

No. 620,392.

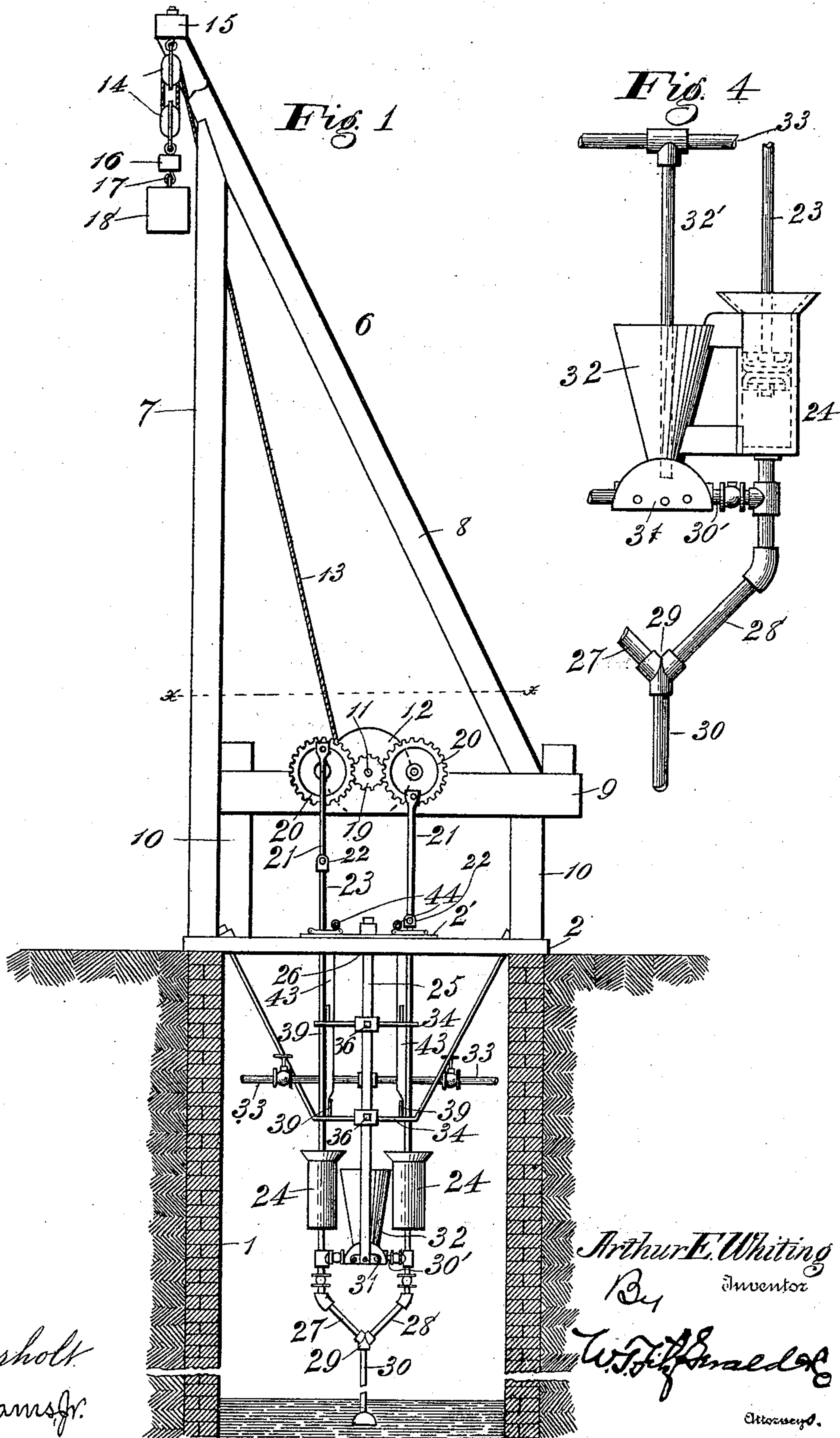
Patented Feb. 28, 1899.

A. E. WHITING.  
FORCE PUMP.

(Application filed Sept. 2, 1897.)

(No Model.)

