Petitioner's Oral Hearing Demonstratives

Crusoe Energy Systems, LLC (Petitioner)
v.
Upstream Data Inc. (Patent Owner)

11,574,372 | PGR2023-00039

Before Hon. HYUN J. JUNG, JAMES J. MAYBERRY, and MATTHEW S. MEYERS

FISH.

DEMONSTRATIVE EXHIBIT - NOT EVIDENCE

Exhibit 1102
Crusoe v. Upstream
PGR2023-00039

Instituted Grounds

Ground	Claims Challenged
Obviousness over Dickerson, CryptoKube, Szmigielski, Kheterpal	1-4, 8, 16-30, 34
Obviousness over Dickerson, CryptoKube, Belady-989, Szmigielski, Kheterpal	1-4, 8, 10-12, 15-30, 34-37, 40
Obviousness over Dickerson, CryptoKube, Belady-989, Boot, Szmigielski, Kheterpal	1-4, 7-12, 15-30, 34-37, 40
Obviousness over MAGS, Polivka, Szmigielski, Kheterpal	1-4, 8, 16-22, 24-30, 34
Obviousness over MAGS, Polivka, Belady-989, Szmigielski, Kheterpal	1-4, 8, 10-12, 15-30, 34-37, 40
Ineligible subject matter	1-4, 7-12, 15-30, 34-37, and 40

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The ’372 Patent

The ’372 Patent

(54) **BLOCKCHAIN MINE AT OIL OR GAS FACILITY**

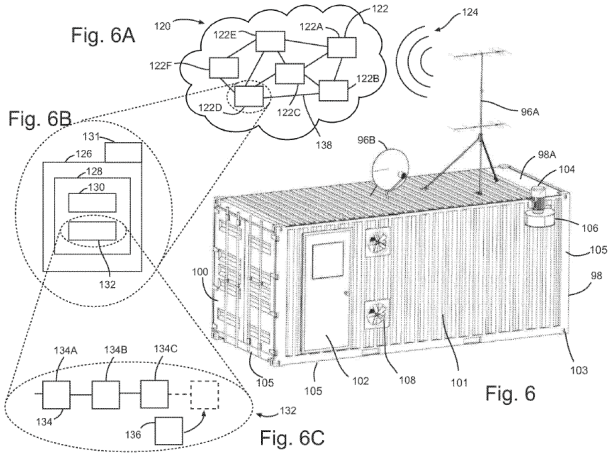
(57) **ABSTRACT**

Methods and systems of operating a blockchain mining device using natural gas produced at a hydrocarbon production, storage, or processing site/facility.

BACKGROUND

At remote oil and gas facilities, excess natural gas is often wasted, for example vented to atmosphere or burned via flaring.

EX1001, Abstract, 1:11-13 (cited in Petition, 8, Reply, 4)



EX1001, FIG. 6 (cited in POR, 47)

However, Applicant has, in making its discovery, provided a mechanism for leveraging the energy in such gas as to provide a source of income, in situations where such gas otherwise might be wasted, for example vented or flared. Applicant’s discovery amounts to a new use for previously known individual components (a common precursor for patentability), and may provide numerous benefits including the reduction of greenhouse gas emissions and capture of revenue where gas disposal is otherwise a capital loss

EX1002, 222-223 (cited in Petition, 11)

The ’372 Patent

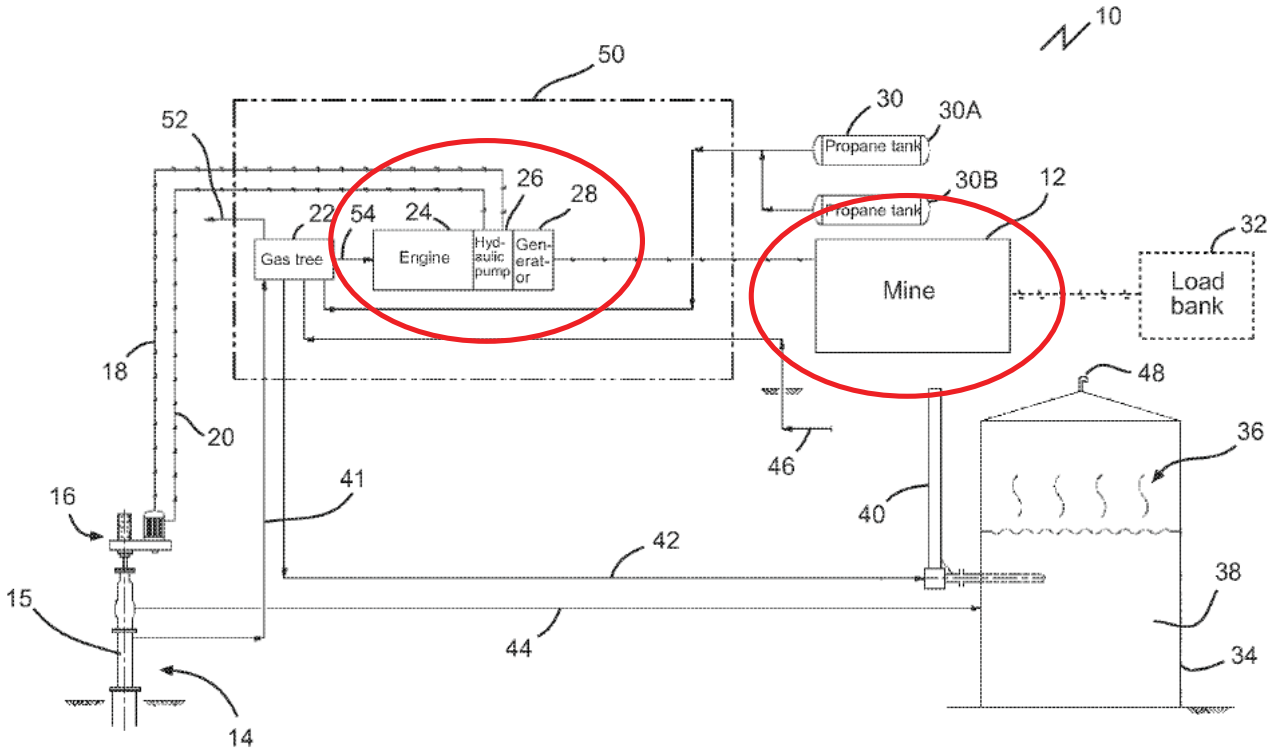


Fig. 1

’372 Patent, Fig. 1 (cited in Petition, 9)

Representative claims of the ’372 patent

1. A system comprising:

a source of combustible gas produced from a facility selected from a group consisting of a hydrocarbon production, storage, or processing facility;

a generator connected to the source of combustible gas to receive a continuous flow of combustible gas to power the generator; and

blockchain mining devices connected to the generator;

in which:

the blockchain mining devices each have a mining processor and are connected to a network interface;

the network interface is connected to receive and transmit data through the internet to a network that stores or has access to a blockchain database;

the mining processors are connected to the network interface and adapted to mine transactions associated with the blockchain database and to communicate with the blockchain database;

the network is a peer-to-peer network;

the blockchain database is a distributed database stored on plural nodes in the peer-to-peer network; and

the blockchain database stores transactional information for a digital currency.

2. The system of claim **1** isolated from a sales gas line and an external electrical power grid.

3. The system of claim **1** in which:

the source of combustible gas and the facility comprise a remote well selected from a group consisting of a remote oil or gas well; and

the remote well is connected to produce the continuous flow of combustible gas to power the generator.

EX1001, Claims 1-3

Claim Construction

Claim Construction

1) “blockchain mining device”

2) “mining processor”

3) “a continuous flow of combustible gas”

4) “sales gas line”

(1) “blockchain mining device”

1. “blockchain mining device”

The term “blockchain mining device” should be construed as “any computing device that is capable of performing blockchain mining without regard to processor speed or power.” [EX1004, 49-50].

Petition, 4-5

You depo

Dr. You, before the break, we were talking about the claim language, blockchain mining devices and network interface.

Do you think these are two separate components in Claim 1 system?

A. No, I don't think so. Previously, I believe you asked me whether the network interface should be within the blockchain mining devices, and my response was that it may or may not be within the network mining devices.

EX1034, 157:12-158:14 (cited in Reply, 2)

Other than the mining processer, is there any other necessary component within the blockchain blockchain mining device?

A. Well, as I stated, there should be connectivities to the network interface, and there could be some associate control systems to ensure the entire engineering systems were integrated and functioning.

EX1034, 177:9-178:11 (cited in Reply, 2)

(2) “mining processor”

2. “mining processor”

The term “mining processor” should be construed as “any processor that is capable of performing blockchain mining without regard to processor speed or power.” [EX1004, 51].

Petition, 6

Crypto you can mine from a home computer in 2023

EX1022, title (cited in Petition, 6 and Reply, 2)

You depo

And is there any reason a personal computer cannot be connected to a power generator?

A. Well, there's no reason saying it cannot be. A personal computer could be adapted to meet all these specifications, when they meet all these limitations and satisfy the constraints as defined as a blockchain mining device.

EX1034, 181:4-182:13 (cited in Reply, 2)

(3) “a continuous flow of combustible gas”

3. “a continuous flow of combustible gas”

The term “a continuous flow of combustible gas” should be construed as “a flow of combustible gas that is continuous for at least a time period (e.g., an hour, a day, a week, a month, or longer).” [EX1003, 54].

Petition, 6

The recitation of a “continuous flow of combustible gas” reflects that the combustible gas is continuous (albeit at varying production rates) as a byproduct of “hydrocarbon production, storage, or processing.”

POR, 7

Definition of BY-PRODUCT

1 : something produced in a usually industrial or biological process in addition to the principal product

EX1037, 1 (cited in Reply, 3)

The claims broadly cover both (1) byproduct gas and (2) primary product gas or sales gas

You depo

Do you think Claim 1 covers both situations as either a primary product or as a byproduct?

A. One -- I believe Claim 1 -- let me double-check Claim 1.

So by reading Claim 1, I think it covers both, if it meets the requirement of the source of combustible gas produced from facilities selected from a group consisting of a hydrocarbon production, storage, or processing facilities.

EX1034, 103:11-104:6 (cited in Reply, 18)

Barbour depo

Q. Does the source of combustible gas cover natural gas you get from a commercial sales gas line?

MR. ZOLOTOREV: Same objections.

THE WITNESS: It might. This -- this singular sentence is quite broad in that depending on the source. If it can be classified as a facility relating to production storage or processing, then, yeah, it could qualify.

EX1033, 146:10-17 (cited in Reply, 18)

Barbour depo

But did you include, you know, when you calculated this 284 systems, applications where you draw natural gas from a natural gas well instead of an oil well?

