

No. 880,449.

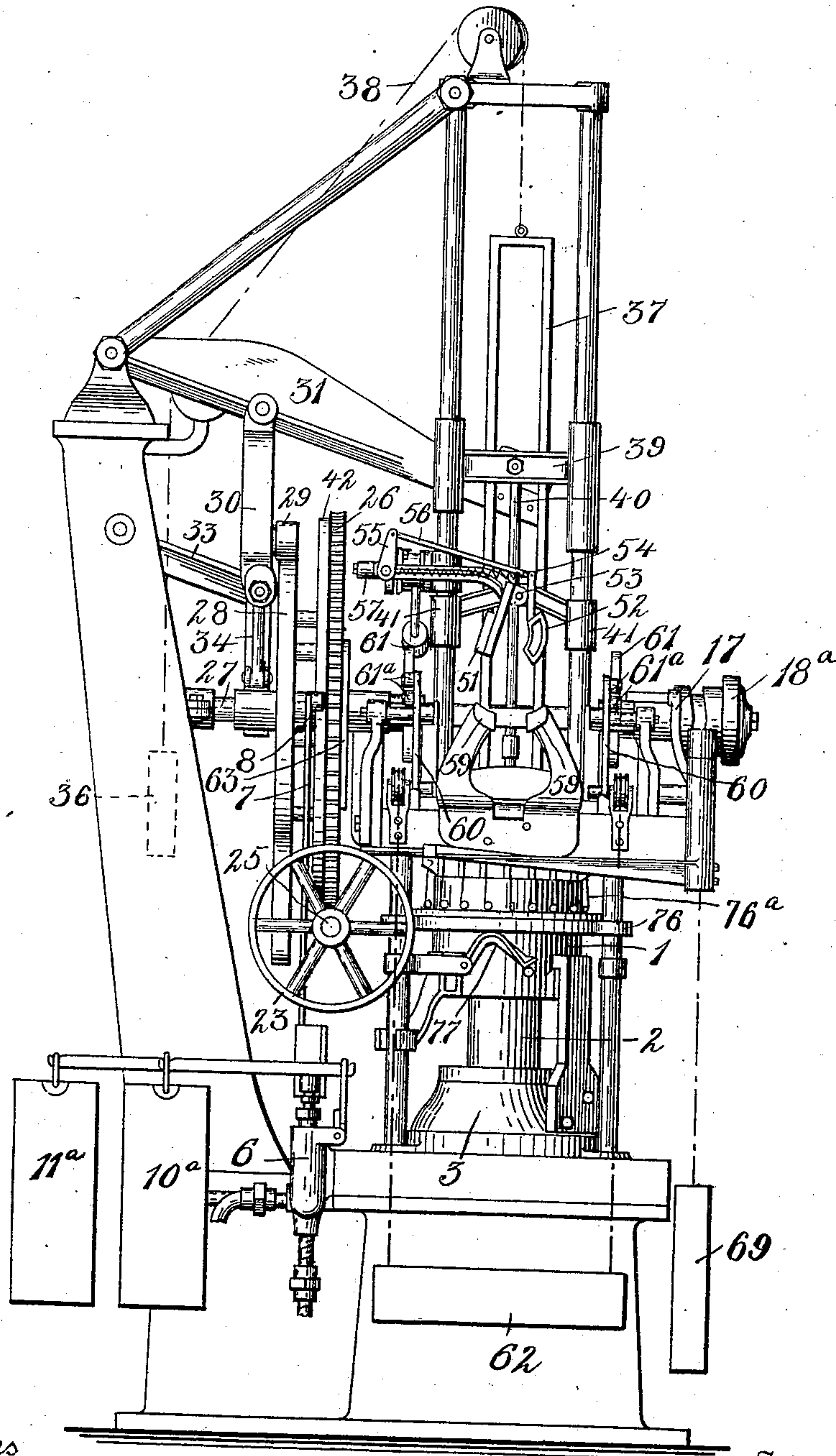
PATENTED FEB. 25, 1908.

S. M. GREEN.
PRESS.

APPLICATION FILED OCT. 29, 1906.

8 SHEETS—SHEET 1.

Fig. 1.



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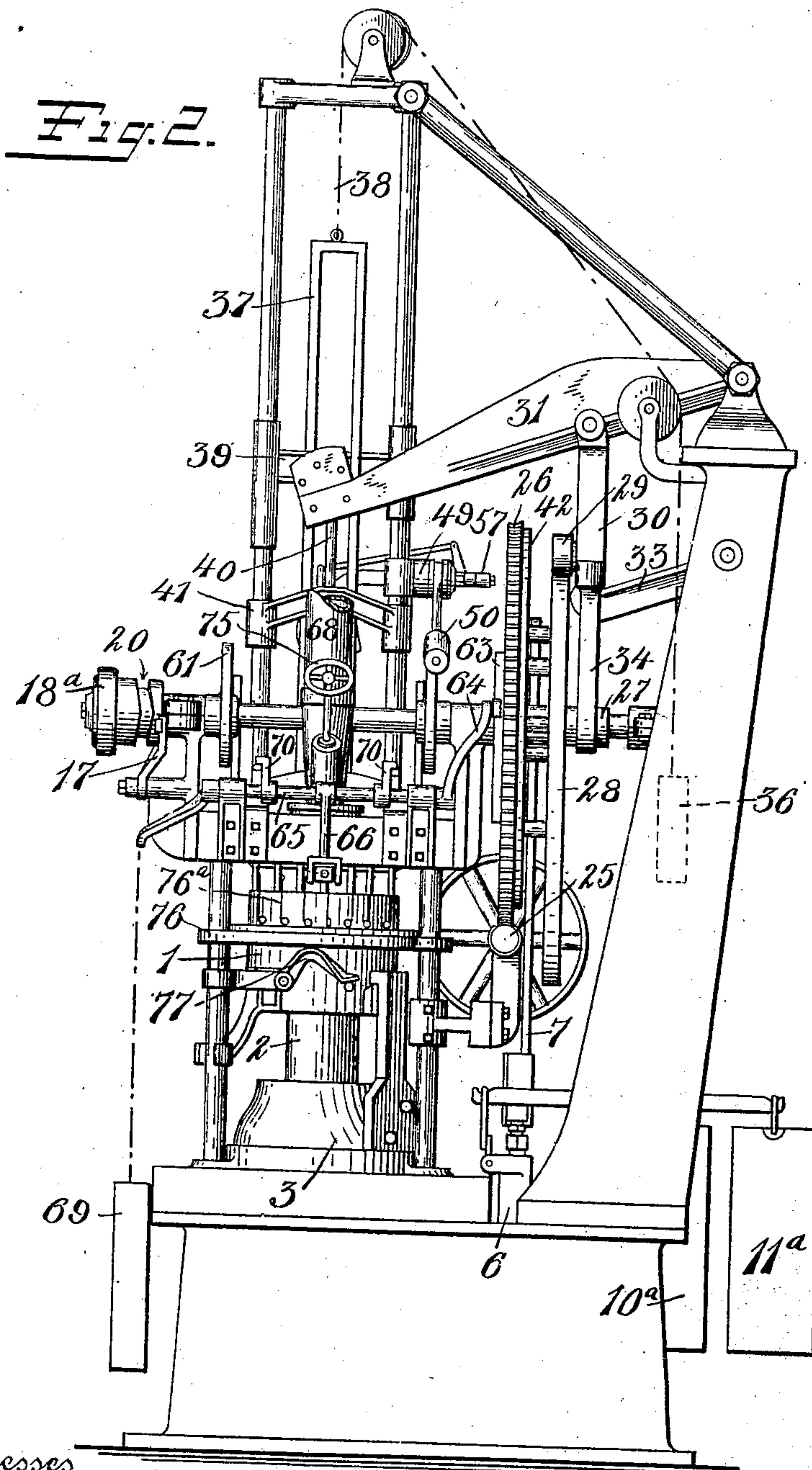
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8 SHEETS--SHEET 2.