4 Sheets—Sheet 1.



Witnesses  
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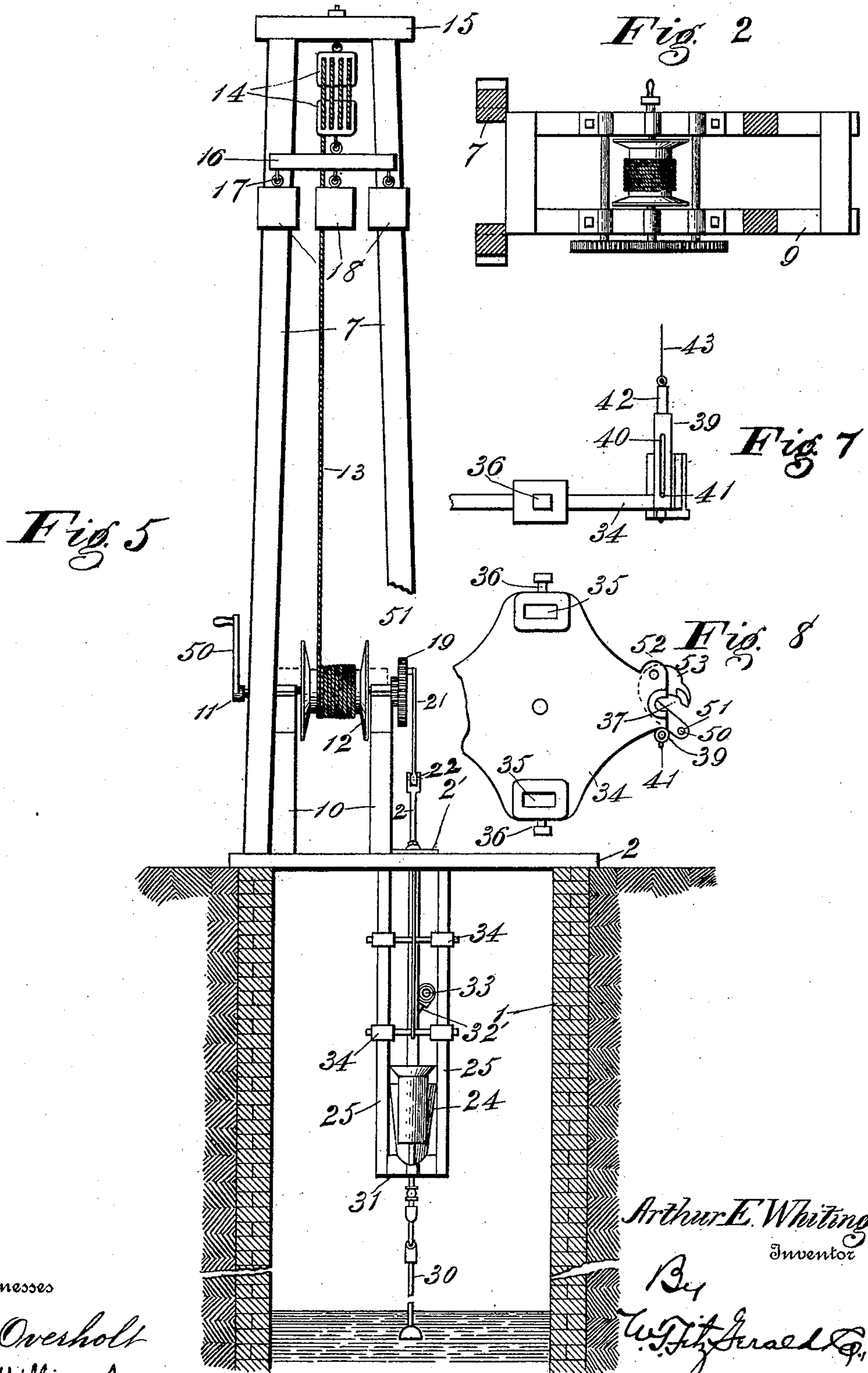
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