A. Any application that was pretty clear was an oil and gas application, I generally included.

EX1033, 162:14-24 (cited in Reply, 18)

Objective Indicia of Nonobviousness

Objective Indicia of Nonobviousness

1. **Commercial Success**
2. Unmet Need
3. Industry Skepticism
4. Industry Praise

Improper opinion testimony

Barbour dec

II. UPSTREAM'S PRODUCTS EMBODY THE '372 PATENT CLAIMS

9. As the CEO of Upstream, I have personal knowledge of the system and its operation. As the inventor, I also have personal knowledge of the claims of the '372 Patent. In connection with preparing this declaration, I reviewed the challenged independent claims of the '372 patent as well as certain dependent claims and verified that Upstream's Hash Generator and Hash Hut systems practice the inventions claimed in at those challenged claims. To be sure, our systems embody many more dependent claims than I discuss herein but I have been asked to focus on a subset of exemplary claims in this declaration.

10. In my understanding, Upstream Data systems, such as the Hash Hut and Hash Generator (from the present to the 2017 prototype) embody claims 1 and 24 of the '372 patent. For example, as illustrated in the following annotated diagram

EX2011, ¶9-10 (cited in POR, 13)

You dec

3. Secondary Considerations of Non-Obviousness

74. For this portion of my declaration, I have relied on the declaration of Mr. Barbour (EX2011), the named inventor of the '372 patent and founder of Patent Owner, Upstream Data. For consistency, I have copied relevant portions of Mr. Barbour's declaration, modifying them as needed to reflect my opinions. As set forth below, I agree with Mr. Barbour's analysis of how Upstream Data products embody certain '372 patent claims; I also agree with his views on issues such as long-felt need, industry skepticism and praise.

EX2010, ¶74 (cited in POR, 13)

Barbour depo

MR. ZOLOTOREV: Well, I would disagree with that characterization. His testimony includes facts about things like commercial success and the other factors.

MR. ZHU: So you're characterizing whether a product practiced the claims of the patent as a fact?

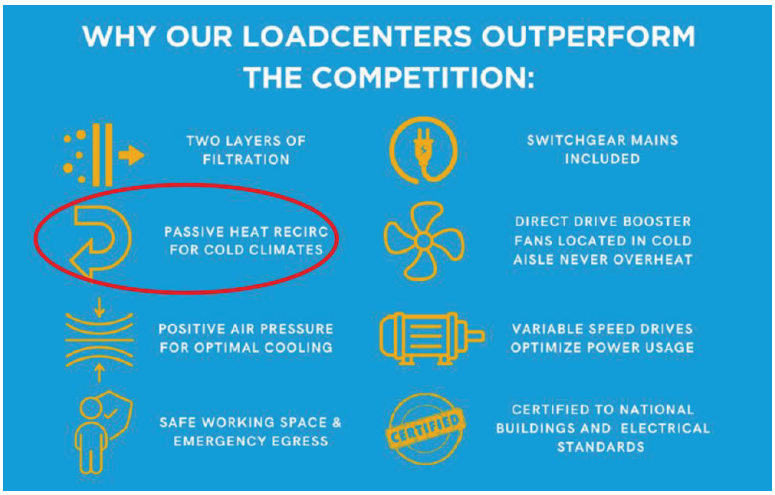
MR. ZOLOTOREV: Well, his -- again, I think the declaration speaks for itself. He's specifically stated in his declaration that he's testifying as an inventor and as somebody knowledgeable -- highly knowledgeable about the products, as well as the head of Upstream Data, rather than as an expert.

MR. ZHU: Okay. I'll take your word for it. He's not testifying as an expert in this case; is that correct?

MR. ZOLOTOREV: He is not being offered by Upstream Data as -- as an expert witness in this case.

EX1033, 173:4-174:12 (cited in Reply, 11)

Upstream failed to show nexus



EX1026, 2 (cited in Reply, 13)

POR, 15

Barbour depo

Q. Okay. And explain a little bit "passive heat recirc for cold climates."

A. Probably, the word "passive" is referring to the fact that there's no additional heating systems beyond -- for example, in the Hash Hut, what the miners themselves are producing.

It sort of relates to the patent we filed around that cooling system that sort of details, like, you know, the spec, I guess, or some of the features of the Hash Hut where all of the heat comes external to the building, which is difficult to achieve without doing it as per, like, that patented spec.

Q. I see. I see.

And this is just the '029 patent we looked at earlier?

A. I still have it opened. Was -- yeah, the '029, yeah.

EX1033, 233:16-234:8 (cited in Reply, 13)

Electric grid/sales gas deployments do not count

You depo

Q. So does Claim 1 cover the situation where the gas is from a commercial sales line?

MR. THOMPSON: Objection. Asked and answered.

THE WITNESS: I don't think that's the case. I believe this was an earlier question you raised.

Claim 1 specifically mentions that a source of combustible gas produced from a facility selected from a group consisting of a hydrocarbon production, storage, or processing facilities. That doesn't happen for a salines line case, and it's not -- the sales line does not produce a source of combustible gas.

EX1034, 104:21-106:8 (cited in Reply, 15)

Single deployments do not embody the claims

POR

Since 2021 and through today Patent Owner has delivered at least an additional 284 systems embodying the '372 patent. Of the delivered systems, approximately 219 (~66%) were deployed in multi-system configurations. Approximately 101 systems (~30%) were deployed with an optional controller.

POR, 22

You depo

Q. I see.

So if you look at the picture in the previous page, in paragraph 76, would that, you know, single container box meet Claim 1?

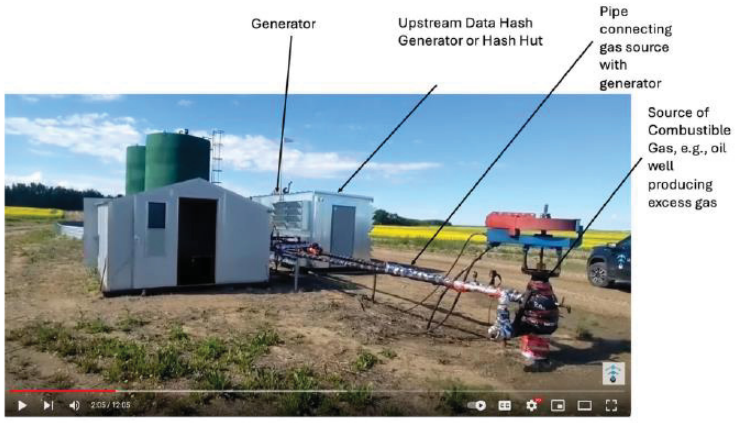
A. So if it's following the petitioner's view, then yes. But based on my understanding, they would require two or more units.

Q. I see.

So are you saying, you know, what is shown here in this figure does not meet Claim 1?

A. Based on my understanding, that's the case. Because Claim 1 recites blockchain mining devices that involve two or more units. If we say each container, each box, it's a mining device, then this photo does not meet the limitation.

EX1034, 153:10-154:7 (cited in Reply, 15)



EX2010, ¶76

Upstream failed to show nexus even for the 284 systems

Barbour depo

So when you -- when you talk about the 284 systems, did you exclude the systems that's hooked up to the electrical grid?

A. What I reviewed, the sales documentation in preparing this declaration, anything that I knew for sure was -- or anything that was unlikely from the records we had to be practicing this patent I excluded in an attempt to be conservative on the numbers.

Q. And when you say "unlikely," does it mean you now -- that the customer is, you know, drawing power from the electrical grid?

A. For example, when I'm given a purchase order, if I personally -- you know, if I -- of course, if I personally knew the client and helped manage the sale and knew it was not -- or at least it was -- I would have doubts, any doubts whatsoever that it would be practicing the patent, I did not include it.

So an example might be a customer who I knew put it on a utility application. And whether or not he could be infringing my patent, to be honest, I'm not clear, but I did not include it because I wouldn't -- wouldn't be enough information to try to determine that.

So earlier you just said if someone, you know, draws power from the electrical grid, that's not included, right?

A. Don't know if I said that precisely. But being uncertain, I tried to narrow what I knew about the sales to directly sources of natural gas, where -- you know, on -- on-site.

I don't know if -- say a product applied to the grid with an upstream external generator as well as gas. I'm not really commenting on that. I'm just saying, to not overstate the sales, I try to limit it to what we knew was co-located on-site with the natural gas source.

Q. And when you say "natural gas source," is that limited to oil wells?

A. I would say no. Any -- any co-location of the equipment on a site with the source of natural gas, in an effort just to be conservative without -- because I do have limited information. Like, I don't have complete information on every sale.

EX1033, 156:9-160:4 (cited in Sur-reply, 18)

Upstream failed to show nexus even for the 284 systems

Barbour depo

But did you include, you know, when you calculated this 284 systems, applications where you draw natural gas from a natural gas well instead of an oil well?

A. Any application that was pretty clear was an oil and gas application, I generally included. In

EX1033, 162:15-20 (cited in Reply, 4)

Q. How many units have you sold in total?

A. In total? So how many, like, Hash Huts, Hash Generators, both, and into every application?

Q. Both, every application.

A. So with every application including, you know, what we talked about earlier, like someone applying a Hash Hut to the grid, many -- like several hundred. I don't know if we're in excess of 400 right now, just because I'd have to review the sales database. Because we have smaller products, too, that are blockchain mining products that are Black Box, et cetera.

EX1033, 139:2-13 (cited in Sur-reply, 18)

Upstream failed to show nexus even for the 284 systems

Barbour depo

Q. Does the source of combustible gas cover natural gas you get from a commercial sales gas line?

MR. ZOLOTOREV: Same objections.

THE WITNESS: It might. This -- this singular sentence is quite broad in that depending on the source. If it can be classified as a facility relating to production storage or processing, then, yeah, it could qualify.

EX1033, 146:10-17 (cited in Reply, 18)

You depo

Q. And does Claim 1 cover the situation where the gas is coming from a natural gas production facility via a commercial sales line?

A. No. I do not think in that way, because here you're talking about a commercial sales line, which is not a hydrocarbon production, storage, or processing facility.

EX1034, 106:2-8 (cited in Reply, 15)

Barbour depo

Q. So is it your opinion that the single-system configuration still practiced Claim 1?

MR. ZOLOTOREV: Objection. Vague and ambiguous. Calls for expert testimony.

THE WITNESS: I believe, previously, a Hash Hut system, single Hash Hut system combined with generator -- Hash Hut being our product, combined with generator at the source of combustible gas would, I think, likely practice Number 1, yes.

EX1033, 168:20-169:3 (cited in Reply, 15)

You depo

So are you saying, you know, what is shown here in this figure does not meet Claim 1?

A. Based on my understanding, that's the case. Because Claim 1 recites blockchain mining devices that involve two or more units. If we say each container, each box, it's a mining device, then this photo does not meet the limitation.

EX1034, 153:10-154:7 (cited in Reply, 15)

Upstream failed to show nexus

Kasdorf dec

> 26. Further, the commercial success could be attributable to numerous other reasons such as marketing efforts, increasing electricity costs, increasing computational efforts required for bitcoin mining, and increasing bitcoin price.