Witnesses

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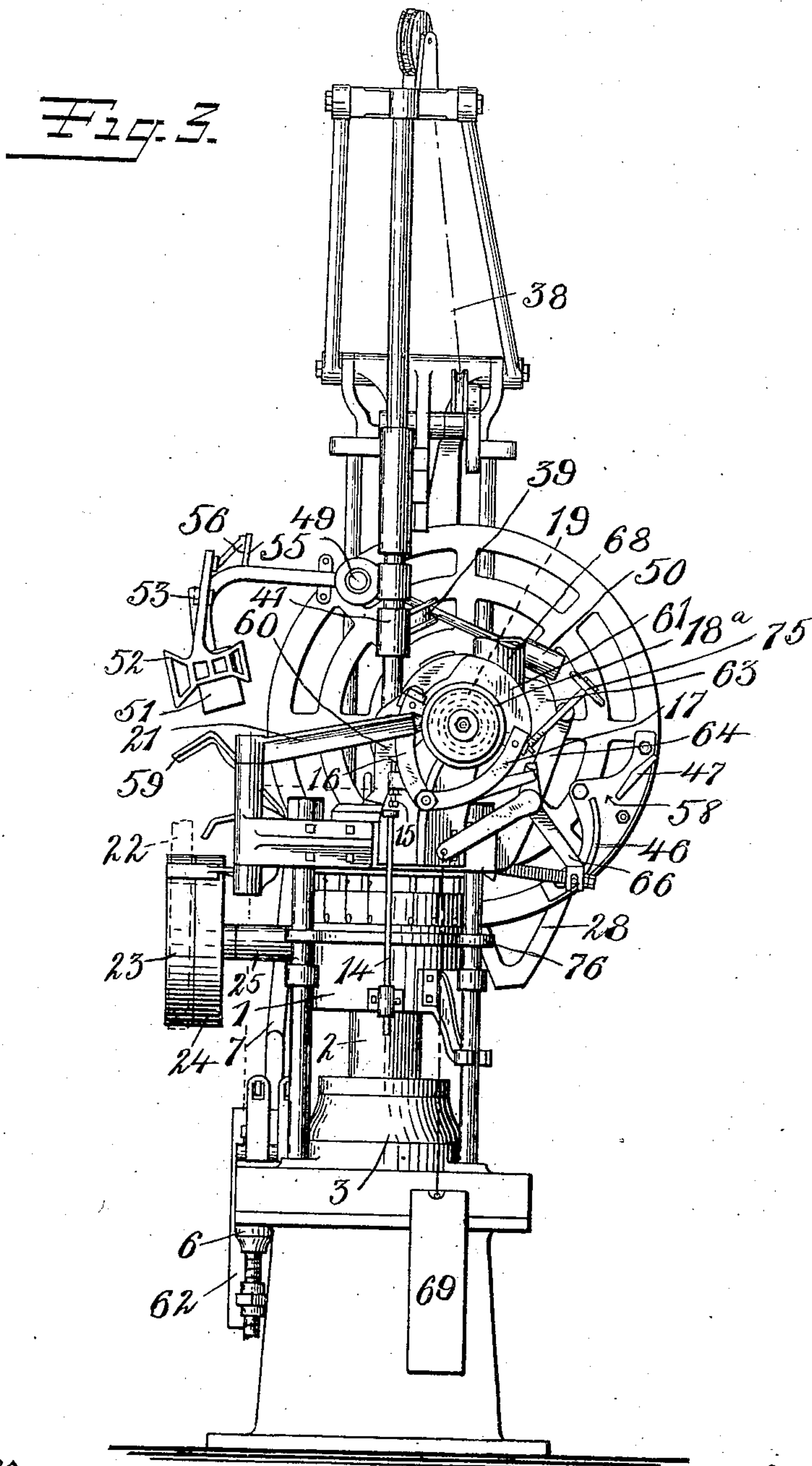
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8 SHEETS—SHEET 3.



