

No. 846,837.

PATENTED MAR. 12, 1907.

A. E. EVANS.  
TRAVELING CRANE.

APPLICATION FILED SEPT. 28, 1906.

4 SHEETS—SHEET 1.

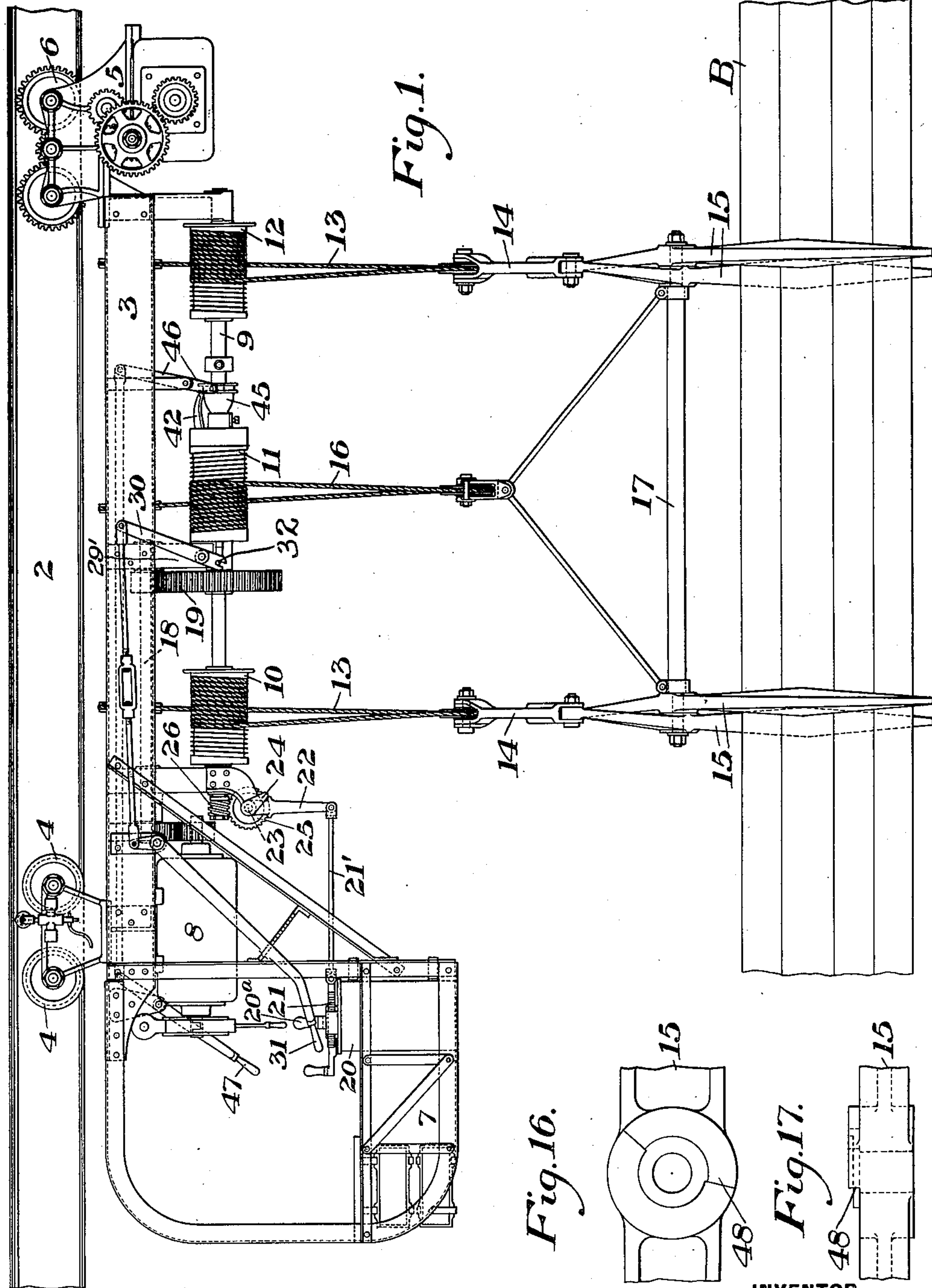


Fig. 1.

Fig. 16.

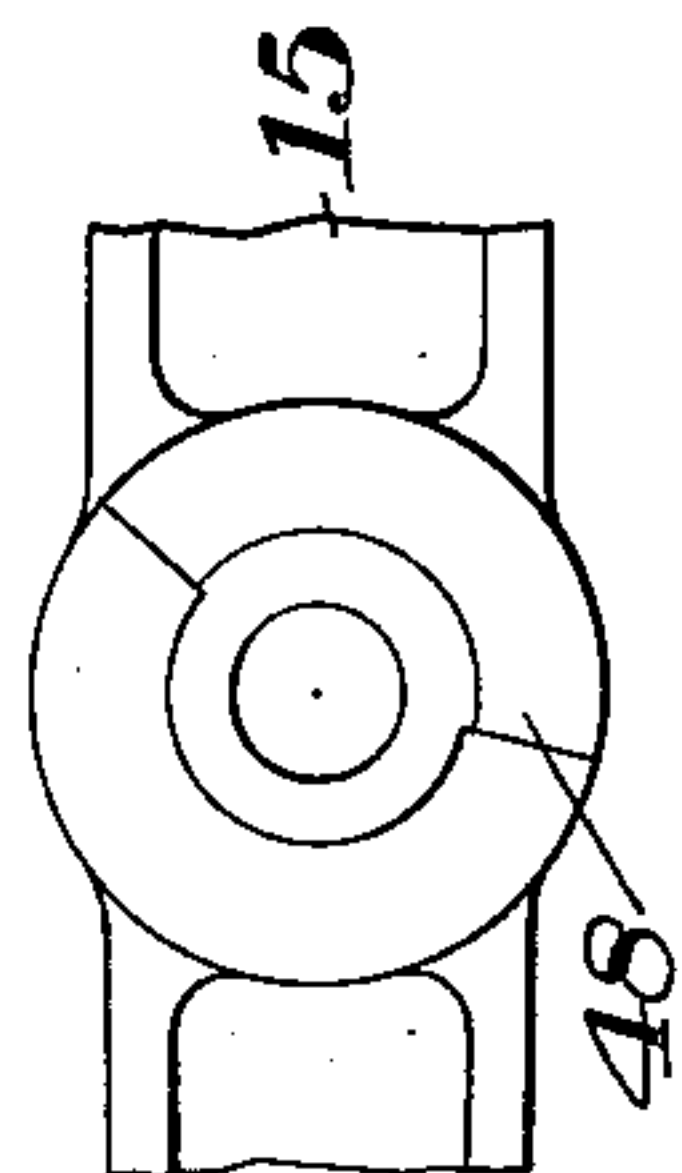
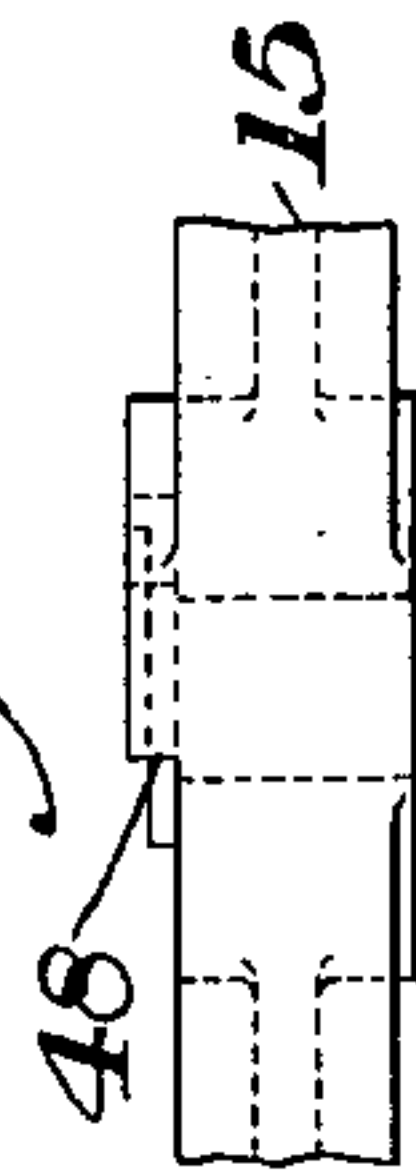


Fig. 17.