EX1036, ¶26 (cited in Reply, 16)

EX1038, 3 (cited in Reply, 16)

> Is it because the computational effort that you need to mine one Bitcoin increases from year to year?
>
> A. As of now, the current status, it's indeed true that Bitcoin is getting harder and harder to mine, and that was because of inherent algorithm that was designed, as we discussed earlier, to try to ensure that the algorithm is intensive, such that the number of blocks we can mine every day will be somehow consistent.

EX1034, 57:14-22 (cited in Reply, 16)

2017:	1
2018:	2
2019:	10
2020:	32
2021-2024:	284

POR, 20-22

Objective Indicia of Nonobviousness

1. Commercial Success
2. **Unmet Need**
3. Industry Skepticism
4. Industry Praise

There were multiple prior art solutions

Barbour Deposition

A. -- normally any well site that has no access to external power will attempt to use the gas as a fuel to power the well site.

Q. Oh, interesting.

Was it, like, common practice?

A. I would say -- well, it's normal practice in the oil and gas industry to use the gas that's available any way possible. Conserve it, otherwise, as in ship it, sell it somehow.

EX1033, 25:9-26:16 (cited in Reply, 17)

EX1013, 2 (cited in Petition, 78)

You depo

So do you think this long-felt unmet need was solved by Dickenson or Bounty?

A. I need some time to refer to Bounty. For Dickensian, I think they partially adjust this problem. I will not say it's being solved because the solved involved multiple components, depending on how you address it. They are already existing methods to deal

Q. For sure. I -- I guess my question is, does the Mags system address, you know, the problem how to utilize stranded gas?

A. So my understanding about this Mags system is that it's a gas processing equipment unit. It could potentially be used for the stranded gas case. But when you're talking about solving a problem of dealing with the strand gas while performing blockchain mining, I do not believe Mags system will meet the needs.

But when you are talking about utilizing some of the gas resources, the Mags system does describe some methods to process the gas.

EX1034, 244:4-250:24 (cited in Reply, 17)

The ’372 patent only discloses a specific use of Belady

Belady-989

(54) Title: GAS SUPPLY SHOCK ABSORBER FOR DATACENTER POWER GENERATION

and can be obtained inexpensively. For example, natural gas is a byproduct of oil drilling operations and is often considered a waste byproduct since it cannot be economically captured and brought to market.

EX1011, Title, [0004] (cited in Reply, 5)

You depo

Q. I see. So let me ask you a different question. Can a data center be used to mine cryptocurrency?

A. If you're asking about a possibility, yes, and they will need to be adapt to run these kind of algorithms and adapt to connect to the network in related transactions, among others.

EX1034, 39:4-9 (cited in Reply, 5)

Upstream failed to show nexus

Barbour depo

> But did you include, you know, when you calculated this 284 systems, applications where you draw natural gas from a natural gas well instead of an oil well?
>
> A. Any application that was pretty clear was an oil and gas application, I generally included.

EX1033, 162:14-24 (cited in Reply, 18)

Barbour depo

> Q. Does the source of combustible gas cover natural gas you get from a commercial sales gas line?
>
> MR. ZOLOTOREV: Same objections.
>
> THE WITNESS: It might. This -- this singular sentence is quite broad in that depending on the source. If it can be classified as a facility relating to production storage or processing, then, yeah, it could qualify.

EX1033, 146:10-17 (cited in Reply, 18)

You depo

> Do you think Claim 1 covers both situations as either a primary product or as a byproduct?
>
> A. One -- I believe Claim 1 -- let me double-check Claim 1.
>
> So by reading Claim 1, I think it covers both, if it meets the requirement of the source of combustible gas produced from facilities selected from a group consisting of a hydrocarbon production, storage, or processing facilities.

EX1034, 103:11-104:6 (cited in Reply, 18)

Upstream failed to show nexus

Barbour depo

Q. So if it's applied to mine Bitcoin off of the electrical grid, does it still embody to Claim 1?

MR. ZOLOTOREV: Objection. Calls for expert testimony.

THE WITNESS: Claim 1 is -- I guess -- an attorney might say limited to source combustible gas, including a generator.

If you're applying the Hash Hut anywhere outside of that to an electrical grid, probably does not embody Claim 1, unless -- unless it's a generator -- unless that electrical grid is comprised of a generator with source combustible gas, then perhaps. You'd have to be more specific.

EX1033, 96:15-97:2 (cited in Reply, 18)

Objective Indicia of Nonobviousness

1. Commercial Success
2. Unmet Need
3. **Industry Skepticism**
4. Industry Praise

Upstream failed to show nexus

Barbour depo

Q. Yeah. The next sentence says: "Therefore, the industry only considered power sources such as hydrol to support this model."

Same question, right? Is this based on your personal knowledge?

A. Reliability was the -- applying Bitcoin mining to reliable, high-quality power sources, of course, that were also cheap was the prevailing market sentiment in the Bitcoin mining industry in around that 2017 time frame.

Q. Do you have any other authority, other than your personal knowledge, for this statement?

A. What do you mean by "other authority"?

Q. For example, have you read a book or published article that supported this statement?

A. Well, I'm saying in that 2016 -- when I incorporated, that was the number one -- I mean, there wasn't a lot published at the time. It was mostly forums, or maybe social media, although I don't think there was much activity -- too much activity. There was some social media platforms.

But, yeah, that was the -- I don't know what authority I could cite. That was pretty much anyone -- any research I could find was -- that was part of the status quo of Bitcoin mining.

EX1033, 243:12-245:25 (cited in Reply, 18)

"In 2018, I got laughed out of the room when I talked about mining bitcoin on flared gas," said Ortolf. "The concept of bringing hydrocarbons to market without a counterparty was laughable."

EX2016, 6 (cited in POR, 26)

Upstream failed to show nexus

CNBC article

For years, oil and gas companies have struggled with the problem of what to do when they accidentally hit a natural gas formation while drilling for oil. Whereas oil can easily be trucked out to a remote destination, gas delivery requires a pipeline. If a drilling site is right next door to a pipeline, they chuck the gas in and take whatever cash the buyer on the other end is willing to pay that day. But if it's 20 miles from a pipeline, drillers often burn it off, or flare it. That is why you will typically see flames rising from oil fields.

EX2016, 2-3 (cited in POR, 26)

WSJ article

For now, Mr. Barbour is holding on to the cryptocurrency that he creates in Alberta, only selling bitcoin when he needs to cover operating costs.

In addition to his container on Black Pearl's oil field, he has built and sold two other units. He is working on his fourth for a team in Texas that was drilling for oil but found only natural gas.

But he has struggled to get oil-industry veterans interested in mining cryptocurrencies. In September, he showcased a rough version of his mining container at an oil show in Lloydminster, a city on the Alberta and Saskatchewan border, to a bewildered crowd.

"Locally, pretty much nobody knows what bitcoin is," he said.

EX2017, 6 (cited in POR, 26)

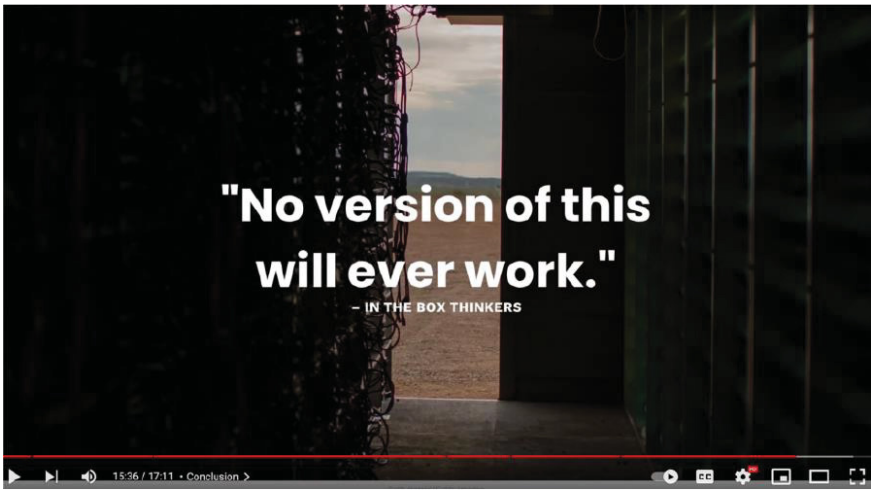
Upstream failed to show nexus

CNN article

A group of Wall Street analysts has a unique idea to allow shale producers in Texa's oil-rich Permian Basin to profit from the massive amount of natural gas that is currently being wasted as a result of shale extraction: harness it to power a Bitcoin mining operation.

EX2018, 4 (cited in POR, 27)

TED talk



EX2019, 15:36 (cited in POR, 28)

Objective Indicia of Nonobviousness

1. Commercial Success
2. Unmet Need
3. Industry Skepticism
4. **Industry Praise**

Upstream failed to show nexus

K33 Report

Several companies and business models have emerged in this rapidly growing niche. The biggest company, Crusoe Energy, signs gas purchase agreements with major oil producers, installs its flare mitigation system close to the oil wells, and operates it. Crusoe Energy has termed the concept "Digital Flare Mitigation."

Crusoe has helped several oil companies reduce flaring from their United States operations, including ExxonMobil39 and Equinor. Crusoe plans to enter the Middle East through an office in Oman as part of its partnership with the Oman government.

Another leading company in this niche is Upstream Data, which pioneered the concept in 2017. This Canadian company's business model differs from Crusoe's in that instead of simply purchasing the gas, it sells equipment directly to oil producers so they can mine bitcoin themselves. Other companies with similar business models include E.Z. Blockchain, Giga Energy, and Jai Energy.