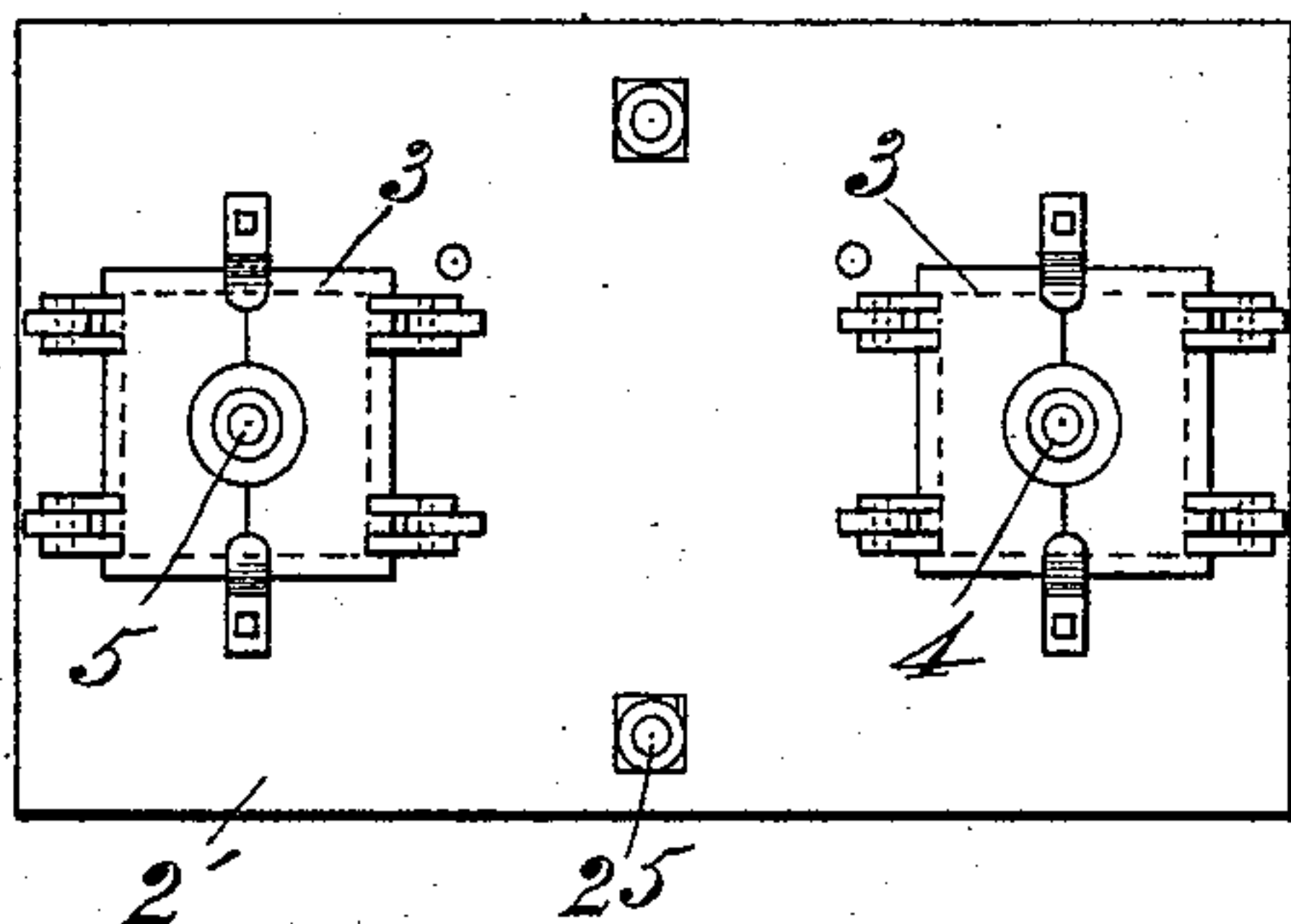
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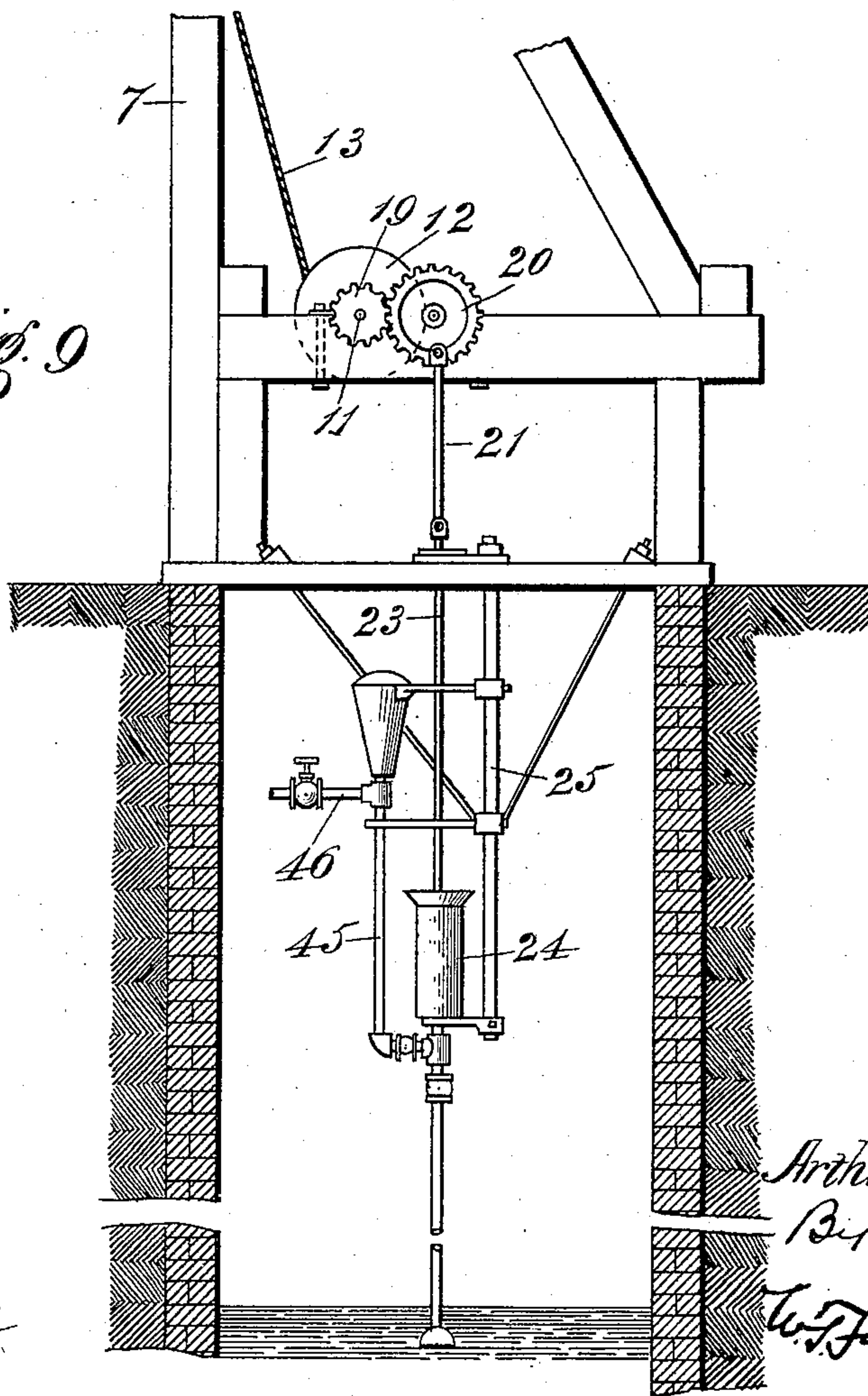
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*Fig. 3*