WITNESSES

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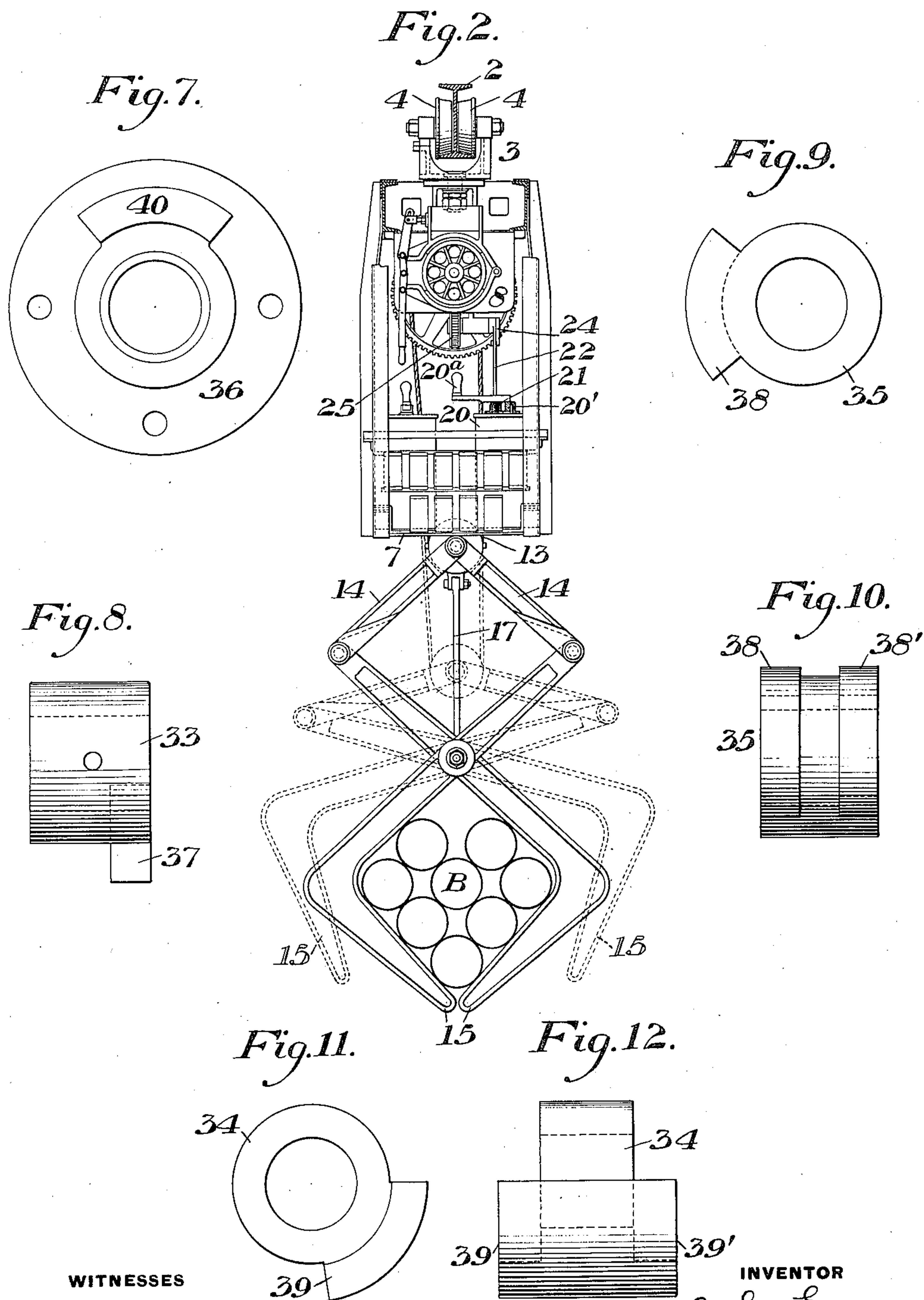
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4 SHEETS—SHEET 2.



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4 SHEETS—SHEET 3.

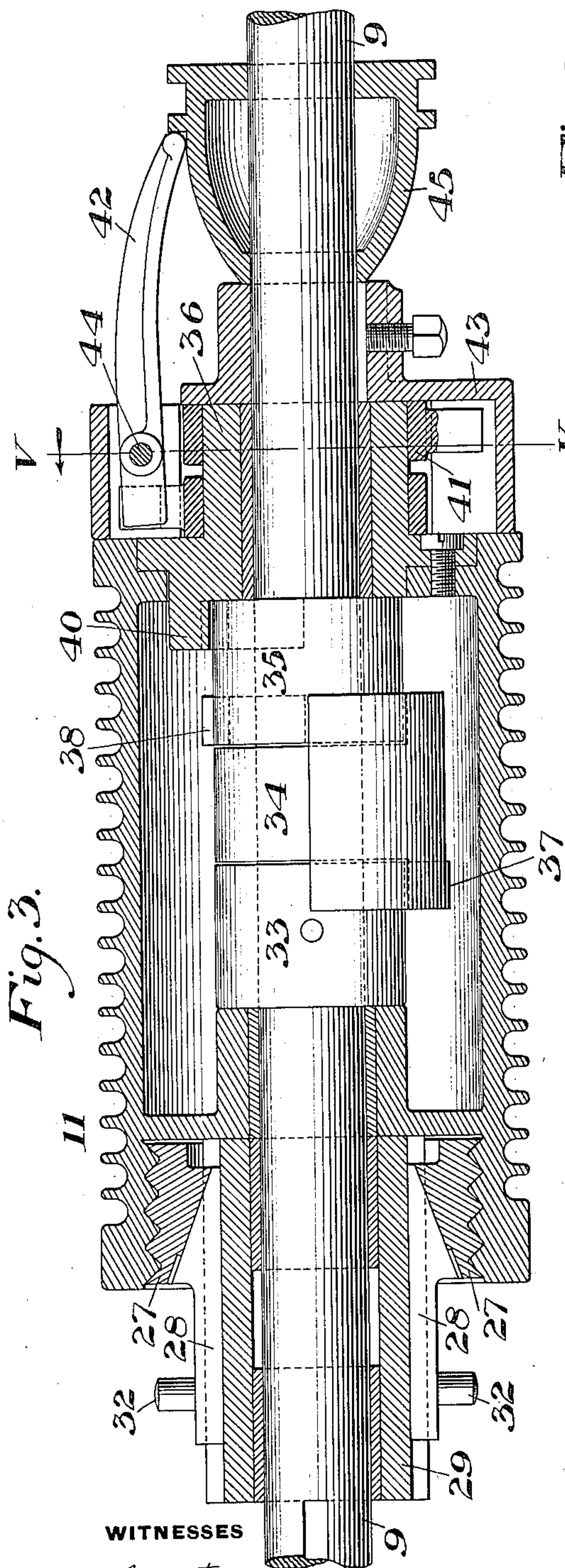


Fig. 3.