Which properties of bitcoin mining make the process a superior customer of stranded natural gas? Oil wells are often located in remote places where it is difficult to set up and operate other energy-intensive power-to-x operations. Because bitcoin mining is an unconstrained location-agnostic process, bitcoin miners can come directly to oil wells to eat up the excess natural gas. In addition, since oil sites typically produce declining amounts of excess natural gas as they mature, an offtaker must be able to scale down its operation modularly. Bitcoin mining is a modular process since you can combine different numbers of machines into varying energy usage levels. Also, when oil wells deplete, the consumer should be able to follow the oil producer to a new site. A bitcoin mining system can be built into a

EX2020, 7 (cited in POR, 29; Sur-reply, 23)

Ground 1: The Dickerson-CryptoKube Combination

Dickerson (PCT Publication No. 2015/123,257)

(54) Title: APPARATUS FOR FLARE GAS PROCESSING AND USE

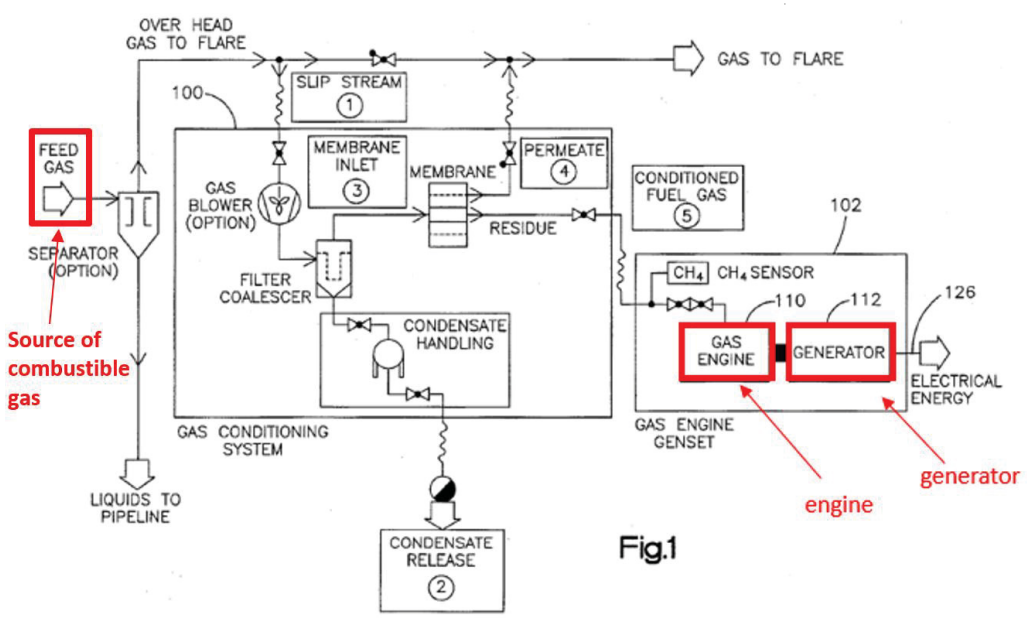


Fig.1

(57) Abstract: A mobile apparatus may include a mobile platform or container equipped with at least one membrane separation unit for separating useful fuel gas from raw natural gas produced at an oil or gas production facility, a gas engine that uses the fuel gas to generate electricity that is returned to the facility, and a control panel for operating the apparatus. A method may include the steps of delivering the apparatus to an oil or gas production facility, connecting and operating the apparatus while the facility is generating raw natural gas, and disconnecting and removing the apparatus from the site when raw natural gas is no longer being generated.

EX1005, FIG. 1 (cited in Petition, 14)

CryptoKube is a mobile miner

CryptoKube

Launch 200

The Launch 200 is designed as a entry level data center for the smaller industrial bitcoin miner or investor. This Kube is ready for you to hook-up a 200 amp service and have you mining with up to 72 kw or around 17 Spondoolie SP35. Everything you need is already inside and ready to go. JUST ADD POWER!

Quick Specs

- Fresh air cooled for maximum efficiency
  - Multiple fans for redundant cooling
  - Can operate from -10c to +30c
- Easy deployment
  - 200 amp, 208 volt 3 phase service require
- Easy deployment
- Built in 2-4 weeks

Launch 200 $29,900 USD ~~$30,200~~ *price is for base model*

EX1006, 1 (cited in Petition, 15, 20-21, 24-25, 30-34, 36-37, 68)

CryptoKube requires cheap electricity

Szmigielski

Industrial miners face almost the same issues as data centers: access to relatively cheap power, good network access, access to latest hardware, and stable political climate. Then there are the demands of installing a lot of computing hardware inside

EX1009, 88 (cited in Petition, 17, 123)

Inexpensive and reliable electricity

One of the biggest costs for Bitcoin miners is the cost of electricity. Electricity is needed in both running the hardware and the associated cooling systems, be it fans or air conditioning. Miners, therefore, seek out locations where electricity is fairly priced. In order to save on cooling costs, they also seek locations with cooler climates. Iceland is a popular location for its abundance of power and for its cool climate. The Scandinavian countries are in demand because the arctic winds do a lot to cool the equipment. In North America, the biggest industrial Bitcoin mine is located in eastern Washington state due to the abundance of inexpensive hydroelectric power.

EX1009, 90 (cited in Petition, 17, 20, 82)

The Dickerson-CryptoKube Combination

Cheap/free excess electricity

Dickerson

[0039] In some cases the amount of electrical power required on an oil field pumping site may be small compared to the amount of power that can be produced with the gas available. For example, the amount of gas going to flare might produce about 3 MW of power when only about 250 KW is needed to run the site. Therefore, the system can provide power for both local consumption and also for export to the grid at the same time if utility power lines are accessible from the site.

EX1005, [0039] (cited in Petition, 14)

Need for electricity

CryptoKube

Low Cost Operation

The CryptoKube was designed from the ground up to consider the cost of operations. Power and cooling are the largest operating costs when running a Bitcoin mining operation. The selection of fresh air cooling means thatthere are no condensers, chillers or power hungry cooling systems to keep the servers running within their operating parameters. Fresh air cooling makes use of fans, much like a server does, to move large volumes of air through the data center to cool the servers and remove the hot air exhaust. The cooler the weather, the faster the ASIC chips in the servers will run. The CryptoKube can run inside a large warehouse, outside in a parking lot or in a server pod farm where the power is cheapest.

EX1006, 4 (cited in Petition, 15)

The Dickerson-CryptoKube Combination

Dickerson

[0014] In one embodiment the mobile container is a 40-foot long ISO container that is capable of holding the heating system, coalescer, one or more membrane separation units, gas engine, and control panel. The heating system, coalescer, membrane separation units, and control panel are in

EX1005, [0014] (cited in Petition 20)

CryptoKube

Security

The CryptoKube ships with a best of class internet firewall, preconfigured to protect your investment in server hardware and keep them running 24 hours a day. The CryptoKube is built inside an ISO shipping container and secured with steel security doors. The choice of a shipping container was primarily due to its reputation for physical security. The optional security cameras and card access control further increase your security posture and peace of mind.

EX1006, 4 (cited in Petition, 20)

The Dickerson-CryptoKube Combination

Upstream does not challenge the motivation of utilizing Dickerson's cheap/free excess electricity, but alleges:

- Motivation to combine is based on hindsight (POR, 9-11)
- Secondary considerations (POR, 11-30)
- Equipment cost is high and there is no excess electricity (POR, 30-33)
- Electricity from a gas generator is not "reliable" (POR, 34-39)
- The Petition did not address reasonable expectation of success (POR, 39-41)
- The combination does not disclose "connected to the network interface and adapted to…communicate with the blockchain database" (POR, 41-50)

Reply, 5-8; POR, 9-50

People had proposed such a combination

Mining with free natural gas

Hello all,

I am looking for some advice. I have followed bitcoin for awhile but, never been a miner. With news of the bitcoin reward halving upcoming in about 1000 blocks, I am considering starting. I have come into a unique situation. A property that we have recently purchased has natural gas. This specific property was owned by a wealthy guy before we purchased it and he was responsible for bringing natural gas to our rural area in the early 1900's. When he worked the land grant deal with the gas company, they awarded him a pennies on the dollar gas contract for the life of the property as long as his family members are alive. So this basically translates to natural gas that cost next to nothing....

EX1016, 1 (cited in Reply, 5)

Barbour depo

Q. Do I understand that the author was considering mining with natural gas?

A. Reading it here, yeah. I mean, it's in the title, and he's talking about cheap natural gas.

Q. So after seeing this, is it still your opinion that the industry only consider power sources such as hydro?

MR. ZOLOTOREV: Objection. Vague and ambiguous. And calls for an expert opinion.

THE WITNESS: I don't know. I can't really

EX1033, 246:18-247:11 (cited in Reply, 5)

Kasdorf depo

Bitcoin miners, the CryptoKubes that I built. But in the -- in the period of selling the CryptoKube, I spoke with multiple clients who -- who wanted to place my CryptoKube on a natural gas generator that was attached to flare gas. This was in -- between 2014 and 2016. But I've never pursued the depth of

EX2022, 18:4-18 (cited in Reply, 5)

Petition addressed reasonable expectation of success

Petition

> As described in this Petition, not only had this been done before, but a person of skill in the art, in 2017, would have been motivated to co-locate a blockchain mining device (e.g., for mining Bitcoin-brand digital currency)[2] at a source of inexpensive power, and would have done so with a reasonable expectation of success of arriving at the Challenged Claims.

Petition, 1-2

> Both the Dickerson system and CryptoKube are containerized and built inside an ISO shipping container to confer better mobility. [EX1005, [0014]]; [EX1006, 1-4]. Thus, it is easy to combine the two by (1) connecting the two systems or (2) placing the respective equipment of the two containers into a single container. [EX1003, 98]; [EX1004, 96].

Petition, 20

"evidence of a reasonable expectation of success … may flow from the prior art references themselves, the knowledge of one of ordinary skill in the art, or, in some cases, from the nature of the problem to be solved." *Elekta Ltd. v. ZAP Surgical Sys., Inc.*, 81 F.4th 1368, 1377-78 (Fed. Cir. 2023).

Reply, 9

Reply, 8-9

Petition addressed reasonable expectation of success

Kasdorf dec

17. It is my opinion that a POSITA would have had a reasonable expectation of success in combining Dickerson and CryptoKube because the combination requires no more than plugging an appliance to a power source. The Dickerson system is designed to provide power to power the

EX1036, ¶17 (cited in Reply, 9)

CryptoKube

Launch 200

The Launch 200 is designed as a entry level data center for the smaller industrial bitcoin miner or investor. This Kube is ready for you to hook-up a 200 amp service and have you mining with up to 72 kw or around 17 Spondoolie SP35. Everything you need is already inside and ready to go. JUST ADD POWER!

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  - 200 amp, 208 volt 3 phase service require
- Easy deployment
- Built in 2-4 weeks

Launch 200 $29,900 USD ~~$38,200~~ price is for base model

EX1006, 1 (cited in Petition, 15)

No additional equipment cost needed

Dickerson

[0024] Oil and gas production facilities require electricity and sometimes heating and cooling to operate, but production facilities are typically located in remote areas where no utility power is available. In accordance with the present method, the container and equipment is transportable and

EX1005, [0024] (cited in Petition,19)

[0039] In some cases the amount of electrical power required on an oil field pumping site may be small compared to the amount of power that can be produced with the gas available. For example, the amount of gas going to flare might produce about 3 MW of power when only about 250 KW is needed to run the site. Therefore, the system can provide power for both local consumption and also for export to the grid at the same time if utility power lines are accessible from the site.

EX1005, [0039] (cited in Petition, 19)

No additional equipment cost is needed

Kasdorf dec

42. However, in the proposed combination, Dickerson's system is already implemented to power the oil well, and there is no additional equipment cost needed. Dickerson teaches that its system generates excess electricity and teaches selling excess electricity to the grid. EX1005, [0039]. When no grid is available, a POSITA would have viewed CryptoKube as a great solution. EX1005, [0039] and [0024]. Further, Dickerson teaches "The modular design approach of the containerized solution allows for future **design flexibility**" and "[t]hrough the addition of future engine and membrane units, additional gas can be processed and the **generation capacity can be increased**." Dickerson, [0034]. Thus, to the extent that more power is needed, a POSITA would have been motivated to modify Dickerson as needed to increase the generation capacity, taking into consideration the equipment cost and the potential profit generated by CryptoKube. A POSITA would have done so with a reasonable expectation of success considering Dickerson's modular design.