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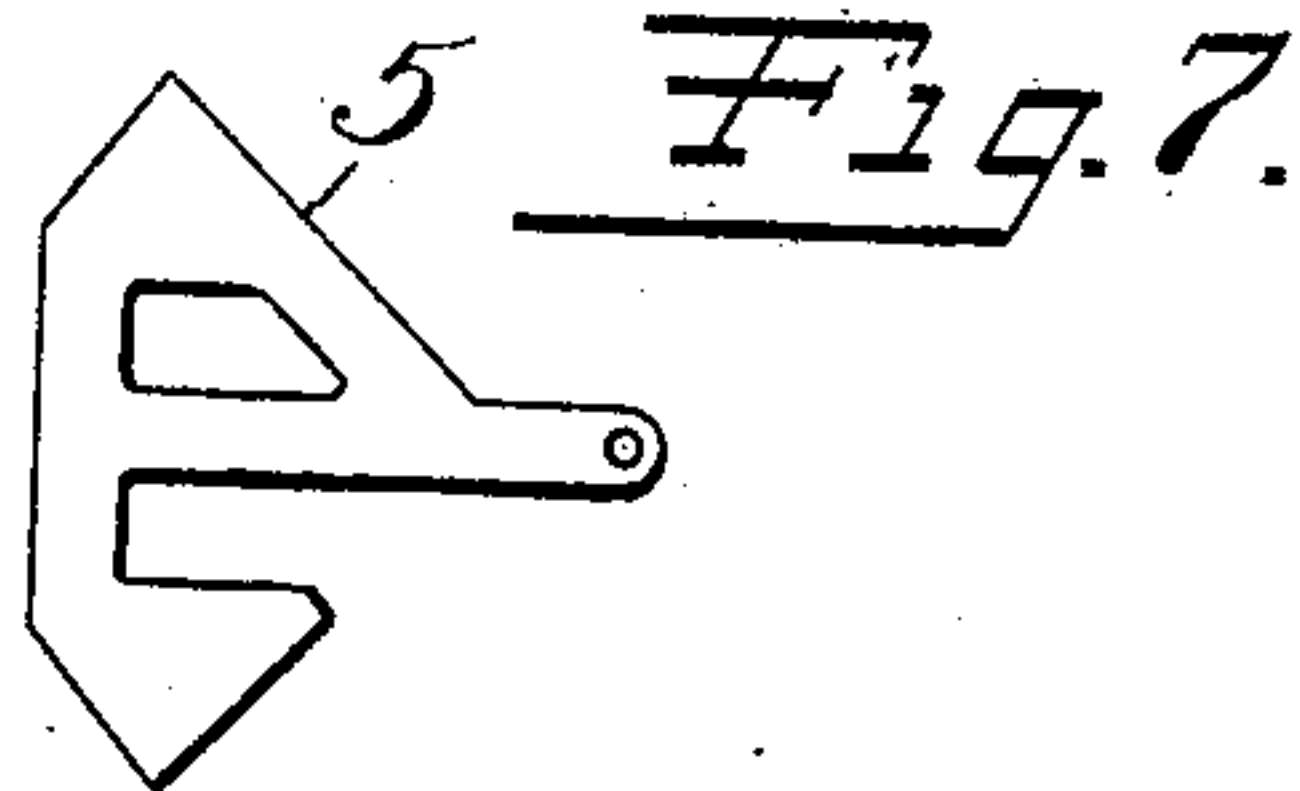
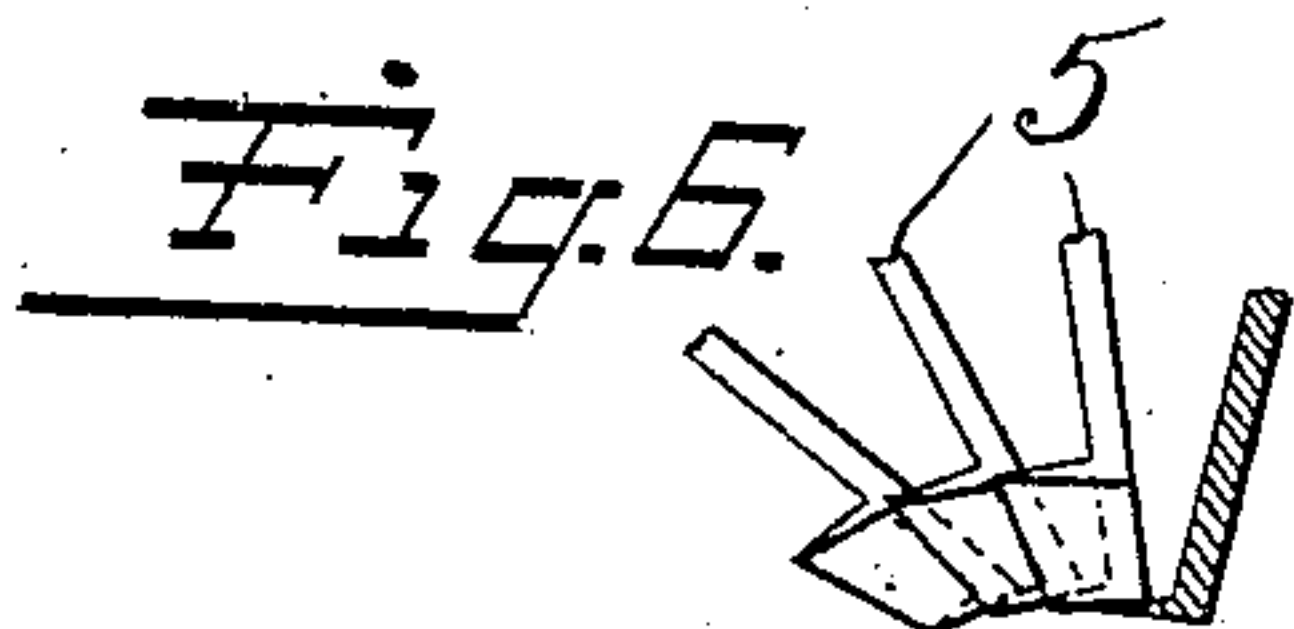
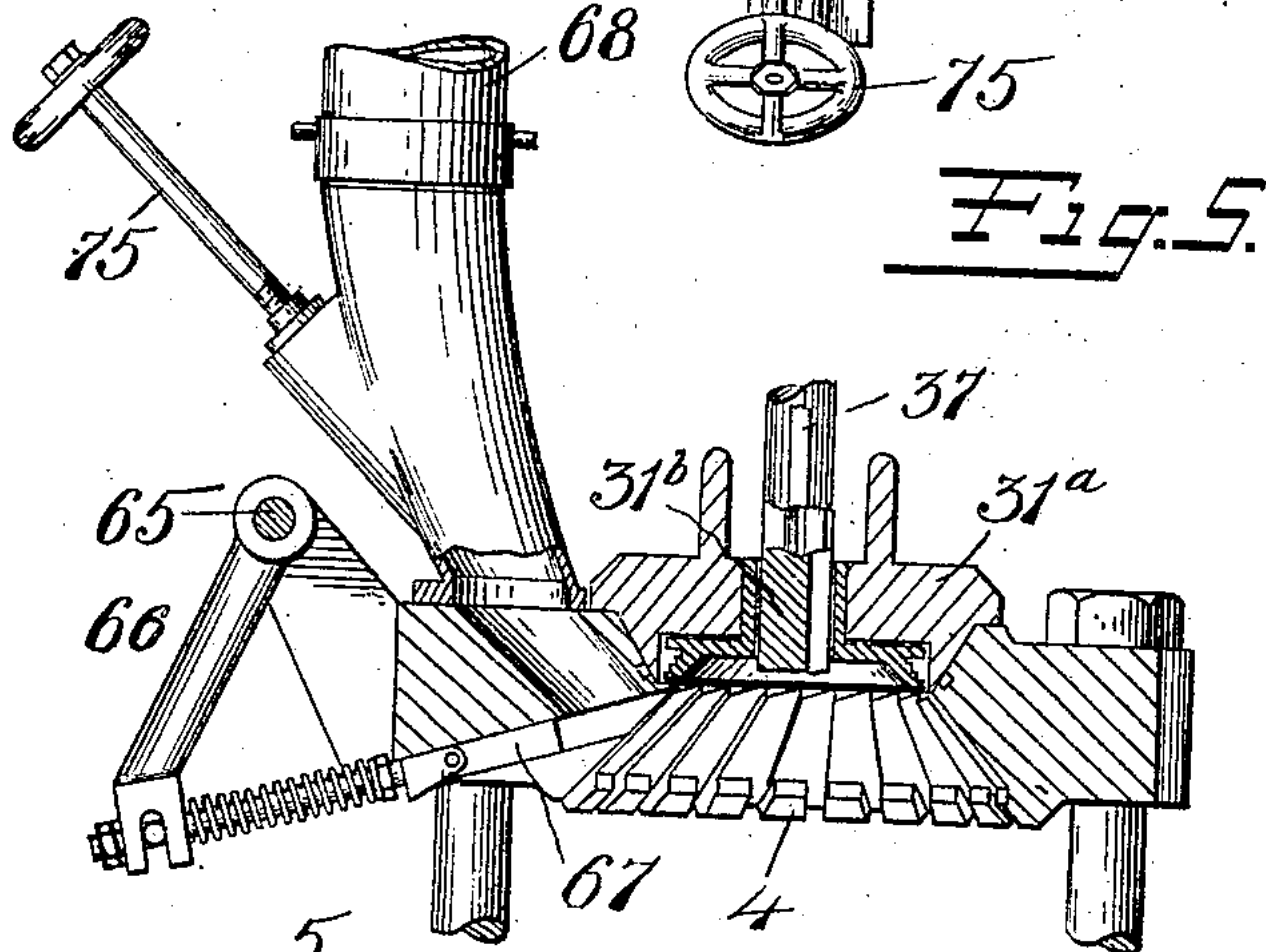
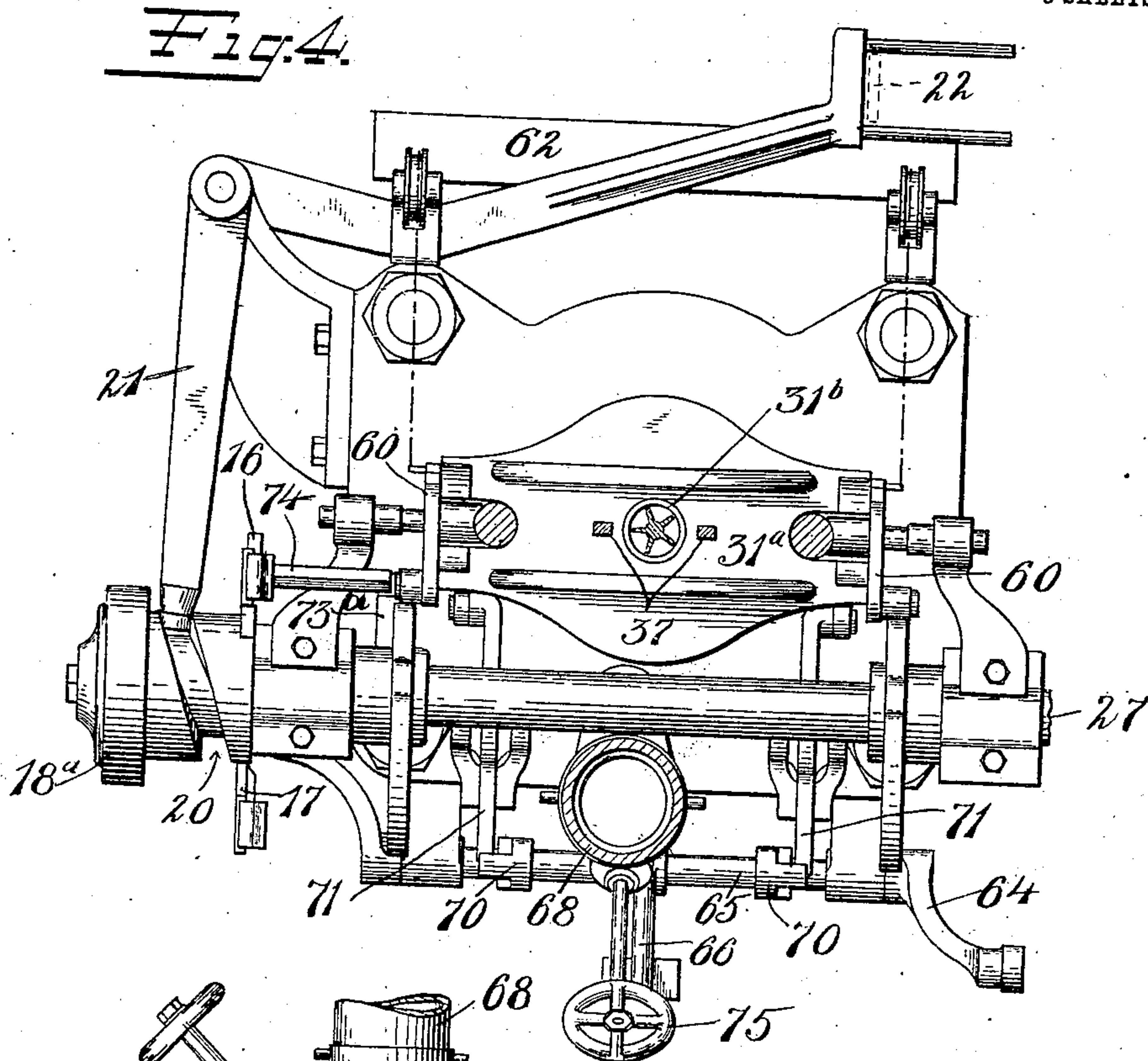
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8 SHEETS—SHEET 4.



