under *Fintiv*.

B. Discretionary Denial Under 35 U.S.C. § 325(d) Is Not Appropriate

This petition challenges each of the claims using a combination of Vink, Patrick and/or AAPA. While AAPA was applied during the prosecution of the '904 Patent, the limitations that were deemed allowable are taught by Vink and/or Patrick. The Examiner erred by overlooking the teachings of Vink and Patrick, neither of which were considered by the Examiner. Ex-1001, 1. Discretionary denial is therefore not appropriate. *Advanced Bionics, LLC v. MED-EL*

Elektromedizinische Geräte GmbH, IPR2019-01469, Paper 6 (Feb. 13, 2020)

(precedential). Accordingly, the Board should not exercise its discretion to deny this petition under § 325(d).

C. Discretionary Denial Under *General Plastic* Is Not Appropriate

The '904 patent has not been challenged in any prior IPR petition, so none of *General Plastic* discretionary institution factors apply to this Petition.

VIII. CONCLUSION

Accordingly, Petitioner has established a reasonable likelihood that the Challenged Claims are unpatentable.

Respectfully submitted,

Dated: March 14, 2023
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IX. MANDATORY NOTICES

A. Real Party-in-Interest

Pursuant to 37 C.F.R. § 42.8(b)(1), Petitioner certifies that the real party-in-interest is Cisco Systems, Inc.

B. Related Matters

Pursuant to 37 C.F.R. § 42.8(b)(2), to the best knowledge of the Petitioner, the '904 patent is or was involved in the following case:

Case Heading	Number	Court	Date
<i>Orckit Corporation v. Cisco Systems, Inc.</i>	2-22-cv-00276	EDTX	Jul. 7, 2022

C. Lead and Back-up Counsel and Service Information

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Please address all correspondence to lead and back-up counsel. Petitioner consents to service in this proceeding by email at CiscoOrckitIPRService@desmaraisllp.com and the email addresses above.

CERTIFICATE OF WORD COUNT

Pursuant to 37 C.F.R. § 42.24(d), Petitioner hereby certifies, in accordance with and in reliance on the word count provided by the word-processing system used to prepare this Petition, that the number of words in this paper is 13,994.

Pursuant to 37 C.F.R. § 42.24(d), this word count excludes the table of contents, mandatory notices under § 42.8, certificate of service, certificate of word count, and appendix of exhibits.

Dated: March 14, 2023

/Yung-Hoon Ha/
Yung-Hoon Ha
Lead Counsel for Petitioner
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CERTIFICATE OF SERVICE

The undersigned certifies that, in accordance with 37 C.F.R. § 42.6(e) and 37 C.F.R. § 42.105, service was made on Patent Owner at the correspondence address of record, as detailed below.

Date of service March 14, 2023

Manner of service Federal Express Mail

Documents served

- Petition for *Inter Partes* Review of U.S. 6,680,904
- Petitioner's Exhibit List
- Exhibits 1001-1011
- Certificate of Word Count
- Petitioner's Power of Attorney

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