*Fig. 9*



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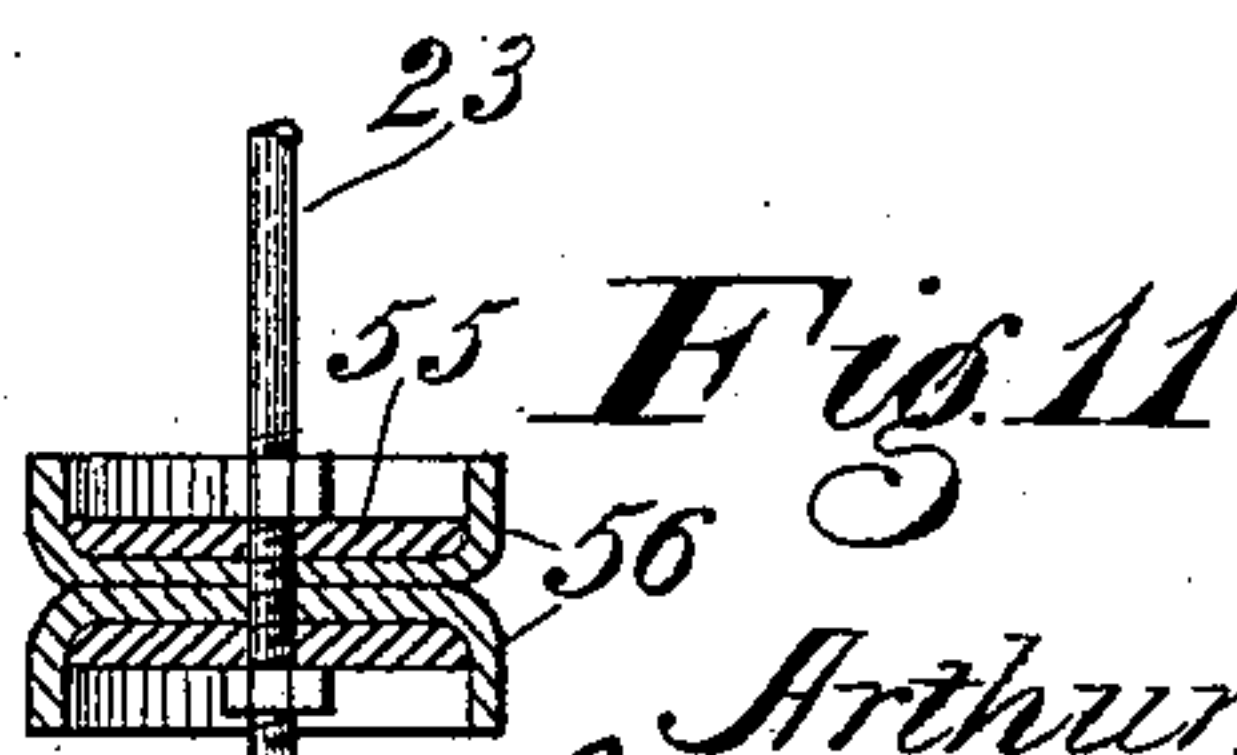