Witnesses
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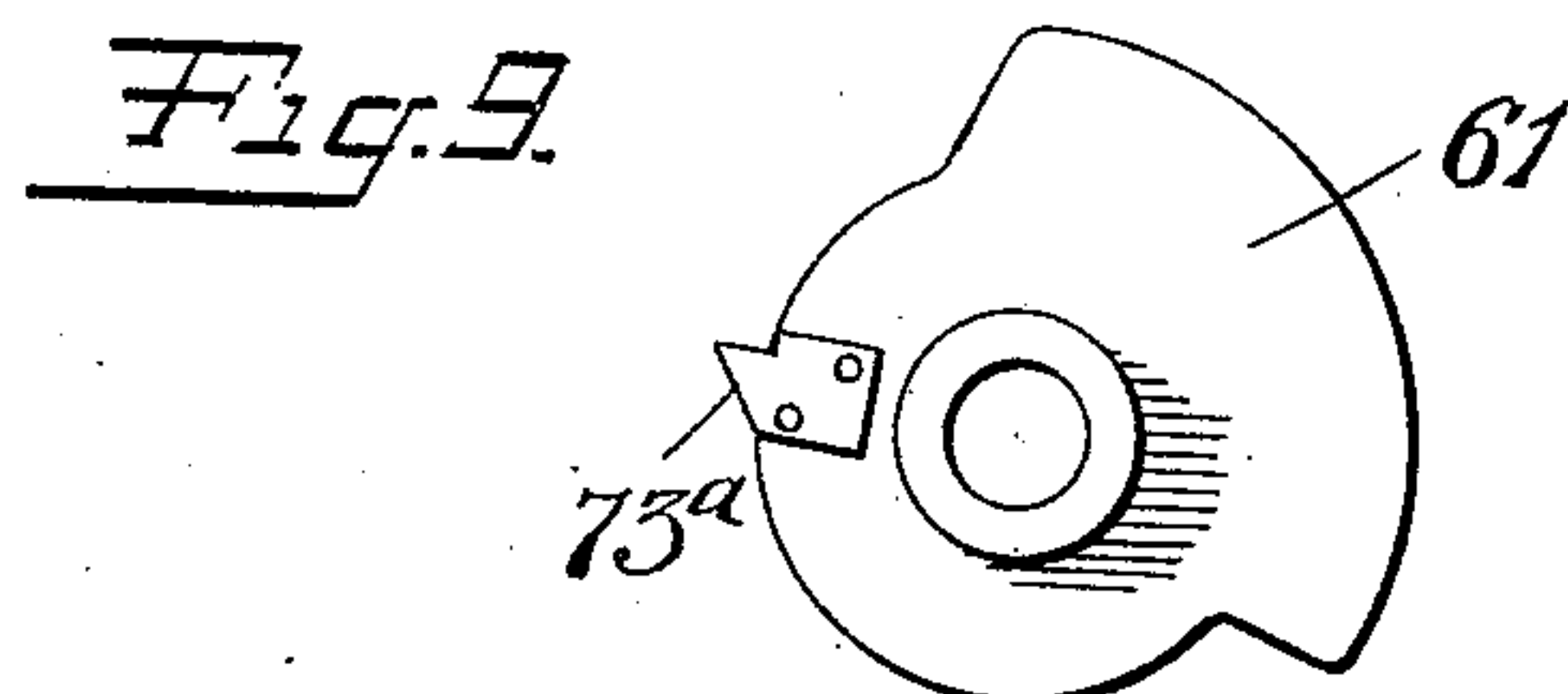
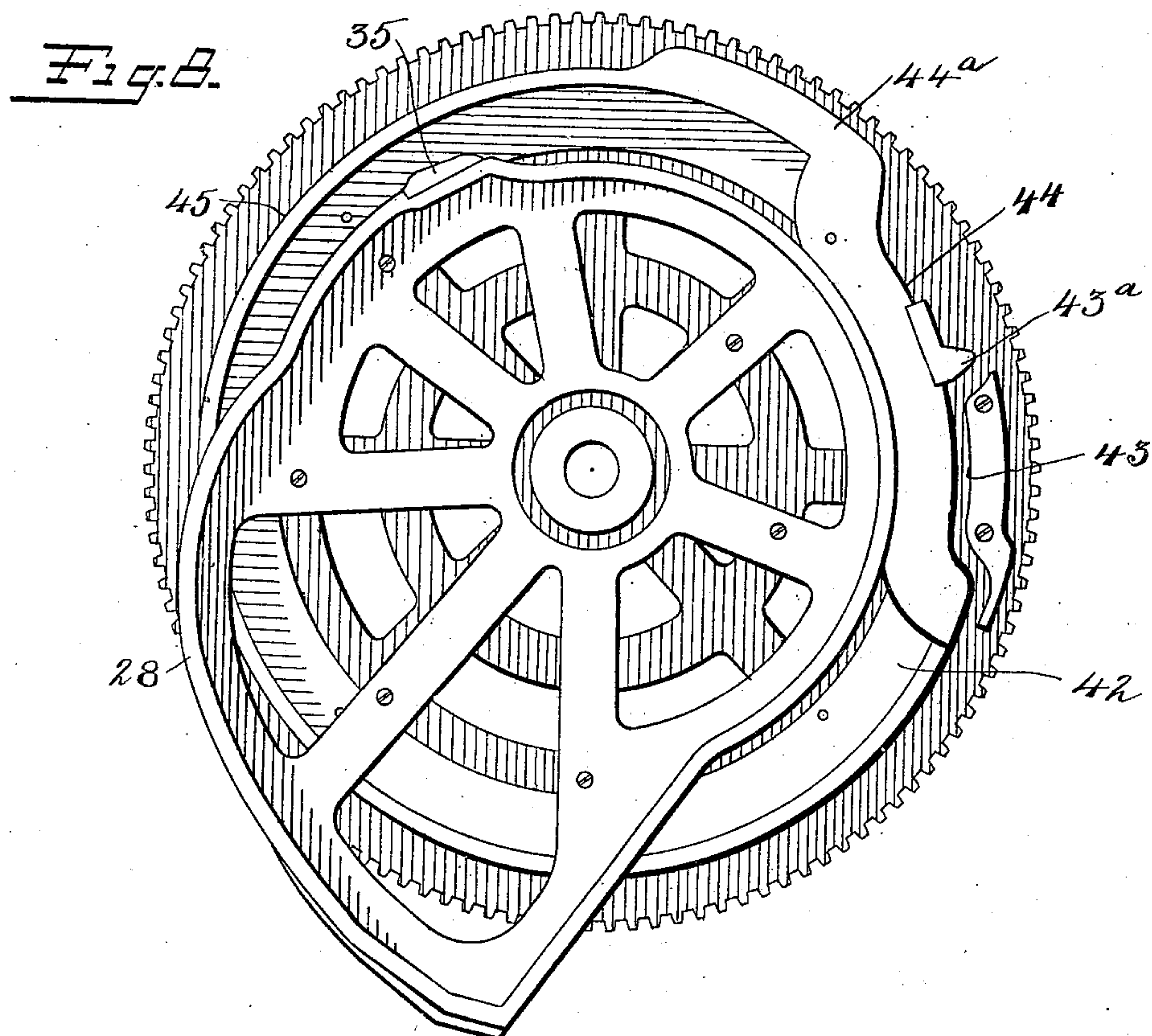
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8 SHEETS—SHEET 5.



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8 SHEETS-SHEET 6.

Fig. 10.