EX1036, ¶42 (cited in Reply, 22)

Gas generators provide "reliable" energy

Kasdorf dec

14. Upstream's argument that power from a gas generator is "unreliable" is also wrong, considering the wide-spread use of such gas generators to power oil wells (Barbour depo tr, 25:9-26:16), and Upstream's position that gas supply is "continuous." POR, 7 ("the combustible gas is continuous (albeit at varying production rates)"). Dickerson's system and the MAGS system power the oil production facility (EX1005, Abstract), and Belady's system powers a data center (EX1011, Abstract), and there is no reason to think the energy supply is unreliable. In fact, one of Dickerson's advantages is "high uptime." Dickerson, [0032]. Dickerson's backup diesel generator also ensures reliability. EX1005, [0021]. Belady further teaches improving reliability by using the gas supply shock absorber. EX1011, Abstract. Indeed, comparing to prior art, the '372 patent offers no inventive measures to make gas generators more "reliable." While boasting the importance of the "optional controller," Upstream admitted that in most cases, there is no need for the "optional controller" because the gas supply is abundant. Barbar depo tr, 216:17-217:5 ("they were just taking a small chunk"). In any case, a POSITA would have known how to set up the system to only use a "small chunk" of the gas supply to ensure reliability. *Id.*

EX1036, 14 (cited in Reply, 7)

Gas generators provide "reliable" energy

Dickerson

[0032] Reliable process solution: The Membrane System is a passive solution with no mechanical or rotating parts. Maintenance and operating costs are reduced considerable compared to other gas treating solutions. The engine operates with a gas similar to natural gas which allows for extended service intervals and high uptime. Installation is ideal for remove locations.

EX1005, [0032] (cited in Reply, 7)

In an application where the facility operator contemplates times when raw natural gas flow will be interrupted, a stand-by diesel generator is provided.

EX1005, [0021] (cited in Reply, 7)

[0039] In some cases the amount of electrical power required on an oil field pumping site may be small compared to the amount of power that can be produced with the gas available. For example, the amount of gas going to flare might produce about 3 MW of power when only about 250 KW is needed to run the site. Therefore, the system can provide power for both local consumption and also for export to the grid at the same time if utility power lines are accessible from the site.

EX1005, [0039] (cited in Petition, 19)

Gas generators provide “reliable” energy

You Deposition

> So again, any power source, any energy source with careful engineering, detailed technologies, and regulation and control, they could eventually be reliable.

EX1034, 23:11-24 (cited in Reply, 7)

Belady-989

> **(57) Abstract**: Gas supply pressure spikes are absorbed and leveled-out by a gas supply shock absorber comprising gas storage, which is charged during positive pressure spikes and utilized during negative pressure spikes. The gas supply shock absorber also

EX1011, Abstract (cited in Reply, 7)

Barbour Deposition

> example, and they were just taking a small chunk and -- at a steady rate, it wouldn't be as useful to them, so they decided to save money. Mostly would be recommending the product, especially lately, with it improving in terms of scaleability.

EX1033, 216:17-217:5 (cited in Reply, 8)

"connected to the network interface and adapted to…communicate with the blockchain database"

1. A system comprising:
a source of combustible gas produced from a facility selected from a group consisting of a hydrocarbon production, storage, or processing facility;
a generator connected to the source of combustible gas to receive a continuous flow of combustible gas to power the generator; and
blockchain mining devices connected to the generator;
in which:
the blockchain mining devices each have a mining processor and are connected to a network interface;
the network interface is connected to receive and transmit data through the internet to a network that stores or has access to a blockchain database;
the mining processors are connected to the network interface and adapted to mine transactions associated with the blockchain database and to communicate with the blockchain database;
the network is a peer-to-peer network;
the blockchain database is a distributed database stored on plural nodes in the peer-to-peer network; and
the blockchain database stores transactional information for a digital currency.

EX1001, Claim 1

Petition addressed “mining processor”

Petition

> CryptoKube is built inside an ISO shipping container and is filled with spondooliestech SP35 servers, that is, blockchain mining devices, each necessarily having a mining processor. [EX1006, 1-4].
>
> A POSITA would have understood that to mine digital currency, the miners need to be connected to a network interface (e.g., a modem or a router) in order to access a distributed, blockchain database that is shared across a network. [EX1004, 104-105]. Thus, CryptoKube meets [1c_i].

Petition, 23-24

> *Microsoft Corp. v. FG SRC, LLC*, 860 Fed. App’x 708, 713 (Fed. Cir. 2021) (“Arguments in a petition must be made with particularity, not opacity.”)

Sur-reply, 1

Petition addressed "mining processor"

Kasdorf dec

104. The CryptoKube is built inside an ISO shipping container and is filled with spondooliestech SP31 OR SP35 servers, that is, blockchain mining devices, each necessarily having a mining processor. [EX1006, 1-4]. CryptoKube also provides "a best of class internet firewall." [EX1006, 4]. CryptoKube contains routers. [EX1007, 00:06:11]. A POSITA would have understood that to mine bitcoin, the bitcoin miners need to be connected to a network interface (e.g., a modem or a router). For example, Kheterpal explains that the Bitcoin protocol defines a system in which the creation and distribution of the bitcoin cryptocurrency is governed by consensus among a peer-to-peer network. [EX1010, [0004]]. The network maintains a public ledger (e.g., bitcoin database) in which new transactions are verified and recorded by members of the network via cryptography. *Id*. The operations of verifying and recording transactions of cryptocurrencies such as transactions in the bitcoin cryptocurrency are sometimes referred to as mining, because completion of each mining operation typically rewards the miner with newly created cryptocurrency (e.g., bitcoins). *Id*. Verified transactions and newly created bitcoins are recorded in the public ledger. *Id*. The public ledger serves as an official history of transactions. *Id*. The amount of cryptocurrency owned by any entity may be determined from the public ledger. *Id*.

EX1004, ¶104 (cited in Petition, 24)

The ASIC chip is (1) connected to the network interface and (2) adapted to communicate with the blockchain database

You Depo

Q. Okay. What other meaning would you ascribe to the meaning "to communicate"?

A. So it would exchange data among other informations, and that's what communication is all about.

EX1034, 87:1-4 (cited in Reply, 10)

Q. Do you need internet connection in order to mine cryptocurrency?

A. I believe network connectivity is important and necessary in this particular case.

EX1034, 34:6-9 (cited in Reply, 10)

You Depo

So does the ASIC, itself, need to exchange data with the blockchain database when it performed the mining function?

A. So when you are talking about blockchain mining, the whole term of blockchain mining would require connections and communications with the blockchain database. But if we are talking about running the algorithms on the ASIC chip itself, the chip could run algorithms without network connection.

EX1034, 197:1-10 (cited in Reply, 10)

Q. So in order to mine Bitcoin, doesn't ASIC chip need to exchange data with a blockchain database?

A. Well, again, to mine Bitcoin, exchanging with the blockchain database will be necessary.

Q. I see.

A. The ASIC chip running the network connection is not a must, but to get a bit -- crypto -- or to get a digital currency, connection communication with the blockchain database will be necessary.

EX1034, 198:23-199:6 (cited in Reply, 10; Sur-reply,3)

The ASIC chip is (1) connected to the network interface and (2) adapted to communicate with the blockchain database

Barbour Depo

Q. Can you just finish that sentence? What were you trying to say? What was controller acting as an interface between?

MR. ZOLOTOREV: Objection. Calls for expert testimony.

THE WITNESS: I think I answered that already. The controller on a mining server interfaces between a number of things, but including network communications, with a blockchain database, among other things. So it's an interface between the chips and other components on the miner.

EX1033, 205:9-19 (cited in Sur-reply, 2)

Barbour Depo

Q. And now, for the ASIC chip to mine transactions, does it need Internet access?

THE WITNESS: In one way or the other, an ASIC chip needs to be controlled and have access to up-to-date information on the network.

EX1033, 207:1-5 (cited in Reply, 10)

The ASIC chip is (1) connected to the network interface and (2) adapted to communicate with the blockchain database

Szmigielski

In this chapter, we will take a look at mining with **Application Specific Integrated Circuits** or **ASICs**. They are microprocessors built for a single purpose. In the case of Bitcoin mining, they are built to perform the SHA-256 hash function that is used in Bitcoin. ASICs have a clear advantage over other mining hardware, as they are the fastest hashing machines (save for the still-theoretical quantum computer) designed specifically for the repeated hashing of candidate blocks.

EX1009, 76 (cited in POR, 49; Sur-reply, 3)

Kasdorf depo

Q. So again, just focusing on -- on this portion of the specification at 17, 15 through 21, as described here, the ASIC integrated circuit is doing the mining while this other component called "controller" is connected to the network interface and communicating with the network, right?

A. Correct. According to this specification.

EX2022, 65:6-66:3 (cited in POR, 48-49; Sur-reply, 3)

Representative claims of the ’372 patent

1. A system comprising:
a source of combustible gas produced from a facility selected from a group consisting of a hydrocarbon production, storage, or processing facility;
a generator connected to the source of combustible gas to receive a continuous flow of combustible gas to power the generator; and
blockchain mining devices connected to the generator;
in which:
the blockchain mining devices each have a mining processor and are connected to a network interface;
the network interface is connected to receive and transmit data through the internet to a network that stores or has access to a blockchain database;
the mining processors are connected to the network interface and adapted to mine transactions associated with the blockchain database and to communicate with the blockchain database;
the network is a peer-to-peer network;
the blockchain database is a distributed database stored on plural nodes in the peer-to-peer network; and
the blockchain database stores transactional information for a digital currency.

EX1001, Claim 1

A subpart of the Spondoolies meets the "mining processor" limitation

Kasdorf dec

> 21. Even under Upstream's narrow view that claim 1 requires the "mining processor" to perform the communication functions, a combination of an ASIC chip and a controller would meet the "mining processor" limitation. Dr. You admitted that the "blockchain mining device" can be a subpart of Hash Generator (e.g., minus the generator, the container box, and/or the racks holding the miners) and the "mining processor" can be a subpart of the S9 miner (e.g., minus the front fan and/or the container box). You depo tr, 160:8-162:21 ("some elements relevant to the function of the blockchain mining devices are part of this device"), 205:13-207:16 ("not everything in the hash generator would be a blockchain mining device"), 211:23-213:19 ("this subset, if they meet all the claim language, would be considered as a mining processor"). By the same rationale, a subpart of the Spondoolies (e.g., the combination of the ASIC chip and the controller) can also be the "mining processor" that meets the "connected to… communicate" limitation.