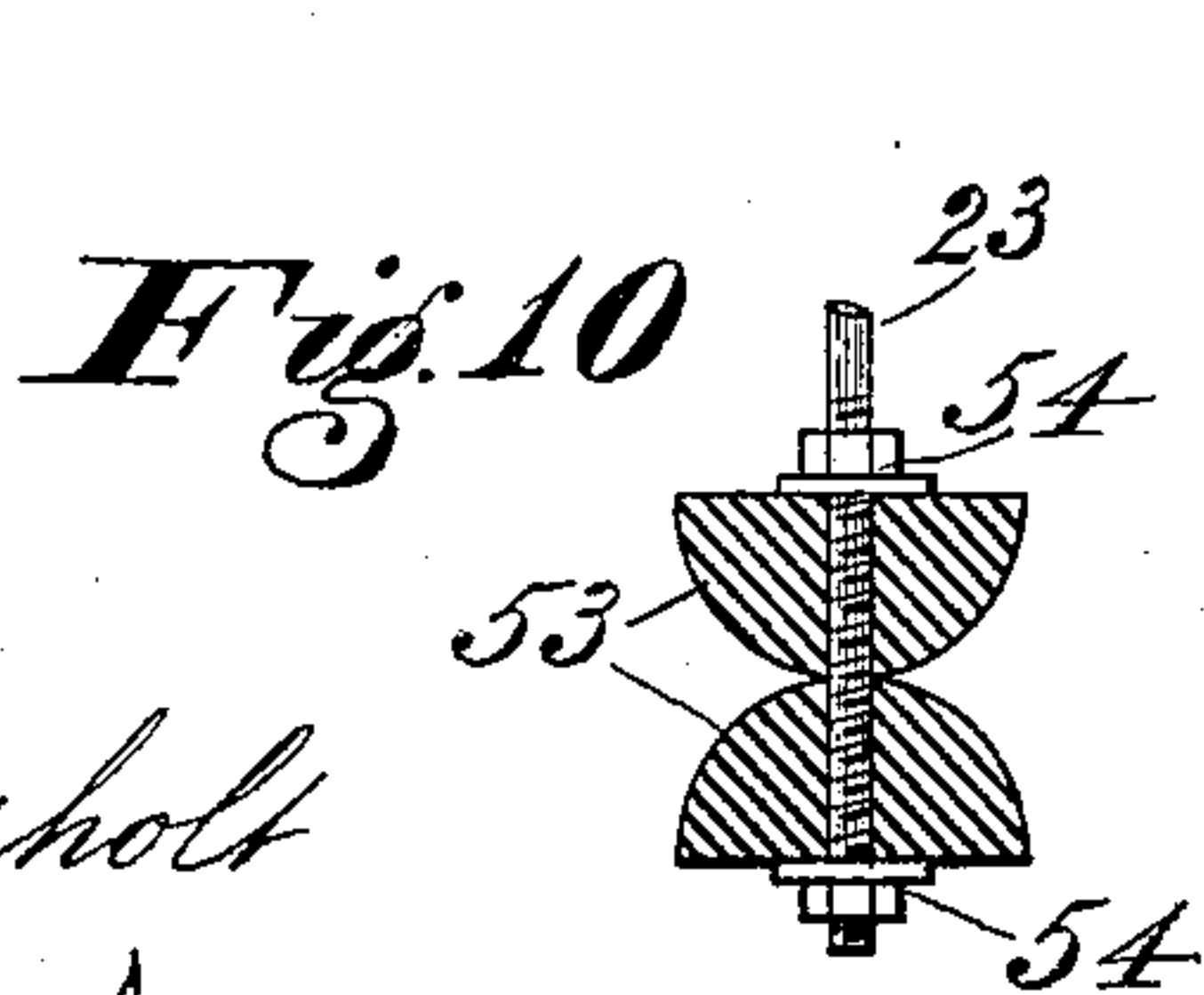
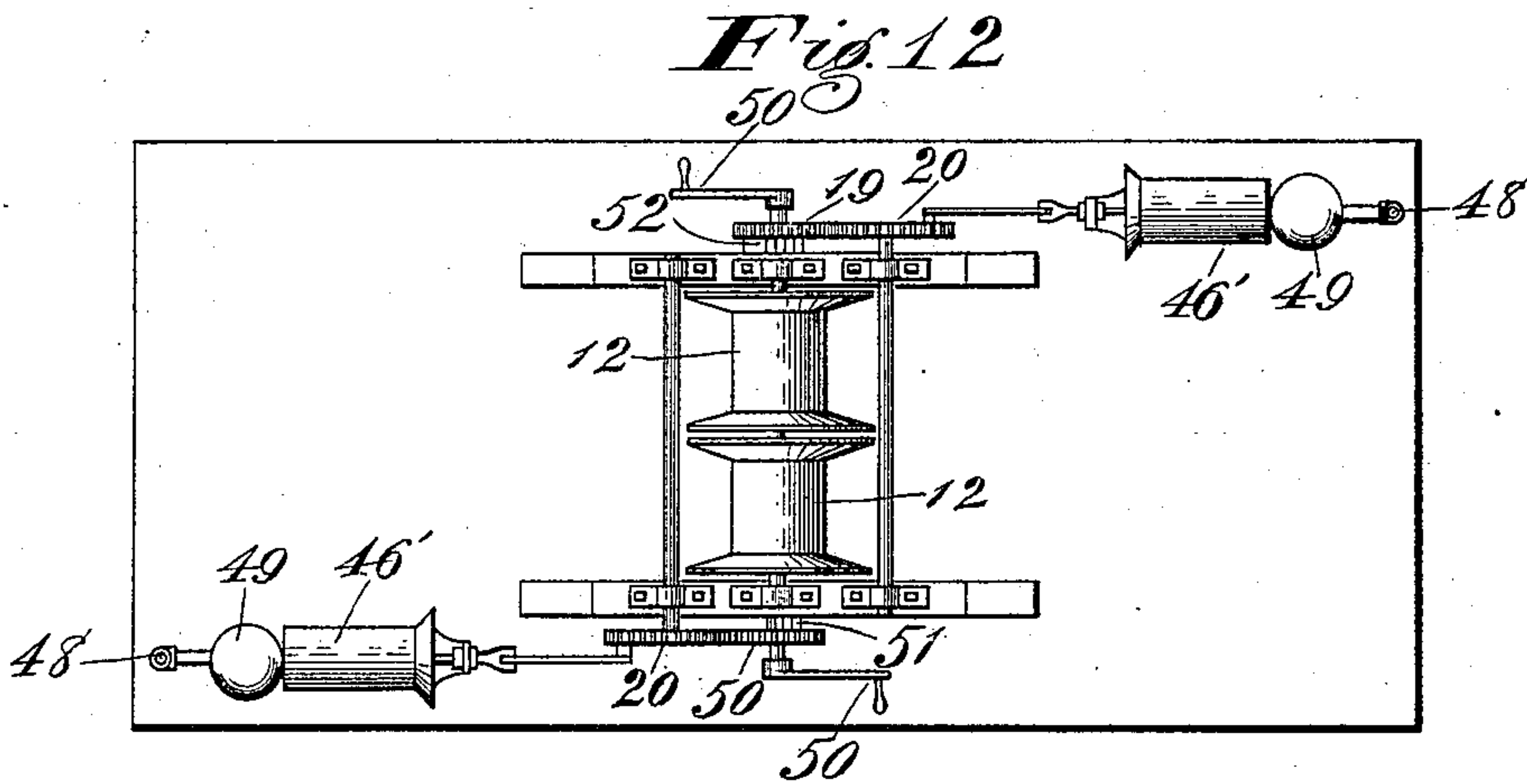