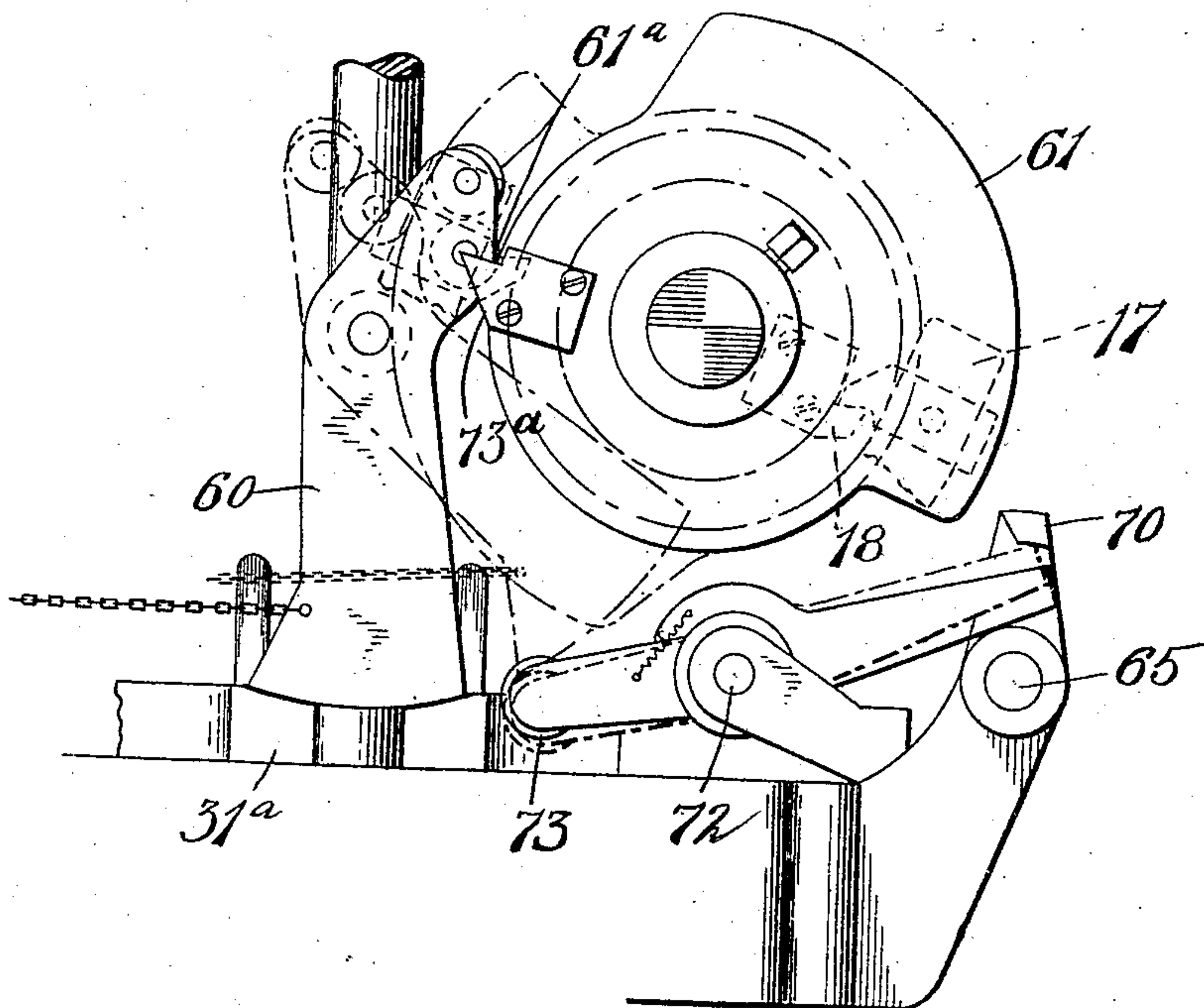
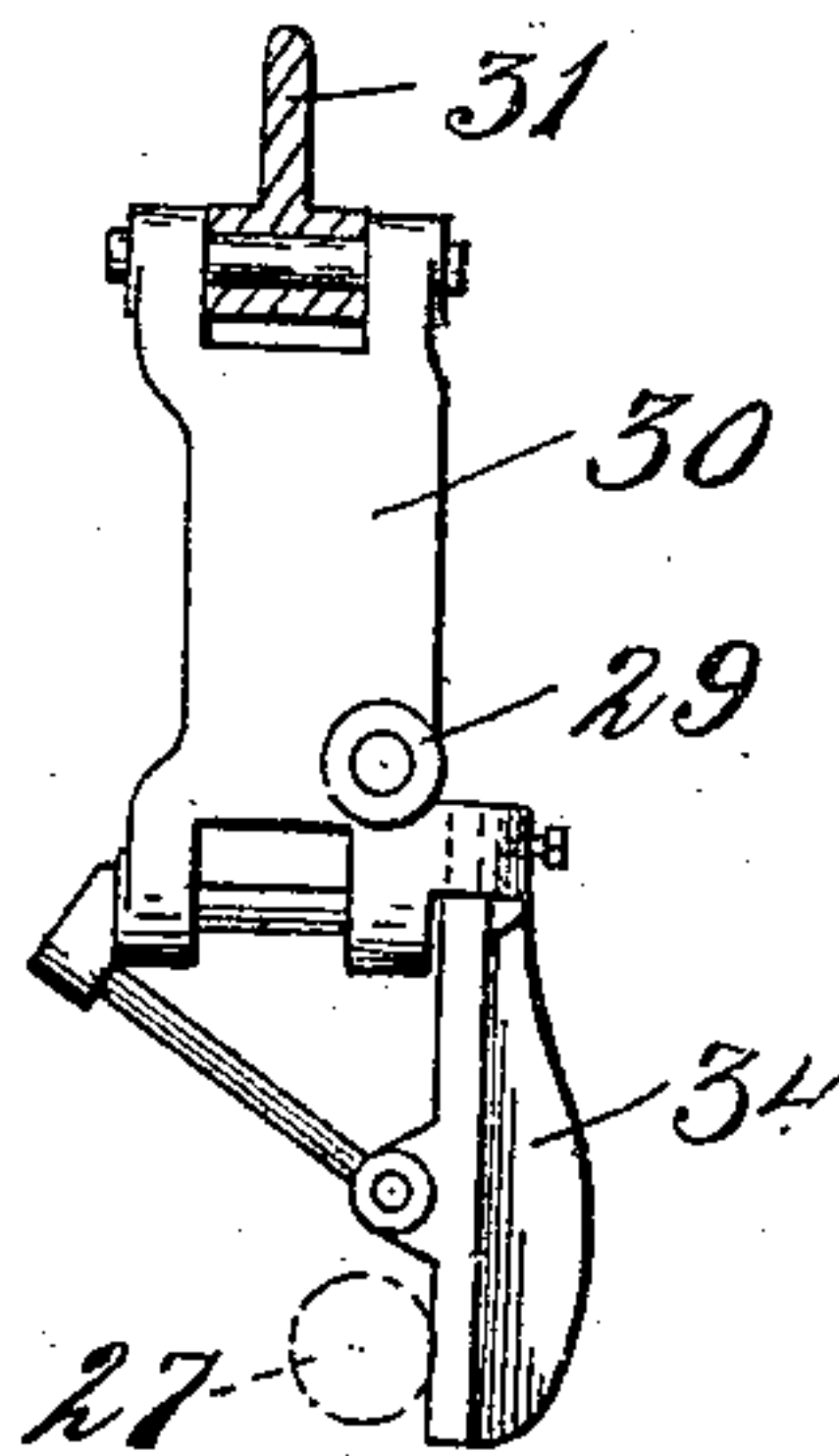


Fig. 11.