EX1036, ¶21 (cited in Reply, 11)

A subpart of the Spondoolies meets the "mining processor" limitation

Sur-reply

> Third, "Petitioner cannot use this testimony, extracted by leading questions by Petitioner's counsel, as a basis to justify a new theory in a Reply Brief and accompanying expert declaration for the first time." *Arthrex, Inc. v. KFx Medical, LLC,* IPR2016–01697, Paper 27 at 42; *see also Corephotonics, Ltd. v. Apple Inc.*, 84 F.4th 990, 1008–09 (Fed. Cir. 2023) (A petitioner may not raise in a reply "'an entirely new theory of prima facie obviousness absent from the petition,' even if the new theory is responsive to the patent owner's response or the Board's institution decision.")

Sur-reply, 4

Petition

> CryptoKube is built inside an ISO shipping container and is filled with spondooliestech SP35 servers, that is, blockchain mining devices, each necessarily having a mining processor. [EX1006, 1-4].

Petition, 23-24

A combination of an ASIC chip and a controller meets the "mining processor" limitation

You depo

Q. Can a mining processer in Claim 1 be satisfied by a subset of the S9 miner?

A. Again, if a subset of S9 miner, as a whole system, meet the requirements that the mining processors are connected to the network interface and adapted to my transactions associated with blockchain database and communicate with the blockchain database, which follow specification that the network is a peer-to-peer network, the blockchain database is a disputed database start on pearl nodes in a peer-to-peer network, and the blockchain database stores transactional information for digital currency, then, yes, this subset, if they meet all the claim languages, would be considered as a mining processer.

EX1034, 211:23-213:19 (cited in Reply, 11)

Ground 2: The Dickerson-CryptoKube-Belady-989 Combination

The Dickerson-CryptoKube-Belady-989 Combination

Belady-989

(57) Abstract: Gas supply pressure spikes are absorbed and leveled-out by a gas supply shock absorber comprising gas storage, which is charged during positive pressure spikes and utilized during negative pressure spikes. The gas supply shock absorber also

EX1011, Abstract (cited in Reply, 7)

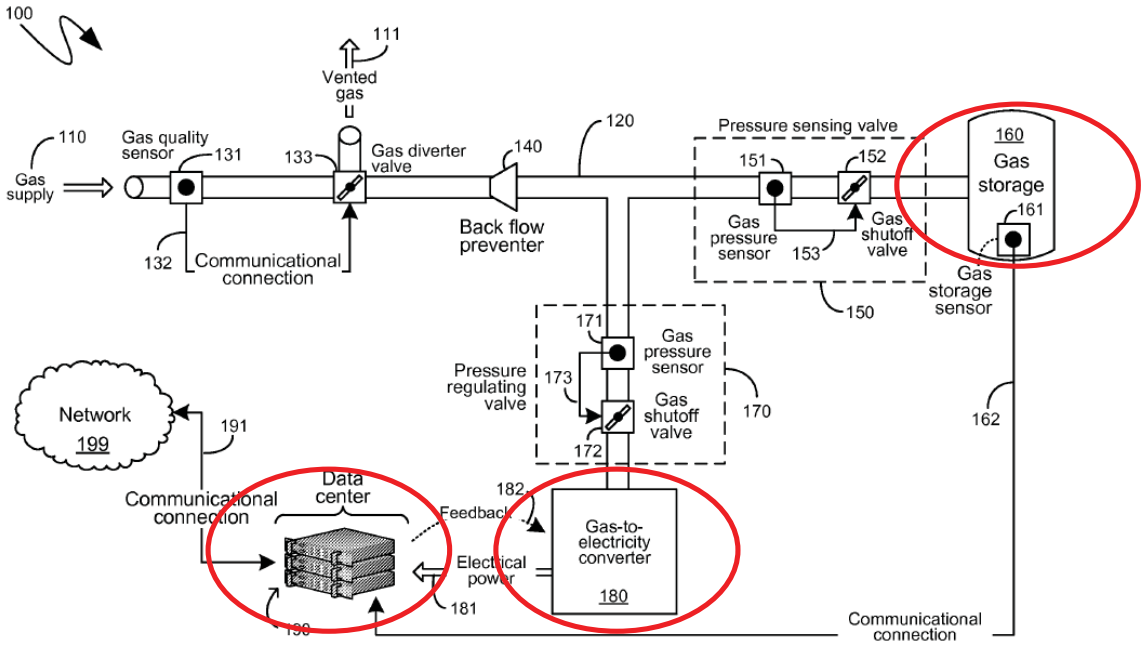


Figure 1

EX1011, FIG. 1 (cited in Petition, 49)

The Dickerson-CryptoKube-Belady-989 Combination

Belady-989

[0004] However, data centers often consume large quantities of electrical power, especially by the computing devices themselves. Increasingly, the cost of obtaining such electrical power is becoming a primary determinant in the economic success of a data center. Consequently, data centers are being located in areas where the data centers can obtain electrical power in a cost-effective manner. In some instances, data centers are

EX1011, [0004] (cited in Petition, 51)

Dickerson

In one embodiment, auxiliary means for providing electricity is provided when there will likely be periods when the production facility will require electricity but will be generating no or low levels of raw natural gas.

EX1005, [0021] (cited in Petition, 51)

The Dickerson-CryptoKube-Belady-989 Combination

Upstream does not challenge the motivation of utilizing Belady-989's gas supply shock absorber, but repeats the same arguments regarding Ground 1 (POR, 50-51) and alleges:

- (1) the modification would involve significant changes
- (2) a POSITA would have been motivated to shut off all mining servers considering the servers may be damaged by voltage and frequency drop in the power supply, and cooling may fail when no power is present;
- (3) CryptoKube differed from Belady's datacenter in that CryptoKube cannot offload processing to other data centers;
- (4) CryptoKube's DCIM cannot control individual ASIC chips within Spondoolies; and
- (5) no POSITA was knowledgeable in both disciplines (oil and gas and crypto mining)

Reply, 20; POR, 51-55

CryptoKube was highly customizable

Kasdorf dec

> 35. Upstream is wrong. First, in my opinion, a POSITA would have been motivated to modify CryptoKube with a reasonable expectation of success because CryptoKube was highly customizable, and optional DCIM software that could be programmed (1) to selectively shut off a subset of the Spondoolies based on temperature or power supply and (2) to ensure the cooling system is prioritized over the Spondoolies. Specifically, the DCIM software can be programmed

EX1036, ¶35 (cited in Reply, 21)

> 37. Third, comparing to a traditional data center (e.g., a 911 call center), one advantage of bitcoin mining is you can pause and resume at will—there is no need to actively offload the processing from CryptoKube because the processing is automatically offloaded to other miners in the blockchain network.

EX1036, ¶37 (cited in Reply, 21)

The load control claims broadly covers shutting off all Spondoolies (and thus all ASIC chips)

The '372 patent

> **10**. The system of claim **1** in which the system is configured to modulate a power load level exerted by the blockchain mining devices on the generator, by increasing or decreasing the mining activity of the mining processor.
>
> **11**. The system of claim **10** in which the system is configured to modulate the power load level by selecting one or more actions from a group of actions consisting of increasing or decreasing a maximum number of mining processors that are engaged in mining transactions.

EX1001, claims 10-11

Kasdorf dec

> 36. Second, the load control claims broadly cover both (1) shutting off a subset of Spondoolies and (2) shutting off all Spondoolies. Barbour transcript, 211:5-14 ("The mining activity can be adjusted, I guess, a number of ways. Obviously, well, cutting power to it is one"); You transcript, 225:15-23 (turning on and off meets the limitation), 228:16-25.

EX1036, ¶36 (cited in Reply, 21)

The load control claims broadly covers shutting off all Spondoolies (and thus all ASIC chips)

Barbour depo

Q. So if you shut down a mining processor, does that decrease the mining activity of that mining processor?

MR. ZOLOTOREV: Objection. Vague and ambiguous. Calls for expert testimony.

THE WITNESS: The mining activity can be adjusted, I guess, a number of ways. Obviously, well, cutting power to it is one, clock rate is another, Internet connection might be another way to modify the mining activity.

EX1033, 211:5-14 (cited in Reply, 21)

You depo

Q. Does turning off and on --

(Reporter clarification.)

BY MR. ZHU:

Q. The servers meet that limitation?

A. Turning on and off, as long as they can increase or decrease the number of active servers, then -- if you think that turning on and off will adjust the number of active servers, then, yes, you will be able to consider them as part of the control functions.

EX1034, 225:15-23 (cited in Reply, 21))

No need for a POSITA to be knowledgeable in both disciplines

Petition

D. Level of Ordinary Skill in the Art

A POSITA would have a degree in chemical engineering, petroleum engineering, process engineering, mechanical engineering, or a similar field with 1-2 years of experience in designing power generation systems, Blockchain mining systems, or other comparable hands-on experience. [EX1003, 19]. Alternatively, a person having 3-5 years of experience in the Blockchain mining industry would also qualify as a POSITA. *Id*. Additional education could substitute for professional experience, or vice versa. *Id*.

Petition, 7-8

In cross-disciplinary cases, a POSITA "may be a composite of different types of individuals" (e.g., part of a multi-disciplinary research team). *AstraZeneca Pharm. LP v. Anchen Pharm., Inc.*, 2012 WL 1065458, at *19-*22 (D.N.J. Mar. 29, 2012), aff'd, 498 F. App'x 999 (Fed. Cir. 2013) (collecting cases); *Apotex Inc. v. Novartis AG*, IPR2017-00854, Paper 109 at 10–11 (PTAB July 11, 2018) (collecting cases).

Reply, 6

Ground 3: The Dickerson-CryptoKube-Belady-989-Boot Combination

The Dickerson-CryptoKube-Belady-989-Boot Combination

Boot

(57) **ABSTRACT**

An independent power system provides electrical power to an electric submersible pumping system positioned in a well that produces petroleum products. The independent power system includes a generator and an engine connected to the generator. The engine is preferably provided with combustible gases from the petroleum products of the well. The independent

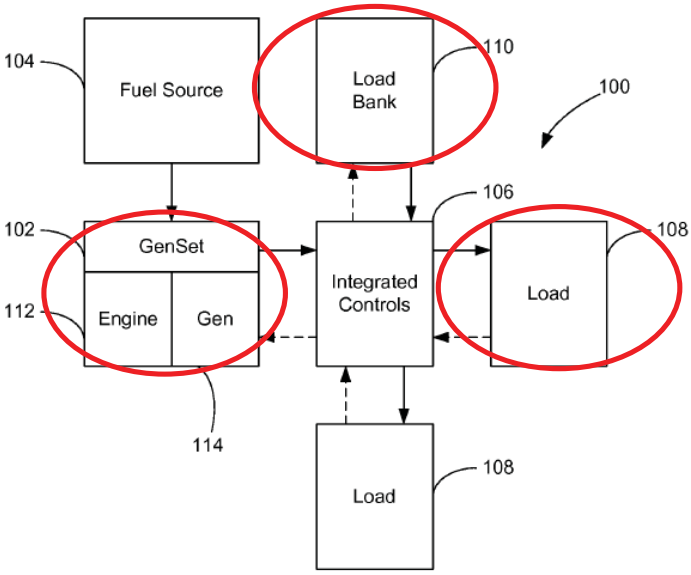
EX1012, Abstract (cited in Petition, 64)

The loads **108** are general references for devices or systems that consume electrical power during a selected operation, such as, for example, electric motors, computers, motor controllers, lighting, heating and other electrical equipment.