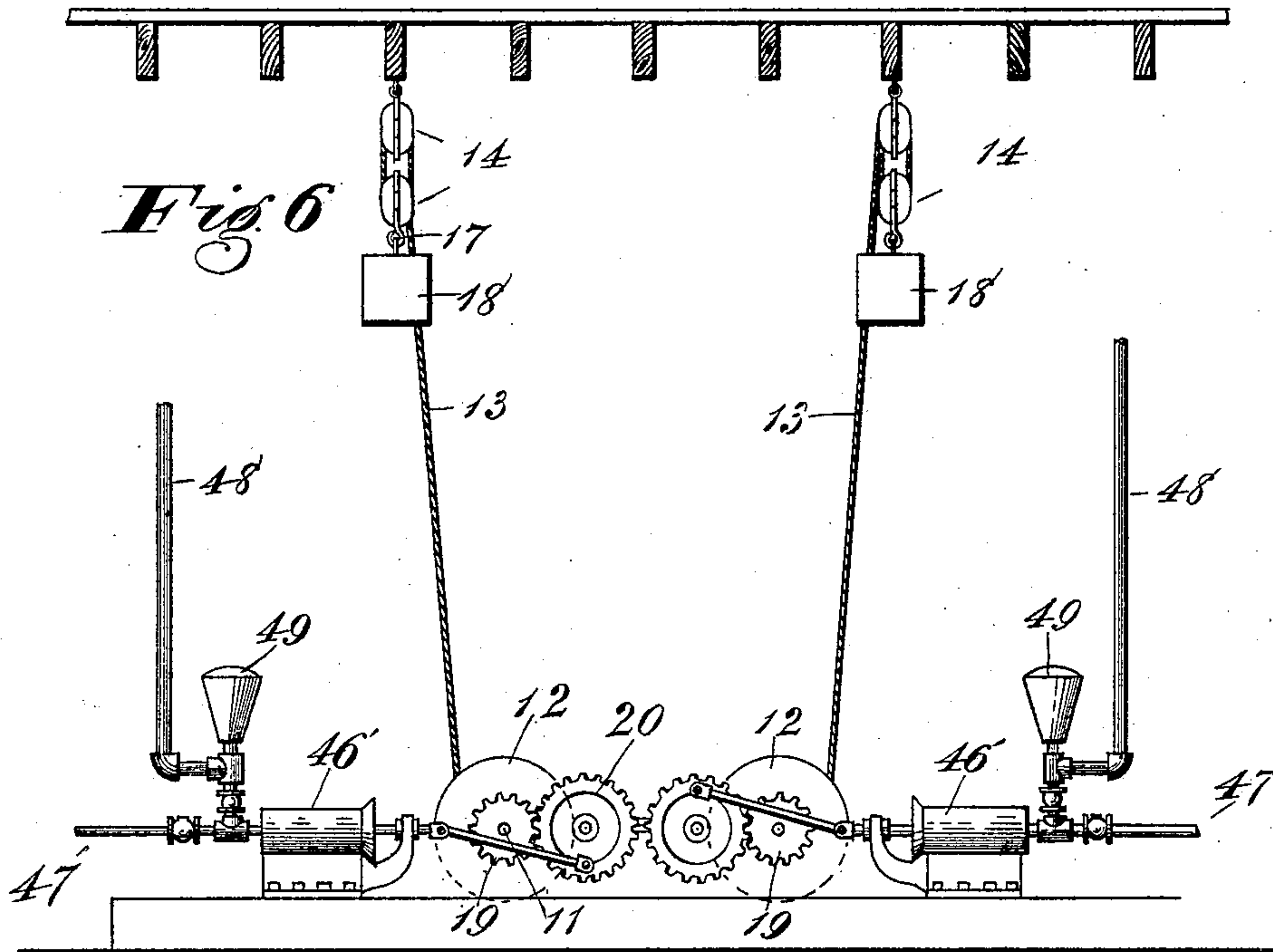
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4 Sheets—Sheet 4.