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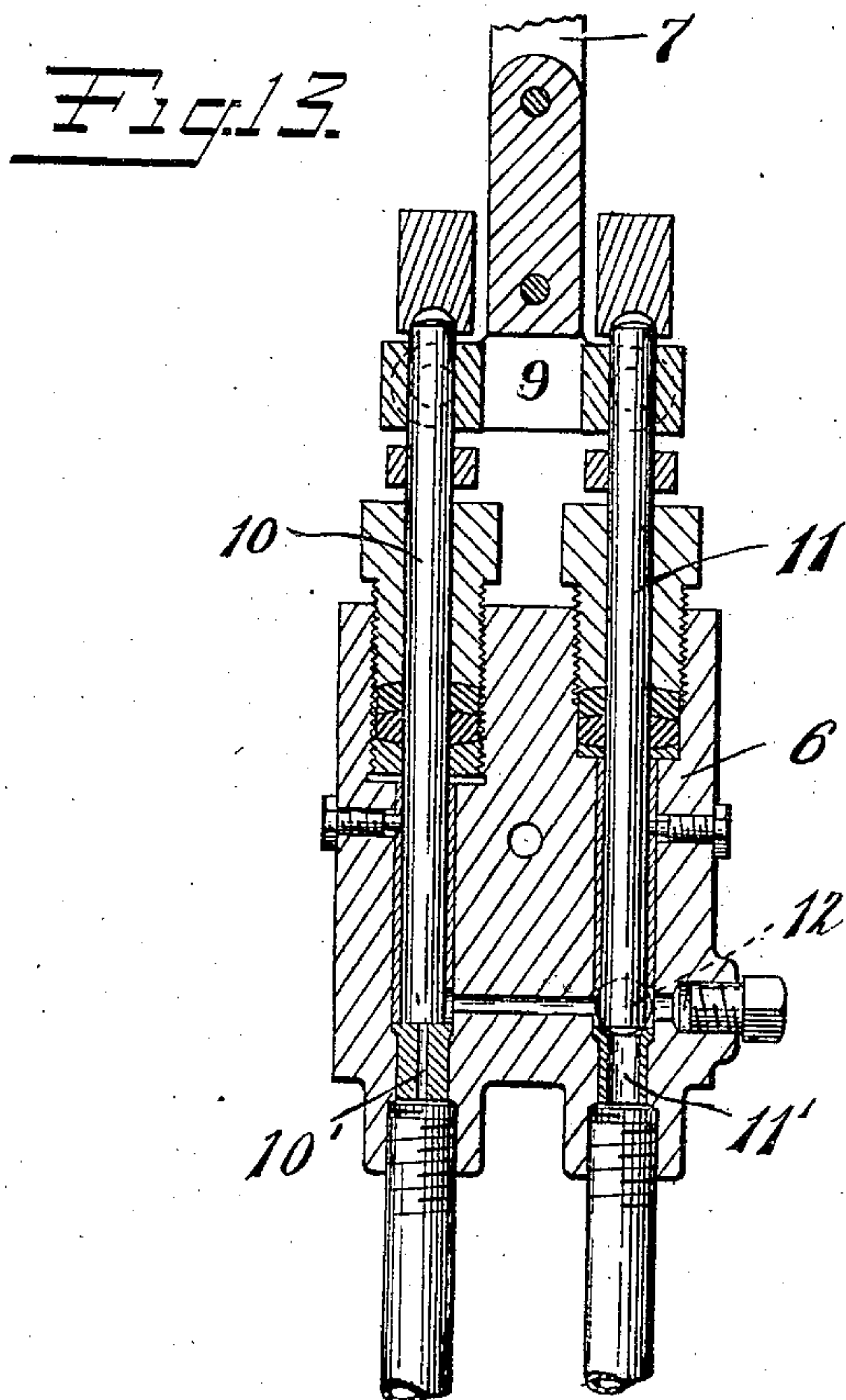
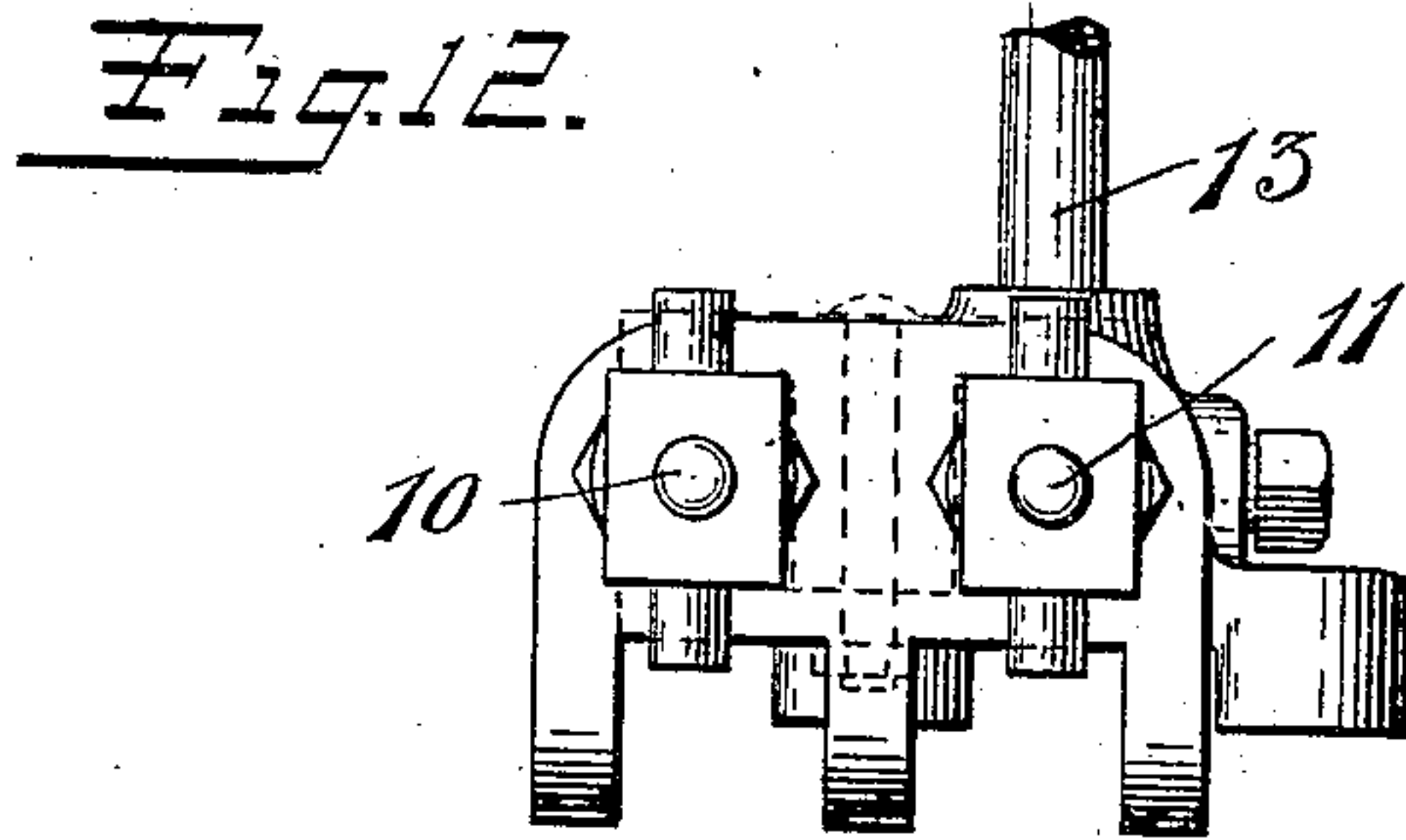
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S. M. GREEN.
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8 SHEETS—SHEET 7.



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S. M. GREEN
PRESS.

APPLICATION FILED OCT. 29, 1906.

8 SHEETS—SHEET 8.

Fig. 14.

Fig. 15.

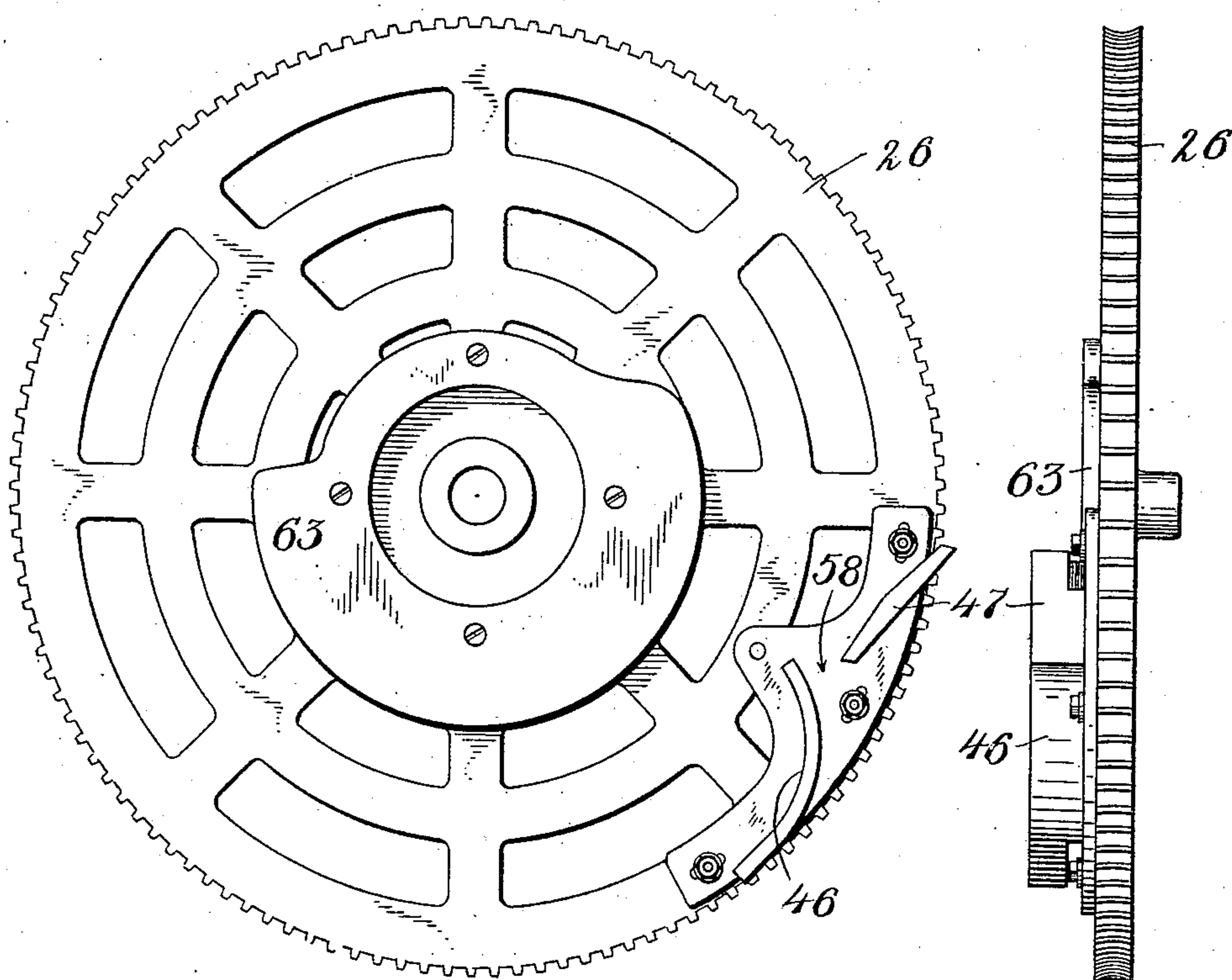
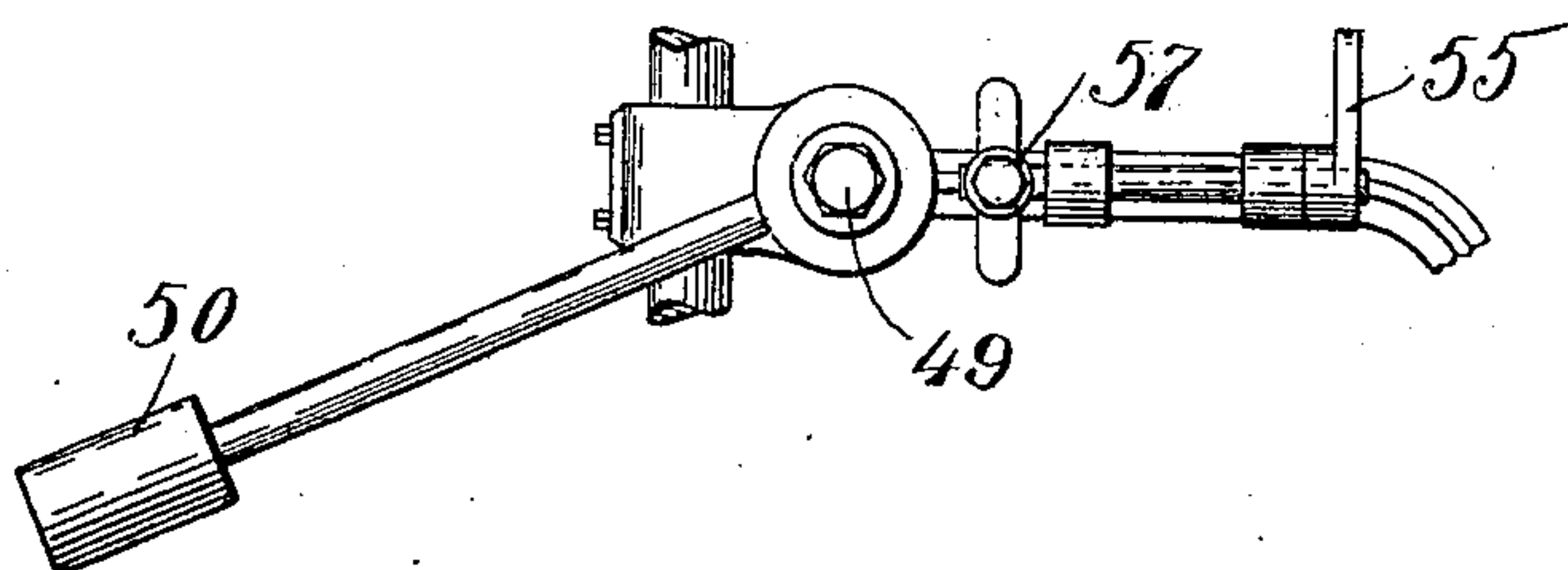