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Fig. 6.

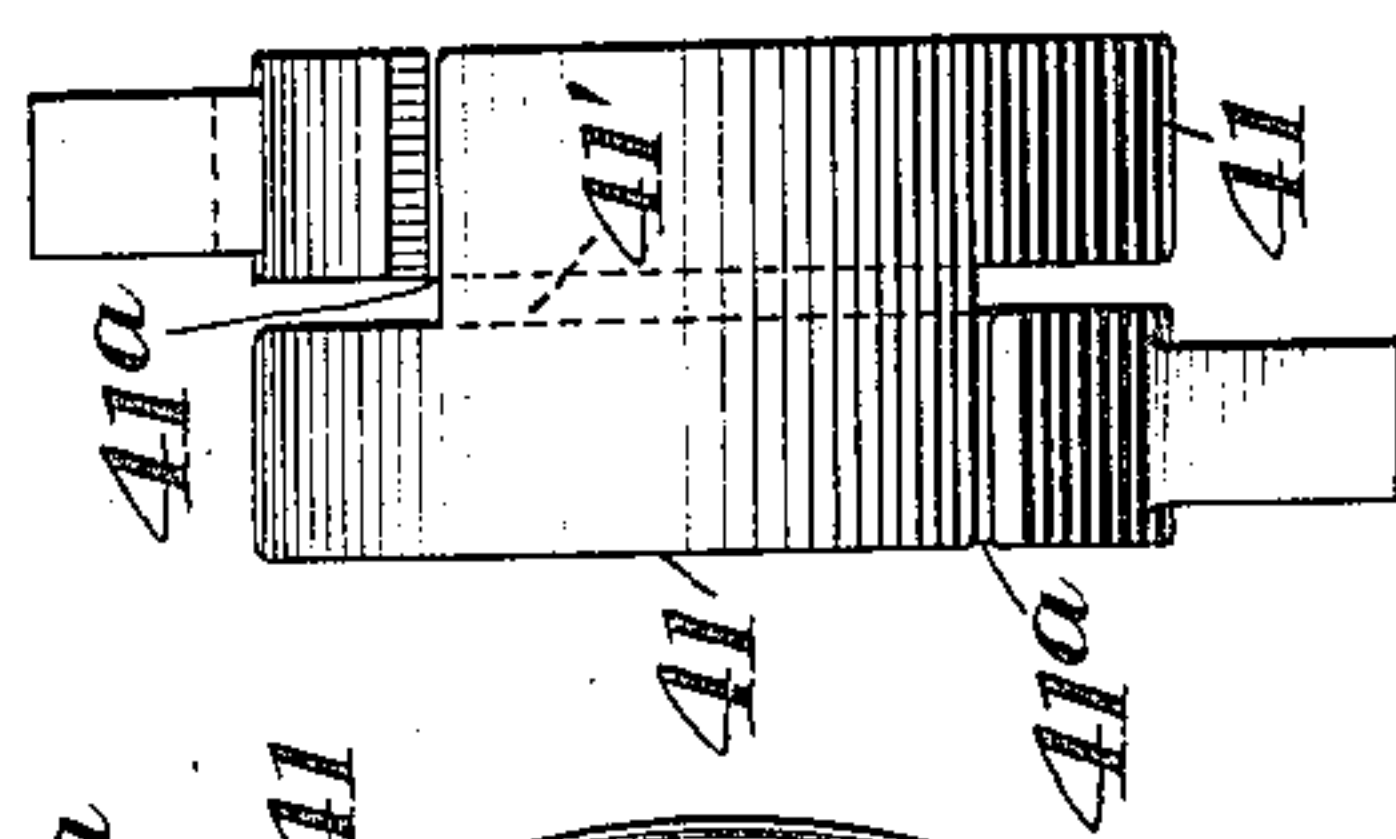


Fig. 5.