EX1012, 2:35-41 (cited in Petition, 65)

In case of a sudden or unpredictable drop-off in power usage by the loads **108**, the load bank **110** is activated to take-up the excess power and stop the engine **112** from racing.

EX1012, 3:8-14 (cited in Petition, 65)



EX1012, FIG. 1 (cited in Petition, 65)

The Dickerson-CryptoKube-Belady-989-Boot Combination

Upstream does not challenge the motivation of utilizing Boot's load bank, but alleges:

- (1) the Petition did not identify with particularity whether Boot's engine or Dickerson's engine is used in this combination
- (2) while Dickerson is a "full-facility generator," Boot is a "pump-related generator"
- (3) Dickerson uses a chiller, which eliminates the need for a loadbank

Reply, 23; POR, 55-58

Dickerson's engine is used in this combination

Petition

> A POSITA would have found it obvious to improve the Dickerson-CryptoKube-Belady-989 combination by further including Boot's teachings including using Boot's load bank to absorb excess power, and gathering oil and gas from multiple wells on a multi-well pad. [EX1003, 284]; [EX1004, 236]. A

Petition, 67 (cited in Reply, 23)

> ***Limitation [1b]***
>
> Boot discloses that the genset 102 includes a driver (engine) 112 coupled to a generator 114. [EX1012, 2: 29-30]. As discussed above, Boot further discloses that the engine 112 operates on methane, ethane or other gases produced in the surface facilities 120 (e.g., phase separators), scavenged from the well 118.

Petition, 69 (cited in Sur-reply, 7)

Similar to Dickerson, Boot is also a full-facility generator

Boot

> The loads **108** are general references for devices or systems that consume electrical power during a selected operation, such as, for example, electric motors, computers, motor controllers, lighting, heating and other electrical equipment.

EX1012, 2:35-39 (cited in Reply, 24)

> **2**. The process of claim **1**, wherein the one or more electrical loads are selected from the group consisting of submersible pumps, surface pumps, water processing equipment, battery pumps, waste treatment equipment, lighting, drilling equipment, auxiliary electrical equipment and transfer pumps.

EX1012, claim 2 (cited in Reply, 24)

Dickerson's chiller does not eliminate the need for load bank

Dickerson

[0022] At some production facilities, only a relatively small portion of the raw natural gas generated by the facility is needed to power the facility, and it is desirable for environmental and sometimes economic reasons for the flaring of raw natural gas to be further reduced. In one embodiment, the invention achieves this objective with the addition of a chiller unit. All or some portion of the raw natural gas generated by the facility is passed through the chiller and the chiller removes natural gas liquids (NGLs) from the raw natural gas stream. The NGLs are collected in containers that can be transported offsite. In the practice of this embodiment the need to flare gas is thus further reduced or eliminated, and the NGLs can be used elsewhere or sold to generate revenue. As an additional advantage, the chiller is powered by electricity from the generator, and the chiller's consumption of electricity furthers the goal of reducing flaring, since the added electricity demand enables the generator to utilize more methane. The chiller is in one embodiment contained in a separate mobile unit but operated through the main control panel.

EX1005, [0022] (cited in Reply, 24)

Ground 4: The MAGS-Polivka Combination

MAGS produces cheap/free excess electricity

MAGS

MAGS separate the natural gas mixture into three streams:

(1) Methane (to generate electricity for "either local use or sale to the grid")

(2) Ethane (to power the MAGS itself)

(3) NGL (to be transported for sale)

Pioneer Energy's Mobile Alkane Gas Separator (MAGS) system separates flare gases that naturally occur at drilling sites into three streams: one can be captured in tanks and shipped off for sale, another powers generators that run the drilling operation, and a third powers MAGS itself. Pioneer sold its first MAGS unit in late 2014 to a company operating in North Dakota, where flare gases are most often simply burned onsite, the gases wasted.

EX1013, 2 (cited in Petition, 78)

to separate the natural gas mixture into three streams. One stream, composed almost entirely of methane with a small amount of ethane, is sent off to power generators to provide electricity for either local use or sale to the grid.

EX1014, [0134] (cited in Reply, 25)

Polivka is a mobile miner

Polivka

Mining Container ~100kW by Polivka GmbH
February 07, 2015, 12:11:27 PM #1

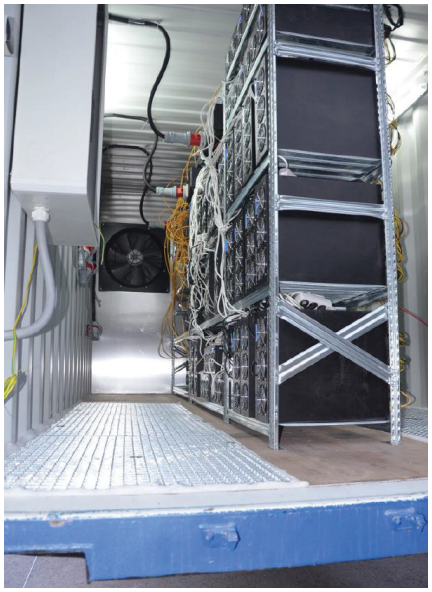
Hello Bitcoin-Community,

Polivka GmbH presents the Mining-Container, should be okay for >100kW of your gear:

Outside

Right aisle and shelf

EX1015, 1 (cited in Petition, 80)



EX1015, 31 (cited in Petition, 81)

Polivka requires cheap electricity

Polivka

If I could get this miner

https://bitcointalk.org/index.php?topic=944406.0

It would work. this miner does not exist . putting 114 s-5's or sp20 in that crate won't pay off.

Now if I had cheap power yeah maybe.

I do like the build.

EX1015, 15 (cited in Petition, 81)

Here in washington state, where we have 2 cent per kilowatt hour hydro power, and more bitcoin mines then we know what to do with... and all of our dams have fish ladders. it can be done, and done profitably.

also doesnt vienna have a nuclear power plant that has never been turned on?

EX1015, 21 (cited in Petition, 81)

On a bigger scale this also causes costs, and not to little of it. You can't avoid it if you want to have cheap power - it doesn't come to you, you must move to it.
Therefore a mobile solution is a nice thing to have. You find a place with even much cheaper power? Not an issue, truck comes tomorrow.

EX1015, 17 (cited in Petition, 81)

I guess this is for gas production only - as soon as you use the gas in a combustion engine to produce electricity you should have heat in abundance.
In Austria some of the biogas electricity plants also offer the service of drying wood chips with the excess heat - I'm not an expert on the biogas field, but we have been thinking on offering the wood-chip drying with miner heat for a second...

EX1015, 18 (cited in Petition, 81)

The MAGS-Polivka Combination

Cheap/free excess electricity

MAGS

> to separate the natural gas mixture into three streams. One stream, composed almost entirely of methane with a small amount of ethane, is sent off to power generators to provide electricity for either local use or sale to the grid.

EX1014, [0134] (cited in Reply, 25)

Need for electricity

Polivka

> If I could get this miner
>
> https://bitcointalk.org/index.php?topic=944406.0
>
> It would work. this miner does not exist . putting 114 s-5's or sp20 in that crate won't pay off.
>
> Now if I had cheap power yeah maybe.
>
> **I do like the build.**

EX1015, 15 (cited in Petition, 81)

The MAGS-Polivka Combination

Upstream repeats the Ground 1 arguments, and alleges:

- (1) unlike Dickerson, MAGS does not produce excess power even occasionally because all the energy produced by MAGS was already spoken for
- (2) MAGS only produces 450kWh, which is not enough to satisfy Polivka's requirement of 120.3kW
- (3) in Young, the engine is rated for 150kW, but only "about 100kW" is required and thus 50kW would be left over for this engine

Reply, 24-25; POR, 59-61

MAGS produces cheap/free excess electricity

MAGS separate the natural gas mixture into three streams:
(1) Methane (to generate electricity for "either local use or sale to the grid")
(2) Ethane (to power the MAGS itself)
(3) NGL (to be transported to market for sale)

to separate the natural gas mixture into three streams. One stream, composed almost entirely of methane with a small amount of ethane, is sent off to power generators to provide electricity for either local use or sale to the grid. Another, composed primarily of ethane and methane (ethane-rich stream), is sent to the MAGS internal power generator to support its own operation. The third, composed of natural gas liquids including propane, butane, pentane, and hexane, as well as higher hydrocarbons, is stored as a liquid so that it can be transported to market for sale.

EX1014, [0134] (cited in Reply, 25)

the oil produced. As shown in optional step **326**, the electricity may be transmitted to the grid for sale. The process **300**

EX1014, [0161] (cited in Reply, 25)

MAGS and Polivka are customizable

51. However, in my opinion, the 450 kWh embodiment is just one example based on one MAGS-200. EX1014, [0144]. The output of MAGS can be adjusted when the gas supply is ample and multiple MAGS-200 can be used. Young teaches "**Flexible capacity scaling with multiple deployments on a single site** is made possible with machine-to-machine communication and prioritization." Young, [0298]. Further, CryptoKube is customizable, and a POSITA can install as many Spondoolies as desirable. Vern depo Tr., 28:21-24. The same goes for Polivka. A POSITA would have been motivated to customize the system based on gas supply with a reasonable expectation of success.

EX1036, ¶51 (cited in Reply, 25)

[0144] In one embodiment, a MAGS-200 field unit processes 200 mcf of raw natural gas per day.

[0145] Assuming a feed of a NGL-rich composition typical of many Bakken sites as shown in Table 1, such a MAGS-200 unit can refine such a raw feed into enough methane to produce about 450 kWh of electrical power and about 1700 gallons of natural gas liquids per day. The output produced by such a MAGS-200 unit would vary with the gas input composition.

EX1014, [0144]-[0145] (cited in Reply, 25)

MAGS

[0298] Flexible capacity scaling with multiple deployments on a single site is made possible with machine-to-machine communication and prioritization. This allows a geometric increase in turndown (three 3:1 units allow 9:1 turndown on a single-site for particularly volatile gas availability)

EX1014, [0298] (cited in Reply, 25)

MAGS and Polivka are customizable

MAGS

[0242] In one embodiment, the MAGS-200 embodiment utilizes a 150 kW rated, methane-propane dual-fuel gas engine. Since only about 65% power capacity (about 100 kW) is required, so derating of the engine is not a concern. For initial start-up, the unit could be run on the wellhead gas at an additional deration until the MAGS system is fully operational.