Fig. 16.



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UNITED STATES PATENT OFFICE.

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PRESS.

No. 880,449.

Specification of Letters Patent.

Patented Feb. 25, 1908.

Application filed October 29, 1906. Serial No. 341,084.

To all whom it may concern:

Be it known that I, SAMUEL M. GREEN, a citizen of the United States, residing at Holyoke, Hampden county, Massachusetts, have invented certain new and useful Improvements in Presses, of which the following is a full, clear, and exact description.

My invention relates broadly to improvements in presses and specifically to automatic presses, and has for its object to produce a new and improved press, and also a press which will be continuous in operation and require only general supervision by an attendant, who at the same time can supervise a number of other similar presses. The press proper, in connection with which I have made my improvements is one that simultaneously shortens and reduces the diameter of the matter within it and is shown and described in U. S. Patent No. 717,857 to E. Hubbard, dated January 6th, 1903.

The invention consists in combinations whereby such presses are improved and rendered more efficient, the ultimate object of the invention being to provide an automatic pulp press.

Briefly stated, the improved press embodies a hydraulic plunger, a form, a source of supply and automatic mechanism for controlling the plunger, opening the press, removing the contents, closing the press and introducing a new charge, and the invention involves such improvements and combinations as are hereinafter described and referred to in the claims.

The following is a description of a press embodying my invention, reference being had to the accompanying drawings, in which

Figure 1 is a front elevation of the press, Fig. 2 is a rear elevation of the same, Fig. 3 is a side elevation, Fig. 4 is a plan view of the body of the press, Fig. 5 is a sectional view of a detail showing the top plate of the press. Figs. 6 and 7 are detail views of the members making up the collapsible form. Fig. 8 is a view of the left hand side of the main worm wheel and cams. Fig. 9 is a detail view of the cam for retracting the cap locking levers and actuating the escapement controlling the belt shifter at the end of a cycle. Fig. 10 is an enlarged detail view showing this cam in connection with the cap locking levers. Fig. 11 is a detail view of the thrust arm. Figs. 12 and 13 are a plan view and section of the hydraulic valve. Fig. 14 is a view of

the right hand side of the main worm wheel with cams thereon. Fig. 15 is a front view of the same. Fig. 16 is a detail view of doffing mechanism.

Referring more particularly to the drawings above described, 1 is the lower head of a hydraulic press and 2 is a plunger carrying the same.

3 is the plunger cylinder.

4 is an upper head, opposite which is the lower head carried by the plunger 2. In these heads fit the sliding members 5, making the form within the head 1, the construction being the same as in the Hubbard patent referred to. As described in said patent the rising of the plunger lifts the lower head and causes the space formed by the sliding members to be reduced in diameter and also in length, thereby compressing the matter inclosed therein in all directions.

The hydraulic valve 6 controls the flow of water to and from the cylinder 3. This hydraulic valve is provided with a controlling lever 7, carrying an antifriction roller 8 and provided with a cross-head 9, to which are pivoted two plungers 10 and 11, held to their seats by weighted levers so as to close ports 10' and 11', the port 10' being the inlet port connected to the high pressure source and the port 11' being the discharge or waste port. Port 12 is connected by the pipe 13 with the cylinder 3, and is connected with either of the ports 10' and 11'.

The piston 2 is provided with an arm carrying a stop 14, (Fig. 3), which as the piston rises, engages with an adjustable abutment 15, connected to the arm 16 of an escapement 16—17. The engagement between the stop 14 and the abutment 15, shifts the escapement so that its arm 17 disengages a projection 18 upon a belt shifter cam cylinder 18^a. This disengagement permits the belt shifter cylinder to fly around until the projection 18 engages the escapement arm 16, the cylinder being propelled by a coiled spring, 19 (shown in dots) one end of which is connected to the shaft 27, while the other is connected to the cam cylinder 18^a. A cam groove 20 in the belt shifter cylinder causes the lever 21 engaged thereby to move so as to shift the belt from the loose pulley 23 to the fast pulley 24 of a cycle-performing mechanism. The fast pulley 24 drives a worm shaft 25, and thereby moves the main wheel 26 and its

shaft 27, which carries a series of actuating cams for performing certain steps in the required order. All these actuating cams are carried by this single shaft 27. The snail-shaped cam 28 engages the roller 29, carried by the link 30, which is connected to the lever 31 so as to permit the cap 31^a of the press to lift and to withdraw the star core 31^b from the center of the compressed mass.

The link 30 has its lower end connected by a lever 33, parallel to the lever 31, and has extending down from it a thrust arm 34, bearing against one side of the shaft 27, (Fig. 11) to assist the lever system in resisting certain thrusts to which it is subjected. Thus the lever system is subjected to a heavy blow when the cam projection 35 strikes the roller 29. This sudden blow is adapted to start the star core from the firmly compressed mass. The remainder of the snail-shaped cam 28 then causes the lever 31 to rise until the cap is elevated to its full height and the core withdrawn from the compressed mass. The cap is elevated by a counterweight 36 connected to the yoke 37 by the chain 38. The lever 31 is connected to the sliding cross-head 39, to which the star-shaped core 31^b is also connected by the rod 40. The cap arises until it engages the fixed sleeves 41 which form a stationary abutment. The cross-head 39 continuing to rise pulls the star core from the compressed mass until the mass drops off into the removing-tongs, as hereinafter described.

The cam 42 (Fig. 8) controls the hydraulic valve. In the position shown, the hydraulic valve is opened by the cam surface 43, so that the cylinder 3 is connected with the high-pressure source. As the cam revolves, the point 43^a engages the roller 8 upon the valve operating lever 7 and shifts the valve so that the high pressure source is cut off, and the cylinder is momentarily open to the exhaust. While the pressure within the cylinder is thus relieved, the projection 35 upon the cam 28 strikes the roller 29 and starts the core 31^b from the compressed mass. The following low surface 44 on the cam 42 permits both the inlet and outlet ports to be closed, so that the slightly reduced pressure in the hydraulic cylinder is maintained. The following high surface 44^a on the cam opens the exhaust port with the result that the hydraulic cylinder is emptied.

The following medium surface 45 permits both the inlet and outlet ports to be closed and maintains the cylinder in condition to be connected with the high-pressure source, which connection is partially brought about by the cam surface.