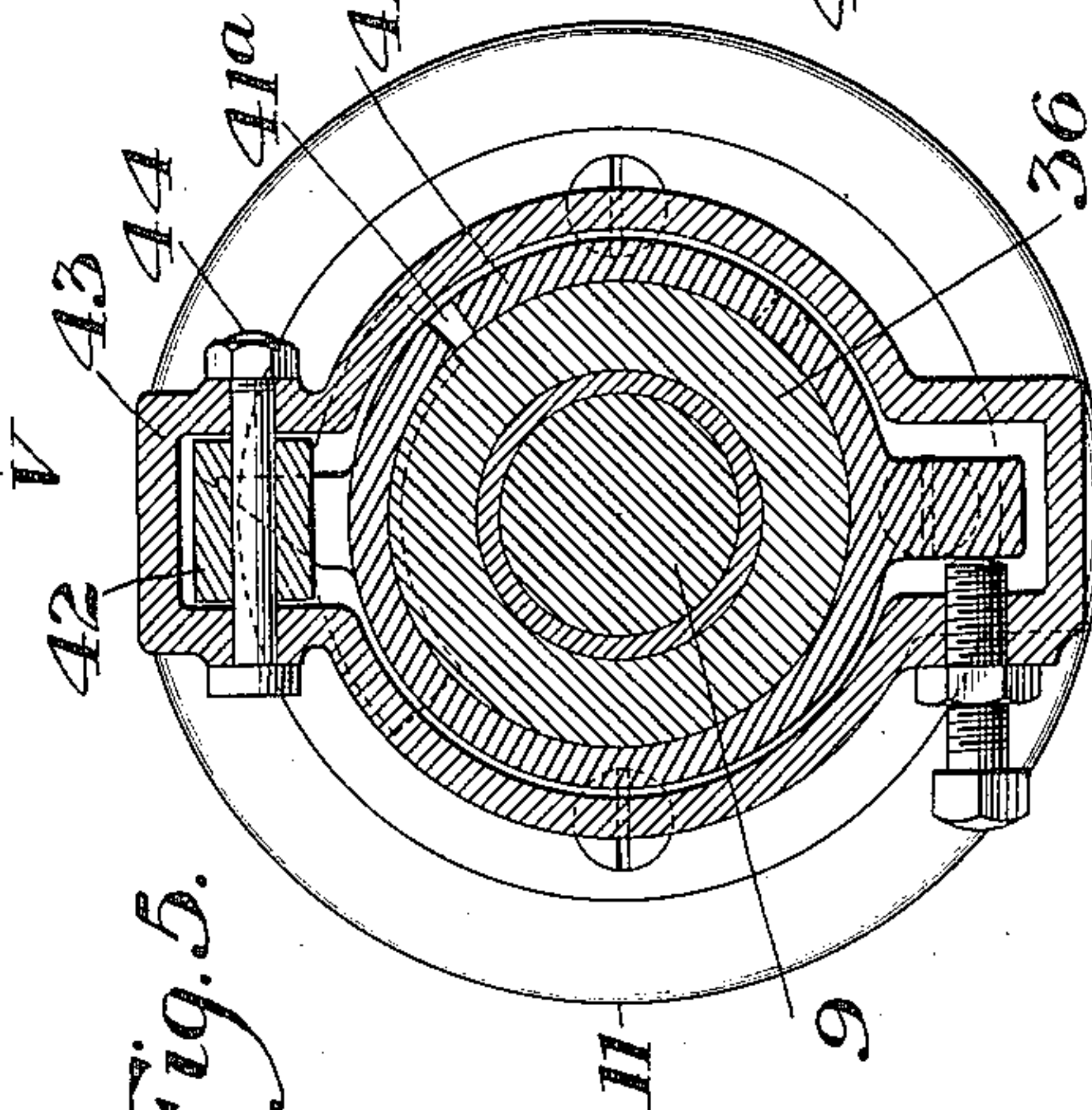
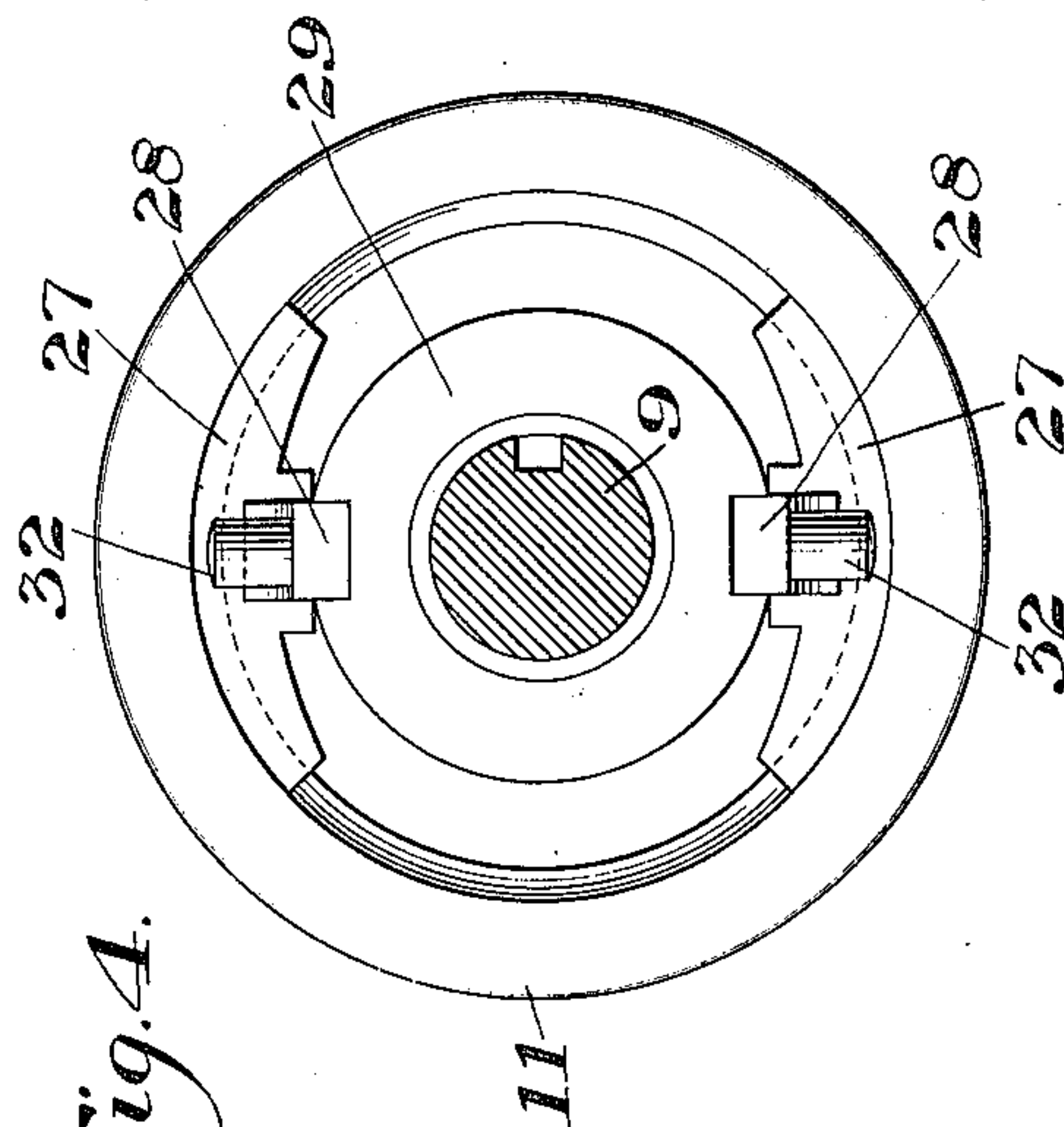


Fig. 4.



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4 SHEETS—SHEET 4.

Fig. 14.

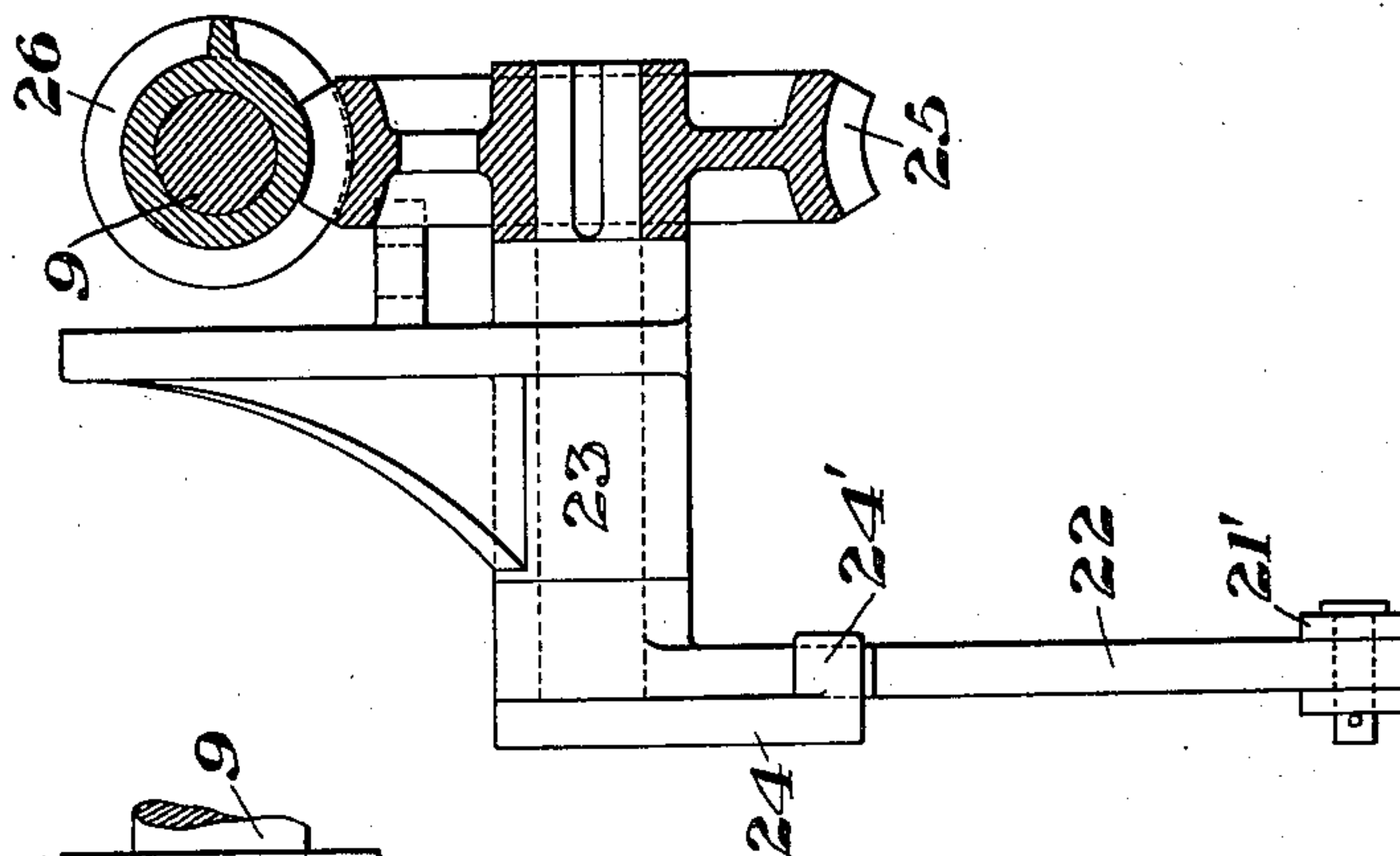


Fig. 13.