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# UNITED STATES PATENT OFFICE.

ARTHUR E. WHITING, OF ASHTABULA, OHIO.

## FORCE-PUMP.

SPECIFICATION forming part of Letters Patent No. 620,392, dated February 28, 1899.

Application filed September 2, 1897. Serial No. 650,384. (No model.)

*To all whom it may concern:*

Be it known that I, ARTHUR E. WHITING, a citizen of the United States of America, residing at Ashtabula, (Station A,) in the county of Ashtabula and State of Ohio, have invented certain new and useful Improvements in Force-Pumps; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to new and useful improvements in force-pumps; and the primary object of the invention is to provide a pump of this character that will be especially simple in construction, durable, economical, and efficient in operation.

To these ends my invention consists in the combination and arrangement of a plurality of coacting mechanisms that will be hereinafter fully described, and the points of novelty will be set forth in the claims.

My invention contemplates the provision of a shaft adapted to rotate by the descent of a weight or plurality of weights and which shaft in its rotation will be caused to actuate mechanism whereby the water will be driven or forced from the well.

I am enabled to accomplish the objects of my invention by the simple means illustrated in the accompanying drawings, in which—

Figure 1 represents a side elevation of my improved pump, showing a well-casing in sections. Fig. 2 is a section taken on the line *xx* of Fig. 1, showing a plan view of the winding-drum and operating-wheels. Fig. 3 is a top plan view of the plate covering the well. Fig. 4 is a detail side elevation of one of the cylinders and the air and discharge chambers. Fig. 5 is a front elevation of the pump, the well-casing being shown in sections. Fig. 6 is a view showing the pumps arranged horizontally for use in cellars or like places. Fig. 7 is a detail view showing the pins for releasing the piston-rods. Fig. 8 is a top plan view of the same, showing a portion of one of the bracing-plates. Fig. 9 is a view illustrating a modified form of pump wherein a single cylinder is used. Figs. 10 and 11 illustrate sectional views of plungers or piston-heads which I employ in carrying out my invention. Fig. 12 is a reduced top plan view

illustrating two force-pumps having connections with different water-supplies, said pumps being operated by a single shaft. 55

Referring to the drawings, the numeral 1 indicates the well-casing, covered in the present instance by a plate 2, upon which plate is supported a plate 2', said plate 2' having secured at each side thereof hinged traps 3, 60 having semicircular recesses 4 cut in their edges to form circular perforations 5 when the traps are closed.

The numeral 6 indicates a framework or derrick composed in the present instance of 65 vertical bars 7, oblique bar 8, cross-bars 9, and legs 10. Journaled in suitable bearings on the upper sides of the horizontal bars 9 is a shaft 11, having keyed thereon a drum 12, having a rope or cable 13 wound thereon and 70 passing through pulley-blocks 14, secured to the under side of a transverse bar 15 at the top of the derrick. Secured to the lower pulley-block is a transverse bar 16, provided on its under side with hooks 17 for the reception 75 of the eyes on the upper sides of weights 18. The shaft 11 is provided on the outside of the horizontal bars 9 with a cog-wheel 19, which for convenience of description I will hereinafter refer to as the "drive-wheel." 80 Journaled in suitable bearings on either side of the drive-wheel are cog-wheels 20, having their teeth in mesh with the cog-wheel 19. Pivotaly secured to the sides of the cog-wheels 20, near the peripheries thereof, are 85 two pitman-rods 21, extending downwardly and having their lower ends pivotaly connected, as indicated by the numeral 22, with the upper ends of piston-rods 23, extending through the circular openings 5 in the hinged 90 traps 3. The lower ends of said rods are provided with piston heads or plungers which are adapted to work alternately in cylinders 24, suitably supported by vertical arms 25, which pass through openings 26 in the plate 95 2'. Secured to the bottoms of the cylinders 24 are pipes 27 and 28, having a three-way connection 29 secured to their lower ends, and said connection has secured thereto a pipe 30, extending into the water and pro- 100 vided at its lower end with a nozzle or strainer of any approved construction. The said pipes 27 and 28 are connected near their upper ends with short laterally-extending pipes 30', lead-



ing to the discharge-chamber 31, which communicates with an air-chamber 32, as is usual in force-pumps. Said pipes 27 and 28 are provided with valves adapted to be operated  
 5 in the usual manner to permit the water to be drawn from the well into the cylinders 24 as the pistons reciprocate therein and prevent the same from being forced back into the well upon the downward stroke of the piston. The pipes 30 have valves therein per-  
 10 mitting the entrance of the water to the discharge-chamber and preventing its escape, as is usual.

Secured to the discharge-chamber, at or  
 15 about the center thereof, is a pipe 32', having pipe connections 33, leading to any point where it is desired to run the water. The rods 25 are braced by means of plates 34, provided with slots 35 for the passage of said  
 20 rods. As a means for securing the plates in a fixed position upon the rods I provide bolts 36. The said plates are provided at opposite ends with semicircular recesses 37, adapted to embrace the piston-rods, and pivotally se-  
 25 cured to the ends of said plates are tubes 39, integral with the plates, said tubes being provided with vertical slots 40 for the passage of pins 41, provided upon bolts 42, having wires 43 connected to their upper ends, which  
 30 wires extend through the plate 2' and are provided at their upper ends with links or handholds 44, by which the bolts 42 can be raised for a purpose that will hereinafter become apparent. The locking member 38 has  
 35 an arm 51 with a perforation 50 and a retaining-arm 53. The locking member 38 is pivoted to the plate 34 or to an extension thereof at 52. Fig. 8 shows the pump-rod released. When it is desired to return it to working  
 40 condition, it will be brought in contact with arm 51, forcing the same back until the perforation 50 registers with the tube 39, when the plunger 42 will pass through the perforation 50, as shown in Fig. 7, the pin 41, work-  
 45 ing in the slot 40, thereby limiting the movement of the plunger in either direction.