EX1014, [0242] (cited in POR, 61)

Q. And so it's rated for 150 kilowatts, right?
A. Yes.
Q. But only about a hundred kilowatts of that is required; is that right?
A. Correct.
Q. So a maximum of 50 kilowatts would be left over, correct?
A. Correct.

EX2022, 89:15-24 (cited in POR, 61)

Polivka

Mining Container ~100kW by Polivka GmbH
February 07, 2015, 12:11:27 PM #1

Hello Bitcoin-Community,

Polivka GmbH presents the Mining-Container, should be okay for >100kW of your gear:

Outside

Right aisle and shelf

EX1015, 1 (cited in Petition, 80)

Ground 5: The MAGS-Polivka-Belady-989 Combination

The MAGS-Polivka-Belady-989 Combination

Upstream does not challenge the motivation of utilizing Belady-989's gas supply shock absorber, but alleges there is no reasonable expectation of success because Belady-989 taught shutting off gas flow to the generator when supply gas pressure rises.

Reply, 26; POR, 65-67

Kasdorf dec

> 57. However, in my opinion, Belady's "pressure regulating valve" is just a safety feature, and under normal conditions, it should never be triggered, because excess gas can be diverted into storage during positive pressure spikes. EX1011, Abstract.

EX1036, ¶57 (cited in Reply, 26)

Ground 6: Section 101

Section 101

1. A system comprising:
a source of combustible gas produced from a facility selected from a group consisting of a hydrocarbon production, storage, or processing facility;
a generator connected to the source of combustible gas to receive a continuous flow of combustible gas to power the generator; and
blockchain mining devices connected to the generator;
in which:
the blockchain mining devices each have a mining processor and are connected to a network interface;
the network interface is connected to receive and transmit data through the internet to a network that stores or has access to a blockchain database;
the mining processors are connected to the network interface and adapted to mine transactions associated with the blockchain database and to communicate with the blockchain database;
the network is a peer-to-peer network;
the blockchain database is a distributed database stored on plural nodes in the peer-to-peer network; and
the blockchain database stores transactional information for a digital currency.

EX1001, Claim 1

A. The '372 Patent Is Ineligibly Abstract

The '372 Patent centers around the abstract idea of using natural gas to power a blockchain mine. [EX1001, Abstract]; [EX1003, 522-524]. The claims recite nothing more than "generic processes and machinery" to achieve the result of powering a blockchain mine with natural gas. *Yu*, 1 F.4th at 1043 (explaining

Petition, 114

Upstream tries to rewrite the claims to read in "flare gas" and "not a residential gas line"

POR

blockchain mining at [a] hydrocarbon facility.'" *Id.* Given the subject matter of the '372 patent, Petitioner predictably cannot explain what is abstract about a generator running on a continuous flow of flare gas to produce electricity powering blockchain mining devices having one or more mining processors and a network interface to communicate with a blockchain database. It is hard to fathom a more practical application of concrete elements.

Instead, Petitioner plainly misreads the '372 patent. For one, Petitioner ignores that the source of combustible gas for the recited generator in the '372 patent is not a residential gas line that can be turned-off without consequences; it is a hydrocarbon facility that continuously flows combustible gas used by the generator. EX2010, ¶169. Petitioner also ignores that the mining of blockchain is

POR, 71 (cited in Reply, 27)

The claims broadly cover both (1) byproduct gas and (2) primary product gas or sales gas

Barbour depo

But did you include, you know, when you calculated this 284 systems, applications where you draw natural gas from a natural gas well instead of an oil well?

A. Any application that was pretty clear was an oil and gas application, I generally included.

EX1033, 162:14-24 (cited in Reply, 18)

You depo

Do you think Claim 1 covers both situations as either a primary product or as a byproduct?

A. One -- I believe Claim 1 -- let me double-check Claim 1.

So by reading Claim 1, I think it covers both, if it meets the requirement of the source of combustible gas produced from facilities selected from a group consisting of a hydrocarbon production, storage, or processing facilities.

EX1034, 103:11-104:6 (cited in Reply, 18)

Barbour depo

Q. Does the source of combustible gas cover natural gas you get from a commercial sales gas line?

MR. ZOLOTOREV: Same objections.

THE WITNESS: It might. This -- this singular sentence is quite broad in that depending on the source. If it can be classified as a facility relating to production storage or processing, then, yeah, it could qualify.

EX1033, 146:10-17 (cited in Reply, 18)

The claims even cover electric grid power

Barbour depo

Q. So if it's applied to mine Bitcoin off of the electrical grid, does it still embody to Claim 1?

MR. ZOLOTOREV: Objection. Calls for expert testimony.

THE WITNESS: Claim 1 is -- I guess -- an attorney might say limited to source combustible gas, including a generator.

If you're applying the Hash Hut anywhere outside of that to an electrical grid, probably does not embody Claim 1, unless -- unless it's a generator -- unless that electrical grid is comprised of a generator with source combustible gas, then perhaps. You'd have to be more specific.

EX1033, 96:15-97:2 (cited in Reply, 18)

Other Reference Slides

Crusoe's '307 patent

(57) **ABSTRACT**

Systems and methods are provided to mitigate flaring of natural gas. A natural gas processing system may process raw natural gas into a fuel gas stream that may be used to power any number of on-site power generation modules. In turn, the power generation modules may convert the fuel gas stream into an electrical output, which may be employed to power any number of distributed computing units housed within one or more mobile data centers. In certain embodiments, the distributed computing units may be adapted to mine cryptocurrency or perform other distributed computing tasks to generate revenue.

EX2002, Abstract (cited in POR, 24)

supply about 6 million homes. Such large-scale flaring of natural gas has raised serious environmental and health concerns and various state and federal regulators have begun to take action by implementing strict regulations and enforcement policies. For example, Colorado generally lim-

EX2002, 1:55-57 (cited in POR, 24)

Accordingly, there remains a need for systems and methods for generating electricity from natural gas produced from oil wells. It would be beneficial if such electricity could be produced and consumed on-site, for example, by using it to operate power-intensive, modular processing units. It would be further beneficial if such processing units could be employed to mine cryptocurrency or perform other distributed computing tasks to generate additional revenue.

EX2002, 2:35-42 (cited in POR, 24)

Q. Okay. So now that you've finished reading that section, do you agree that as part of the solution that the patent proposes is to combine power generated from flare gas with computing units that are adapted to mine cryptocurrency?

A. If it -- if raw natural gas is the equivalent to flare gas, then yes, I agree.

Q. And so in 2018, this patent is proposing this as a solution to an existing problem, right?

A. Correct.

EX2022, 44:5-14(cited in POR, 24)

(1) “blockchain mining device”

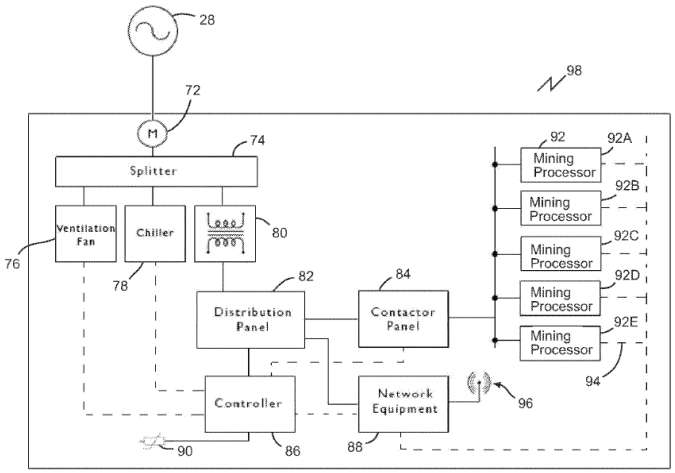


Fig. 4

EX1001, FIG. 4 (cited in POR, 4)

Referring to FIG. **4**, each blockchain mining device **12** may be composed of suitable components. The blockchain mining device **12** may have a network interface, such as network equipment **88**, and one or a plurality of mining processors **92** (**92**A-**92**E for example). The network inter-

EX1001, 15:21-25 (cited in Reply, 2; POR, 4)

Referring to FIG. **4**, an example layout is illustrated of the components that may make up a mining device **12**. The enclosure **98** may contain one or more of a meter **72**, a splitter **74**, a ventilation fan **76**, a chiller **78**, a step-down transformer **80**, a distribution panel **82**, a contactor panel **84**, a controller **86**, network equipment **88** such as a modem and a network switch, a thermistor or temperature sensor **90**, and one or more mining processors **92** such as processors **92**A-E.

EX1001, 16:32-39 (cited in Reply, 2; POR, 4)

Referring to FIG. **4**, the blockchain mining device **12** may comprise a controller **86** connected to operate one or more aspects of the blockchain mining device **12**. The controller **86** may be connected to operate a cooling system, for example having a ventilation fan **76** and a chiller **78**, to maintain the mining processor **92** within a predetermined operating range of temperature. For example, if the internal

EX1001, 17:23-29 (cited in POR, 4)

blockchain mining devices connected to the generator;
in which:
the blockchain mining devices each have a mining processor and are connected to a network interface;

EX1001, 19:59-62 (cited in POR, 4)

(2) “mining processor”

2. “mining processor”

The term “mining processor” should be construed as “any processor that is capable of performing blockchain mining without regard to processor speed or power.” [EX1004, 51].

Petition, 6

Each mining processor **92** may have a variety of configurations, but generally may include at least a power supply, a controller board and mining circuitry, such as an ASIC circuit. Various mining circuitry examples include CPU (central processing unit), GPU (graphics processing unit), FPGA (Field-Programmable Gate Array), and ASIC (application specific integrated circuit).

EX1001, 17:9-15 (cited in Petition, 5, POR, 5)

(4) “sales gas line”

4. “sales gas line”

The term “sales gas line” should be construed as “a pipeline for long-distance transportation of sales gas meeting sales-gas specifications from a hydrocarbon production, storage, or processing facility to a customer connected to the pipeline.” [EX1003, 55-56]. This construction is supported by the ’372 patent

Petition, 7

The ’372 patent only discloses a specific use of Belady

Szmigielski

> Industrial miners face almost the same issues as data centers: access to relatively cheap power, good network access, access to latest hardware, and stable political climate. Then there are the demands of installing a lot of computing hardware inside a building: cooling, monitoring, and maintenance. To make things more difficult, miners get paid in bitcoins but their costs are in fiat currencies (Dollars, Euros, Kronas, and so on).

EX1009, 88 (cited in Petition, 17, 123; Reply, 5)

> **Large Scale Mining challenges**
>
> In addition to facing the same challenges as data centers, such as network connectivity, availability of electricity, and price, the largescale Bitcoin mines face numerous unique issues. The hardware replacement cycles are much shorter, measured in months rather than in years. The Bitcoin exchange rate is an external factor affecting the profitability, and the competition between the miners is fierce. Industrial Bitcoin miners were also the first to employ immersion cooling of components at a large scale. Let's examine the challenges in a little more detail.

EX1009, 90 (cited in Petition, 17; Sur-Reply, 10)