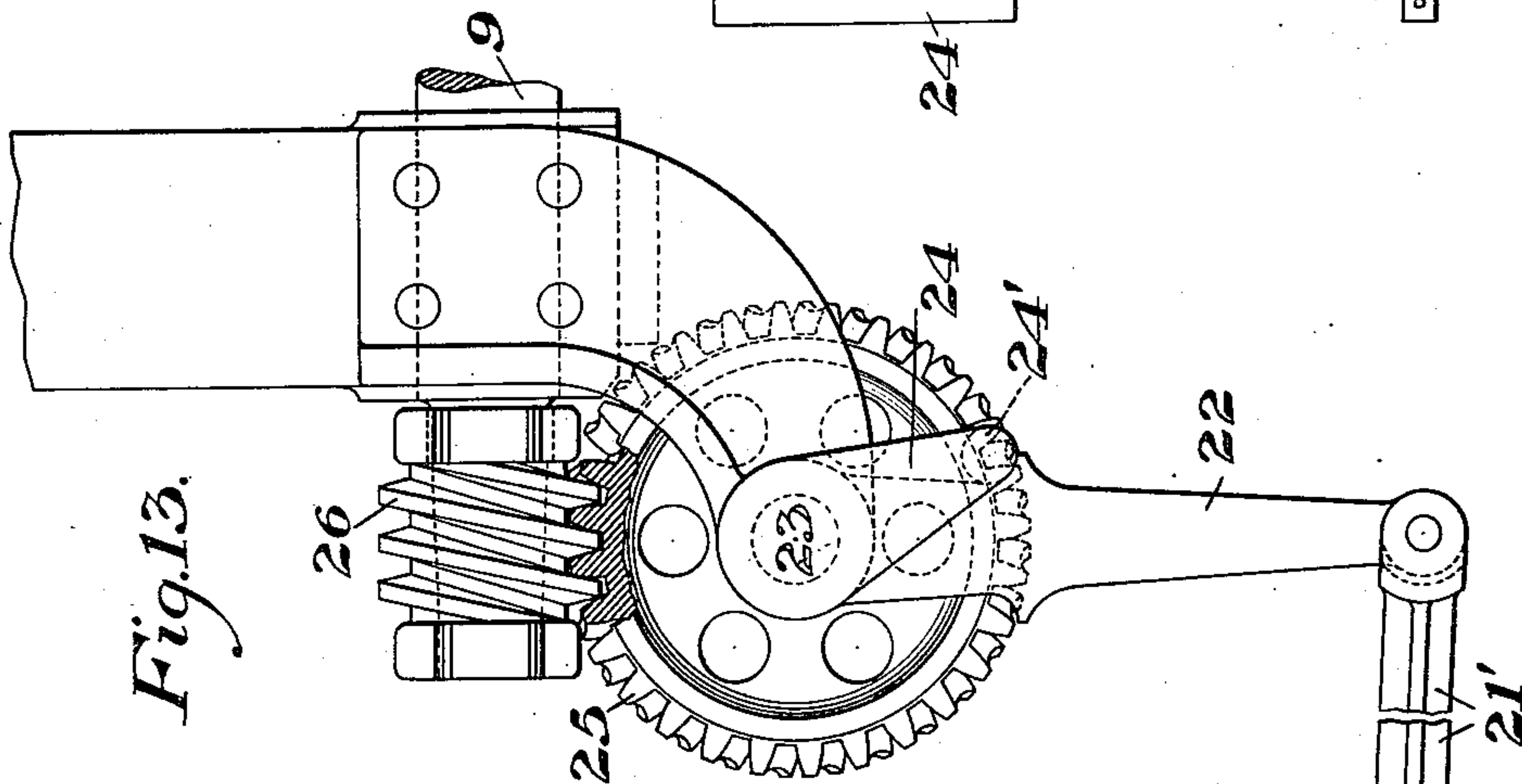
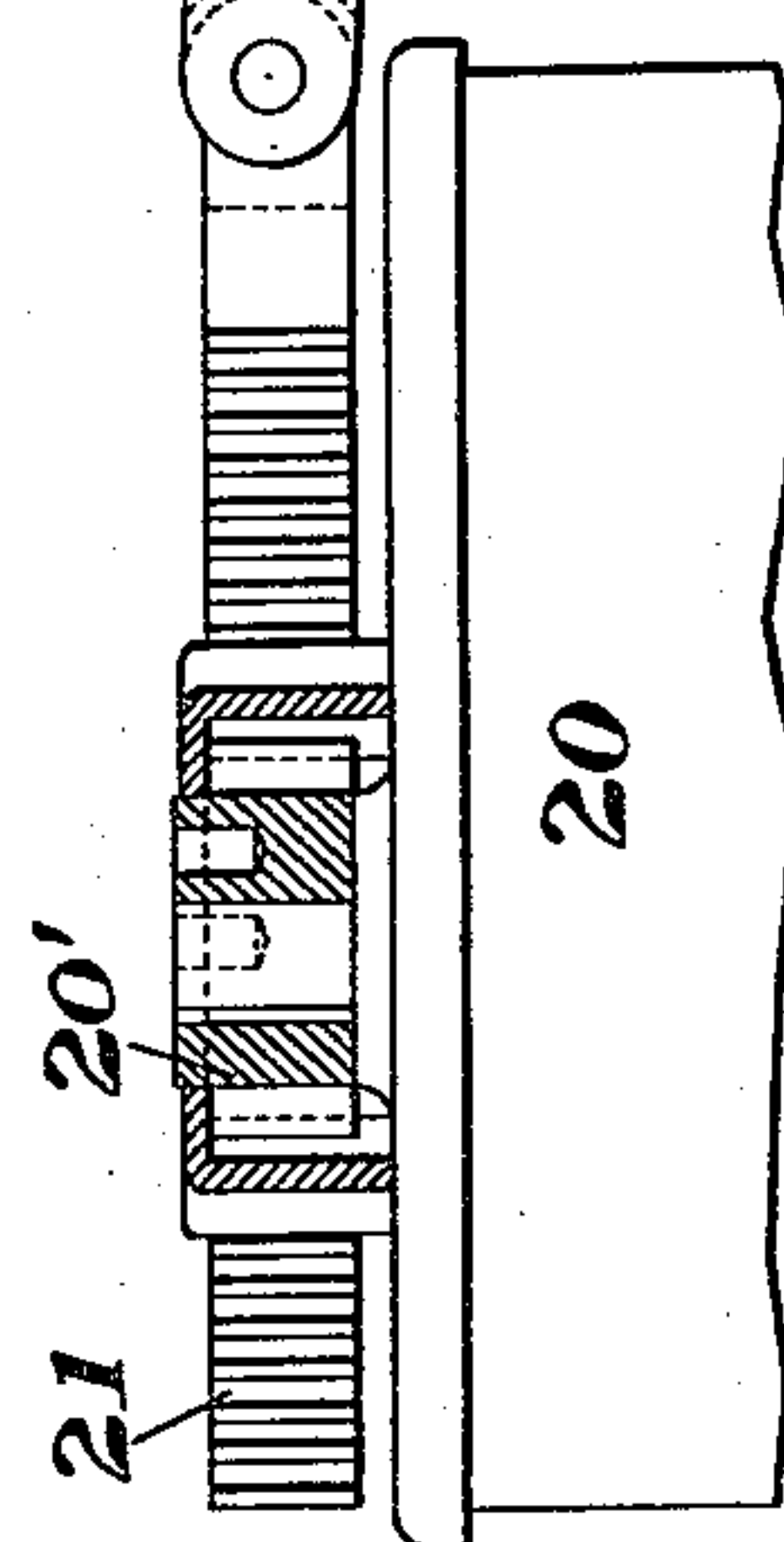
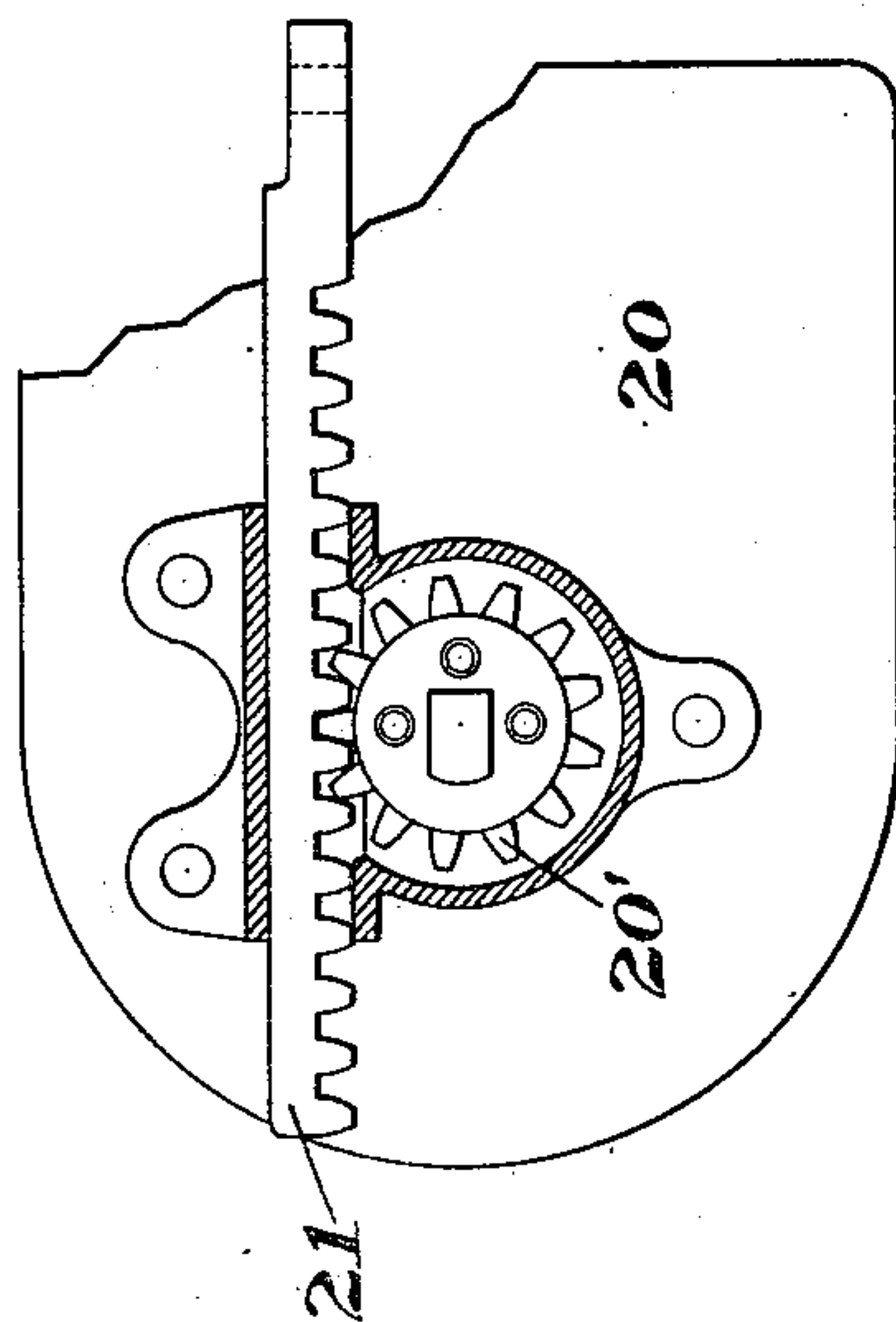