Referring to the modification illustrated in Fig. 9, it will be seen that a single cylinder is used and the discharge-chamber is dis-  
 50 pensed with, and in lieu thereof a pipe 45 is provided having communication with the pipe 46, through which the water leaves the well. It will further be noted that as there is only one piston-rod and pitman to be operated  
 55 there will be no necessity for more than one of the wheels 20. Attention being called to Fig. 6, it will be noted that I provide two drums 12, having the ropes or cables 13, extending over the pulley-block, which in the  
 60 present instance are shown secured to the transverse beams of the floor. The numeral 46' indicates cylinders having pistons therein and valve-controlled connections 47, leading to the well. I preferably provide in this  
 65 form of pump four working cylinders oppositely disposed, which, it will be obvious, will necessitate the duplication of the gear-wheels

19 and wheels 20 at the opposite ends of the drums. For causing a continuous flow of water from the outlet-pipe 48 I provide air-  
 70 chambers 49, having valve-controlled connections with the pipes 47, leading to the cylinders.

Secured to the shaft 11 is a crank 50, by which means said shaft and the drum secured  
 75 thereto are rotated when it is desired to lift the weights to the top of the derrick, and in order to enable this to be done without operating the pump I mount the wheels 19 loosely upon the shaft and provide the shaft with  
 80 ratchets 51, whose teeth are adapted to be engaged by pawls 52 on said wheels, and it will be seen that by reason of this construction the drum can be rotated in the direction to wind or lift the weights without operating the pump  
 85 mechanism.

Referring to Fig. 10, the numeral 53 indicates two circular sections of rubber centrally perforated for the passage of the piston-rods, which in the present instance will be provided  
 90 above the top section and below the bottom section with nuts 54, adapted to be tightened to force said sections together, and as said sections are formed of yielding material it will be obvious that by forcing them together  
 95 they will be caused to expand, thus compensating for wear. In the form illustrated in Fig. 11 the numeral 55 indicates two disks centrally perforated for the passage of the piston-rod and having leather disks 56 inter-  
 100 posed between them. The piston-rod is provided above the upper disk 55 and below the lower disk with lock-nuts adapted to be turned to bring the disks in close contact with the leather disks, which leather disks,  
 105 it will be apparent, may be readily removed and replaced when worn out.

Having described the mechanism constituting my invention, I will now proceed to describe its operation, attention being called  
 110 to Fig. 1. Assuming the weights to be elevated, as said weights fall the drum 12, through the medium of the cable 13, will be caused to rotate, and the cog-wheel 19 being  
 115 in gear with the cog-wheel 20 will cause said wheels to rotate, which wheels, through the medium of the pitman-rods 21, will cause the pistons to reciprocate and cause the water to be drawn into the cylinders alternately and forced therefrom to the discharge-chamber in  
 120 the same manner, from whence the water is conducted through the pipes 32 and 33 to any point where it is desired to run the same.

Having at times throughout the description referred to the operation of the various  
 125 parts and having described the operation of the form of pump illustrated in Fig. 1, I do not deem it necessary to further describe the forms shown in Figs. 5 and 9, the analogy between said forms being so close as to render  
 130 this description unnecessary.

This invention, it will be understood, is susceptible to many changes and modifications involving mechanical skill which will come



within the scope of the invention without departing from the spirit thereof, and I do not therefore desire to be understood as limiting myself to the precise construction of the parts  
 5 shown in the drawings, as, for instance, I may use any desired form of plunger or piston-head adapted to operate in the cylinder. Further, the cylinders in practice will all be provided with flaring mouths to facilitate the  
 10 entrance of the plungers therein.

Referring to Fig. 12, it will be noted that two drums are placed upon a single shaft having operative connection with the pumps, which in the present instance are adapted to  
 15 lead to different sources of water-supply, and it will be understood that clutches will be employed which will make it possible to run the pumps independently.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In a pump, a brace-plate having a vertical slotted tube and recesses, a device closing and unclosing said recesses, a bolt working in said tube and having a pin working in  
 25 said slot, all arranged as set forth.

2. In pumps, a brace-plate having a recess to receive a pump-rod, said plate carrying a pivoted member for opening and closing said  
 30 recess, a vertical tube on said plate and a bolt working in said tube to lock and unlock said movable member, all arranged as set forth.

3. In a pump, a brace-plate having slots  
 35 for the rods supporting the pump, also having semicircular recesses for the plunger-rods, perforated pivoted members carried by said

plate to retain the plunger-rods in place, and tubes having plungers working therein and registering with the perforations in said mem- 40  
 bers, thereby locking the plunger-rods in position, all arranged as set forth.

4. In a pump, a perforated brace-plate having a semicircular recess, a pivoted member having a perforation carried by said plate, a 45  
 slotted tube attached to said plate and having a bolt with a pin working in said slot and registering with said perforation, all arranged as set forth.

5. The herein-described force-pump consist- 50  
 ing of a pair of cylinders; a discharge-chamber; pipes and suitable valves connecting said cylinders and discharge-chamber; a supply-pipe and valves therefor extending and uniting below said cylinders; pistons fitting 55  
 said cylinders and having pump-rods attached thereto extending to the top of the well, and suitable driving mechanism for reciprocating said rods, in combination with a pivoted locking member adapted to encircle 60  
 said rods and hold the same in their operative positions and having a stop-pin to lock said members in engagement with said rods, and suitable means to control said rods from 65  
 a position at the top of the well, substantially as described and for the purpose set forth.

In testimony whereof I have signed this specification in the presence of two subscribing witnesses.

ARTHUR E. WHITING.

Witnesses:

H. W. DORMAN,  
 W. C. MCCREERY.