The cam surfaces 46 and 47 upon the wheel actuate the tongs. These tongs are pivoted at 49, being counterbalanced by the weight 50. They consist of an arm 51, movable about axis 49, and carrying another arm 52,

pivoted at the point 53 and normally held in retracted position by the spring 54. This arm is connected by a rod 56 to a crank 55, which, together with its shaft, is carried by arm 51. The shaft of the crank has a lateral projection 57. This lateral projection as the wheel 26 revolves is engaged by the inner surface of the cam 46. This engagement depresses the tongs and occurs at a time when the cap is raised and the core is about to be withdrawn from the compressed mass. Complete depression of the tongs takes place just before the core is withdrawn, so that they are in position to grasp the object as it falls. Just before it falls the projection 57 escapes the cam surface 46 and rises through the space 58 so as to be engaged by the outer surface of the cam 47. This engagement brings the movable member 52 of the tongs towards the stationary member 51, so that it firmly grasps the compressed object and at the same time permits and causes the tongs to return to their original position. When they have returned to their original position, the cam surface 47 having passed, the tongs are opened by the spring 54 and the compressed object permitted to fall upon the guides 59 which direct it to a suitable trough or hopper. The weight 50 holds them in elevated position.

When the pressure is on, the cap 31^a is locked by levers 60, (Fig. 10). As soon as the lever 31 has raised the core so as to start it slightly from the mass, the cams 61 engage antifriction rollers 61^a on the levers 60 and retract them against the action of the weight 62 so as to unlock the cap. The levers 60 are held in retracted position while the lifting lever 31 raises the cap and withdraws the core and returns them to their respective depressed positions. At that time the cams 61 permit the weight 62 to pull the levers 60 forward into cap-locking position. At this instant the cam 63 disengages the arm 64 connected to the pulp valve controlling shaft 65. This shaft is provided with an arm 66 which engages the pulp valve 67 which controls the supply through the hose 68. As the cam 63 releases the arm 64, the weight 69 falls and turns the shaft 65 so as to open the pulp valve and permits the press to receive a new charge of pulp at the proper time. After a stated period, the cam 63 engages the arm 64 and closes the valve. The valve shaft has two projections 70 beneath which lie the ends of two spring levers 71, pivoted at 72, and provided with anti-friction rollers 73. These anti-friction rollers are engaged by the levers 60 when they are retracted by the cams 61, with the result that their rear ends are moved so as to engage the hooked projections 70 and thus lock the pulp valve shaft 65 against all movements whatsoever, until the cap has been re-locked in its depressed position. After the cam 63 has ac-

tuated the pulp valve 67 so as to close it, a projection 73^a on the cam disk engages a rod 74 mounted upon the escapement member 16, shifting the escapement so as to permit the belt-shifting cam cylinder 18^a to rotate half a revolution, at which time it engages the other escapement arm 17. This rotation shifts the belt from the fast pulley to the loose pulley and therefore stops the cycle-performing mechanism. It is to be noted that the rising of the plunger 2 to a given point starts the cycle-performing mechanism and the complete revolution of the shaft 27 marks the end of the cycle. When the pulp supply is cut off the press can be washed out through an opening formed by the removal of the plug 75.

The press is provided with a sliding ring 76, carrying retracting springs 76^a for maintaining the elements 5 of the contracting form in proper position, and with levers 77 for lifting this guide at the proper rate of substantially the same form, and performing the same functions in the same way as similar elements in the apparatus of the Hubbard patent above referred to.

The operation of the press is as follows: Assuming the press to be filled with pulp and the plunger 2 to be rising, this action continues until the stop 14 engages the abutment 15 and shifts the escapement so as to permit the belt shifter cylinder 18^a to shift the belt to the fast pulley. This starts the cycle-performing mechanism which first through the cam point 43^a, cuts off the supply to the hydraulic cylinder and momentarily opens the exhaust port so as to slightly reduce the pressure within the cylinder. The cam 31 then acts to start the core 31^b while the compressed mass is still under some pressure, such pressure being necessary to prevent the compressed mass from collapsing during the starting of the core. The cap locking levers 60 are then withdrawn by the cam 61 and the cam 31 continuing to act, raises the core 31^b, together with the cap 31^a until the cap is stopped by an abutment 41. The core 31^b continuing to rise is withdrawn from the compressed mass. Just prior to the withdrawal of the core, the tongs are depressed and opened through the action of the cam surface 46, so as to embrace the compressed article, and as the projection 57 is released by said cam surface 46 and engaged by the cam surface 47 the tongs close and lift the article out of the press. After this the cap and star core are lowered and the cap is locked by the locking lever 60, the same being pulled forward by the weight 62. The forward movement of the cam locking levers releases the valve locking levers 71 and the high point of the valve closing cam 63 having passed the pulp valve is opened by the action of the weight 69. The pulp flows in until the cam 63 again closes the pulp valve.

The projection 73^a then engages the rod 74, mounted on the escapement member 16 and shifts the escapement so as to permit the belt shifting cylinder to again move, shifting the belt to the loose pulley and thereby stopping the cycle-performing mechanism. Just prior to this action of the belt shifter, and after the cap 31^a has been locked, the cam surface 43 actuate the hydraulic valve so as to connect the cylinder with the high pressure source. This condition of affairs continues until the hydraulic plunger has again risen sufficiently high to cause the stop 14 to again engage the abutment 15, from which a new cycle of the cycle-performing mechanism begins.

The machines embodying my invention permit of various modifications, as will be evident to those skilled in the art. By means of my invention, a hydraulic press can be started and operated so as to produce its product automatically, and thus do away with all labor except that required for general supervision and enabling an attendant to take the place of an operator, which attendant can supervise a number of such machines.

What I claim is:

1. The combination of a press cover, means for removing the same by a movement in a straight line, a lever for locking and unlocking said cover, said lever engaging therewith and moving in a different direction from that in which the cover moves, a cam for withdrawing said lever, a belt shifter and a trip for actuating said belt shifter upon the locking of said cover and a common driving mechanism for actuating all of said parts.
2. The combination of a press cover, a lever for locking the same, a cam for withdrawing said lever, a belt shifter and a trip for actuating said belt shifter upon the locking of said cover, a pulp valve and means for opening said pulp valve after said cover is locked and a common driving mechanism for actuating all of said parts.
3. The combination of a press cover, a lever for locking the same, a cam for withdrawing said lever, a belt shifter and a trip for actuating said belt shifter upon the locking of said cover, a pulp valve and means for opening said pulp valve after said cover is locked and means for closing said pulp valve after a predetermined period, a hydraulic plunger and means for bringing said plunger into action upon the closing of said valve.
4. The combination of a shaft, a spring actuated cylinder thereon having a projecting lug and carrying cam surface, a belt shifter controlled by said cam surface, an escapement having stops for engaging and disengaging said lug, means carried by said shaft for causing one of said escapement stops to disengage said lug once on each

revolution of said shaft, and a plunger having a means causing the other escapement stop to disengage said lug at the extreme position of said plunger.

5 5. In a press a removable cap, locking levers adapted to engage therewith and cams for forcing said levers out of locking engagement with said cap and a common driving mechanism for moving said cap and
10 actuating said cam.

6. In a press a removable cap, locking levers adapted to engage therewith, and
15 cams for forcing said levers out of locking engagement with said cap, a supply valve, a cam and connection for closing said valve, and levers adapted to engage with said connection and held in such engagement by
said cap locking levers when the same are out of engagement with said cap.

20 7. A revolving cam, a pair of tongs pivoted so as to move bodily about an axis, a projection engaging with the inner surface of said cam, whereby said tongs, are depressed and opened, a second revolving cam, whose
25 outer surface is adapted to engage said projection and close said tongs and lift them to normal position.

8. The combination of a cap, a counterbalance therefor, a core, means for releasing
30 said cap, means for lifting said cap and core simultaneously and an abutment for stopping the upward movement of said cap before said core has reached the limit of its upward movement.

35 9. The combination of a revoluble cam, a lever parallel to the axis of said cam and actuated thereby, and a steady arm connected to said lever and bearing against the shaft of said cam so as to receive the thrust
40 due to the cam action on said lever.

10. In a hydraulic press the combination of a plunger, a form and a core, a hydraulic valve controlling inlet and discharge ports, a cam surface for momentarily opening the discharge port of the hydraulic valve, means
45 for slightly elevating the core when said pressure is so reduced, a cam surface for continuously opening said discharge port and means for opening the press and removing the core entirely from the compressed object.
50

11. In a hydraulic press the combination of a plunger, a form and a core, a hydraulic valve controlling inlet and discharge ports, a cam surface for momentarily opening the discharge port of the hydraulic valve, means
55 for slightly elevating the core when said pressure is so reduced, a cam surface for continuously opening said discharge port and means for opening the press and removing the core entirely from the compressed
60 object, and means for catching and removing said compressed object as the core is withdrawn.

12. In a hydraulic press, the combination of a belt shifter, a spring actuating the same,
65 an escapement controlling said shifter, a cycle-performing mechanism actuated by said belt, a hydraulic valve controlled by said cycle-performing mechanism, means carried by said plunger for releasing said
70 escapement to permit said belt shifter to start said cycle-performing mechanism and means carried by said cycle-performing mechanism to release said escapement to permit said belt shifter to stop said mechanism.

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Witnesses:

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