Fig. 15.



WITNESSES

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# UNITED STATES PATENT OFFICE.

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## TRAVELING CRANE.

No. 846,837.

Specification of Letters Patent.

Patented March 12, 1907.

Application filed September 28, 1906. Serial No. 336,613.

*To all whom it may concern:*

Be it known that I, ALBERT E. EVANS, of  
Pittsburg, Allegheny county, Pennsylvania,  
have invented a new and useful Traveling  
5 Crane, of which the following is a full, clear,  
and exact description, reference being had to  
the accompanying drawings, forming part of  
this specification, in which—

Figure 1 is a side elevation of apparatus  
10 constructed in accordance with my inven-  
tion. Fig. 2 is an end elevation. Fig. 3 is a  
vertical longitudinal section, on a larger scale,  
showing part of the apparatus. Fig. 4 is an  
end elevation of the parts shown in Fig. 3.  
15 Fig. 5 is a vertical section on the line V V of  
Fig. 3. Fig. 6 is a detail view of the friction  
brake-band. Figs. 7 to 12, inclusive, are de-  
tail views showing the devices for producing  
lost motion between the middle drum and  
20 the other drums. Figs. 13, 14, and 15 are de-  
tail views showing the mechanism employed  
to automatically operate the controller for  
the hoisting-drums in order to stop the hoist-  
ing and the lowering operations at predeter-  
25 mined limits. Figs. 16 and 17 are detail  
views of the joint or pivot for the grappling-  
hooks and show the manner in which the  
opening and closing movements of the hooks  
are limited.

30 My apparatus affords simple means by  
which tongs can be operated to grasp the  
burden which is to be raised and also to raise  
or lower the burden by means of a single  
shaft adapted to rotate several drums and  
35 provided with clutch mechanism by which  
one of the drums can be held, so as to permit  
independent motion of the other drums  
either in opening or closing the tongs and by  
which all of the drums can be rotated simul-  
40 taneously for the purpose of raising and lower-  
ing the burden. It also provides means for  
automatically stopping the hoisting mechan-  
ism when the grappling hooks or tongs have  
reached the predetermined limit of upward  
45 or downward travel and means by which the  
opening and closing movement of the hooks  
or tongs is limited.

In the drawings, 2 represents the overhead  
track on which a traveling trolley runs, which

is a single I-beam, as shown, or which may 50  
be of any suitable construction, and 3 is a  
trolley which is mounted on the track by  
means of suitable wheels 4 4. The overhead  
track may be suspended from the roof-truss  
of a building or may be carried on any de- 55  
sired type of framework. The trolley may  
be caused to travel along the track by means  
of a motor 5, provided with suitable gearing  
6. The trolley preferably carries the opera-  
tor's platform 7 and the motor 8, by means 60  
of which the grappling hooks or tongs open-  
ing and closing mechanism is operated. This  
motor is in gear with a shaft 9, carrying  
drums 10, 11, and 12. The drums 10 and 12  
are provided with ropes or other flexible con- 65  
nections 13 13, connected to the arms 14 of  
tongs 15, and the middle drum is provided  
with a similar rope 16, which is connected to  
the frame 17 of the tongs. It is clear from  
the construction shown in the drawings that 70  
if the rope 16 is held stationary while the  
ropes 13 are unwound from the drums 10 12  
that it will bear the weight of the tongs, and  
the jaws being relieved thereby will open,  
whereas if the rope 16 be held stationary and 75  
the ropes 13 wound on the drums 10 12 the  
weight of the tongs and the burden will be  
put upon the jaws and the jaws will close.

My invention provides means by which  
these drums 10 11 12, although mounted on a 80  
single shaft and operated by a single motor,  
will enable the drum 11 to be held and pre-  
vented from rotating while the drums 10 and  
12 are rotated in either direction to a suffi-  
cient extent to transfer the support from the 85  
jaws to the frame of the tongs, and vice versa,  
and means whereby the drum 11 may be  
caused to rotate with the shaft 9 in either di-  
rection at any point between the extreme  
limits of the independent rotation of this 90  
drum on the shaft.

My invention also provides means by  
which the three drums are positively rotated  
together while the tongs are held in either  
their open or closed position and means for 95  
automatically operating the controller for  
the drum-motor when the tongs have reached  
their upper or lower position.



The invention also provides positive means by which the opening and closing movement of the tongs is limited.

The hoisting-motor 8 is connected to the drum-shaft 9, preferably by means of a shaft 18 and gearing 19, and the controller 20 for the motor 8 is connected with the shaft 9, so that when the drums have reached the limit of their rotation in either direction the controller will be automatically operated to open the circuit and stop the motor, thus preventing injury to the apparatus. Preferably this is done by means of a pinion 20' on the controller 20, which meshes with a rack 21. The rack 21 is connected, by means of the link 21', with the lower end of the lever 22, which is loosely mounted on the end of the shaft 23. A second lever 24 is secured on the shaft 23, so as to be rotated by it, and the end of the lever 24 is provided with a projection 24', which engages with the opposite edges of the lever 22 and causes the lever 22 to move to operate the controller when the worm-wheel 25 is rotated by the worm 26, which is located on the end of the drum-shaft 9 when the drums are rotated to hoist or lower the grappling hooks or tongs. Each of the drums 10 and 12 is fixed to the shaft 9. The middle drum is not fixed to the shaft, but is designed to be connected therewith for rotation in either direction by means of the apparatus shown in Fig. 3, which also affords the required independence of rotation of the drums 10 and 12 to the limited extent necessary for transferring the support from the jaws to the frame of the tongs.

Referring to Figs. 1 to 3, the drum 11 is mounted loosely on the shaft 9, and there are clutch-shoes 27 interposed between the flange on the drum and the clutch-wedges 28. These clutch-wedges are fixed as regards rotative movement, but are adapted to reciprocate on the tubular portion 29 of the hanger 29' by means of a lever 30, which is operated by a hand-lever 31 at the operator's station on the trolley and is connected to pins or trunnions 32 on the clutch-wedges 28. The lost motion is provided by four members 33, 34, 35, and 36. The part 33 is keyed to the shaft, the parts 34 and 35 are loose on the shaft, and the part 36 is fixed to the drum 11. The part 33 is shown in Fig. 8, and has a projection 37, and the part 35 (shown in Figs. 9 and 10) has two projections 38 and 38'. The intermediate member 34 (shown in Figs. 11 and 12) has projections 39 39' on its opposite sides, these being adapted to engage the projections 37 and 38 of the members 33 and 35. The member 36 has an inward projection 40, which is adapted to engage the projection 38' of the member 35. The member 36 is surrounded by a friction-ring 41, the preferable construction of which is shown in Figs. 5 and 6, hav-

ing two parallel members encircling the member 36 and connected together by an intermediate web 41', and each of them being divided at points 41<sup>a</sup>. This clutch-ring 41 is operated by a lever 42, which is pivoted to a clutch-casing 43, keyed to the shaft 9, and the lever 42 is adapted to be moved on its fulcrum 44 by means of a cone-shaped wedge 45, which is mounted on the shaft, and is moved back and forth by means of a lever 46, connected to a hand-lever 47 at the station of the operator.

The tongs being supposed to be in the position as is shown by dotted lines in Fig. 2 around a group of pipes B or other burden to be elevated, if it is desired to close the tongs upon the burden and then to raise them the operator proceeds as follows: He first moves the lever 31 so as to press the wedges 28 into engagement with the friction-shoes 27, which by pressing outwardly against the flange of the drum holds the drum temporarily from rotation. He then by means of the controller 20 starts the motor 8 and rotates the shaft 9. As the drum 11 is held by the clutch it will remain stationary while the drums 10 and 12 rotate, raising the ropes 13 and inclosing the jaws upon the burden. When they have rotated sufficiently to close the tongs, the projection on the member 33, which is keyed to the shaft, will have engaged the projection on the member 34, and this in turn will have engaged the projection on the member 35, and the latter will have engaged the projection on the member 36, which, being fixed to the drum, will then cause the rotation of the drum. As soon as the operator perceives by the tendency of the clutch to slip that the rotation of the drum 11 has begun he will release his hold on the lever 31, thereby freeing the clutch members 27 and 28 and permitting the drum 11 to rotate freely with the other drums and to raise the tongs.

When it is desired to lower the tongs, with the burden, upon the floor or other support, the operator moves the cone-wedge 45 by means of the lever 46 and its connections, so as to move it forwardly into the position shown in Fig. 3, causing the clutch-arm 42 to move on its pivot and to press its inner end inwardly, thus clamping the clutch-ring 41 firmly upon the member 36, and thus connecting this member frictionally to the shaft and compelling it to rotate with the shaft. He then reverses the motion of the motor 8, which causes the shaft 9 to turn in the direction proper for lowering the tongs, so that the action of the clutch-ring 41 will cause the drum 11 to turn with the shaft 9, and therefore with the drums 10 and 12, so that all the ropes 13 and 16 are unwound at an equal rate



When for any reason it is desired to raise the tongs while partly open, the operator prevents the rotation of the drum 11 by means of the friction-shoes 27 and the clutch-wedges 28, and meantime causes the shaft 9 and drums 10 and 11 to rotate and wind up the ropes 13 until the tongs are opened to the desired amount. The operator then starts the drum 11 to rotate with the shaft 9 by means of the hand-lever 47 through its connection with the cone-wedge 45, movement of which causes the friction-band 41 to grasp the friction member 36 on the drum 11. At the same time the lever 31 is actuated to cause the clutch-wedges 28 to release the friction-shoes 27 from engagement with the drum 11 and permit this drum to rotate with the shaft 9. This operation may also be performed to lower the tongs while partly open in the same manner, the direction of rotation of the drums being reversed in this case.

When in hoisting or lowering the tongs reach the upward or downward limit of travel, the lever 24 on the end of the shaft will be rotated by the worm-wheel 25 and worm 26 on the end of the drum-shaft 9 and the projection 24' and the end of the lever 24 will be moved and through the link 21' and the rack 21 and pinion 20' will move the controller-lever to its central position, thus opening the circuit and stopping the motor until such time as it is again started in the opposite direction only through the hand-lever 20<sup>a</sup> by the operator.

When the burden has reached the floor or other support and it is desired to open the tongs, the operator moves back the clutch-lever 46, thereby retracting the cone-wedge 45 and loosening the pressure of the lever 42 in the clutch-ring 41. This disconnects the shaft 9 from the member 36. The operator again moves the lever 31, so as to bring the parts 28 27 and the drum 11 into frictional contact, thus holding the drum 11, and as the members 34, 35, and 36 are no longer held frictionally or by engagement with the member 33 the shaft 9, together with the drums 10 and 12, will continue to rotate independently of the drum 11, which remains stationary. The effect of this is to cause the unwinding of the ropes 13, while the rope 16 is held, and the tongs will thus be opened. While the tongs are in this open position, by rotating the drums 10 11 12 together, so as to wind the ropes upon the drums, the tongs will be raised while open and will remain open until they are again lowered into position and it is desired to close them upon another burden, when the operation as above described will again be repeated. In order to provide positive means for limiting the opening and closing movements of the arms of the tongs, the meeting faces of the pivot or joint are provided with projection or jaws 48,

Figs. 16 and 17, which permit the tongs to open freely within the desired limit and prevent unnecessary movement of the hoisting apparatus.

The advantage of using two loose members 34 and 35 between the member 33 and the member 36 is that it provides a greater range of independent motion of the shaft relatively to the drum 11, although my invention as defined in the broader claims is not limited thereto. The shape of the tongs shown in Fig. 2 is novel and useful. These tongs are made of such shape that when they surround the burden they will completely encircle the same, and for this purpose the jaws are made of L shape, their lower extremities being substantially at right angles to the upper portions. This affords jaws which are better adapted for the handling of pipe and other cylindrical objects than other devices of the kind heretofore known to me.

The skilled mechanic will be able to modify the apparatus in many ways without departure from the invention as defined in the claims, since

What I claim is—

1. Apparatus for operating hoisting-drums independently or simultaneously as desired, comprising a shaft and drums, one of said drums being fixed to the shaft, and the other drum having mechanism adapted to permit independent rotation of the shaft to a limited extent, and holding mechanism on said shaft by which the drum is held during such independent motion; substantially as described.
2. Apparatus for operating hoisting-drums independently or simultaneously as desired, comprising a shaft and three drums, at least one of said drums being fixed to the shaft and at least one of the other drums having mechanism on said shaft to permit independent rotation of the shaft to a limited extent; substantially as described.
3. Apparatus for operating hoisting-drums independently or simultaneously as desired, comprising a shaft and drums, one of said drums being fixed to the shaft, and the other drum having mechanism adapted to permit independent rotation of the shaft to a limited extent; and means for rotating said other drum at any point within the limits of its independent rotation substantially as described.
4. The combination of a shaft, a rotative member mounted loosely thereon, friction mechanism for holding said member, and a collar or projection on the shaft, and a second collar or projection connected with the drum and having loose intermediate motion; and frictional means for rotating said drum at any point within the limits of its loose intermediate motion substantially as described.
5. The combination of a shaft, a rotative member mounted loosely thereon, frictional



mechanism for holding said member, a collar or projection on the shaft, and a second collar or projection connected with the drum, and an intermediate loose member or members having collars or projections adapted to engage the collars or projections above mentioned and having intermediate loose motion; substantially as described.

6. The combination of a shaft, a rotative member mounted loosely thereon, frictional mechanism for holding said member, a collar or projection on the shaft, and a second collar or projections connected with the drum and having loose intermediate motion, and a friction device for connecting the last-named collar or projection frictionally with the shaft; substantially as described.

7. Apparatus for operating hoisting-drums independently or simultaneously as desired, comprising a shaft and drums, one of the drums being fixed to the shaft, and the other drum having intermediate mechanism adapted to permit independent rotation of the shaft to a limited extent, holding mechanism adapted to hold the drum during such independent motion, and mechanism adapted to connect and disconnect the shaft with a part of said intermediate mechanism to effect rotation in a reverse direction; substantially as described.

8. Hoisting mechanism comprising tongs, drums by which the tongs are operated, said drums being adapted to raise and lower the tongs, and one of the drums having independent rotation to a limited extent to effect the opening and closing of the tongs, means for rotating the independently-rotatable drum at any point within the limits of said independent rotation said drums being mounted on and rotated by a single shaft; substantially as described.

9. Hoisting mechanism comprising tongs, and a shaft having drums, by which the tongs are operated, said drums being adapted to raise and lower the tongs, and one of the drums having connections on said shaft permitting independent rotation to a limited extent to effect the opening and closing of the tongs; and means for rotating said independently-rotatable drum while the tongs are partly opened substantially as described.

10. Hoisting mechanism comprising tongs and three drums mounted on a shaft by which the tongs are operated, one of the drums having connections on said shaft permitting independent rotation to a limited extent to effect the opening and closing of the tongs; substantially as described.

11. The combination of a shaft, a drum, and collars or projections 33, 34 and 35, on the shaft, one of them being fixed to the shaft, a collar or projection on the drum adapted to engage the collar 35, and means

for frictionally connecting the drum to the shaft; substantially as described.

12. Apparatus for operating hoisting-drums independently or simultaneously as desired, comprising a shaft and three drums, two of said drums being fixed to the shaft and the third drum having mechanism on said shaft arranged to permit independent rotation of the shaft to at least a limited extent; substantially as described.

13. Apparatus for operating hoisting-drums independently or simultaneously as desired, comprising a shaft and drums, one of said drums being fixed to the shaft, and the other drum having mechanism adapted to permit independent rotation of the shaft to a limited extent, a motor for operating said shaft and mechanism for automatically stopping said motor; substantially as described.

14. Hoisting mechanism comprising tongs, drums by which the tongs are operated, said drums being adapted to raise and lower the tongs, and one of the drums having independent rotation to a limited extent to effect the opening and closing of the tongs, said drums being mounted on and rotated by a single shaft, a motor for operating said shaft, a controller for said motor, and mechanism for automatically operating said controller to stop the motor at predetermined points; substantially as described.

15. Hoisting mechanism comprising tongs, drums by which the tongs are operated, said drums being adapted to raise and lower the tongs, and one of the drums having independent rotation to a limited extent to effect the opening and closing of the tongs, said drums being mounted on and rotated by a single shaft, a motor for operating said shaft, a controller for said motor, means for operating said controller to start said motor and mechanism operated by the shaft for automatically stopping said motor; substantially as described.

16. Hoisting mechanism comprising tongs and three drums mounted on a shaft by which the tongs are operated, one of the drums having connections on said shaft permitting independent rotation to a limited extent to effect the opening and closing of the tongs, and means on the tongs for limiting the opening and closing movement of said tongs; substantially as described.

17. Hoisting mechanism comprising tongs and three drums mounted on a shaft by which the tongs are operated, one of the drums having connections on said shaft permitting independent rotation to a limited extent to effect the opening and closing of the tongs, means on the tongs by which the opening and closing movement is positively limited; and means arranged to rotate said



drums while the tongs are partly opened substantially as described.

18. Hoisting mechanism comprising tongs and three drums mounted on a shaft by which the tongs are operated, one of the drums having connections on said shaft permitting independent rotation to a limited extent to effect the opening and closing of the tongs, and jaws on the tongs by which the

opening and closing movement is positively limited; substantially as described.

In testimony whereof I have hereunto set my hand.

ALBERT E. EVANS.

Witnesses:

WILLIAM K. ACKLEY,  
WM. G. STEWART.