J. MARSHALL.

AUTOMATIC HYDRAULIC HAT PRESS.

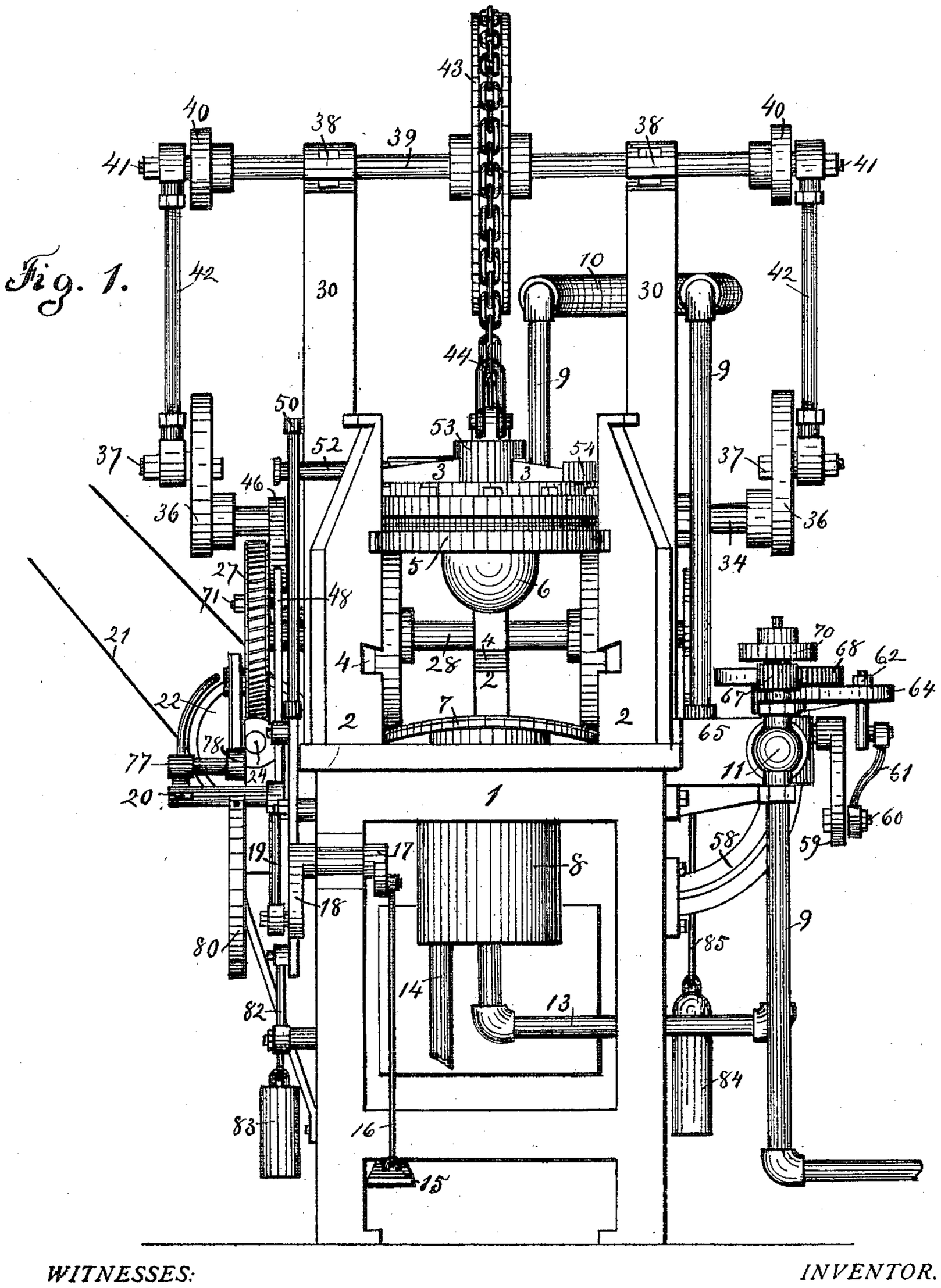
APPLICATION FILED SEPT. 24, 1910.

994,858.

Patented June 13, 1911.

5 SHEETS—SHEET 1.

Fig. 1.



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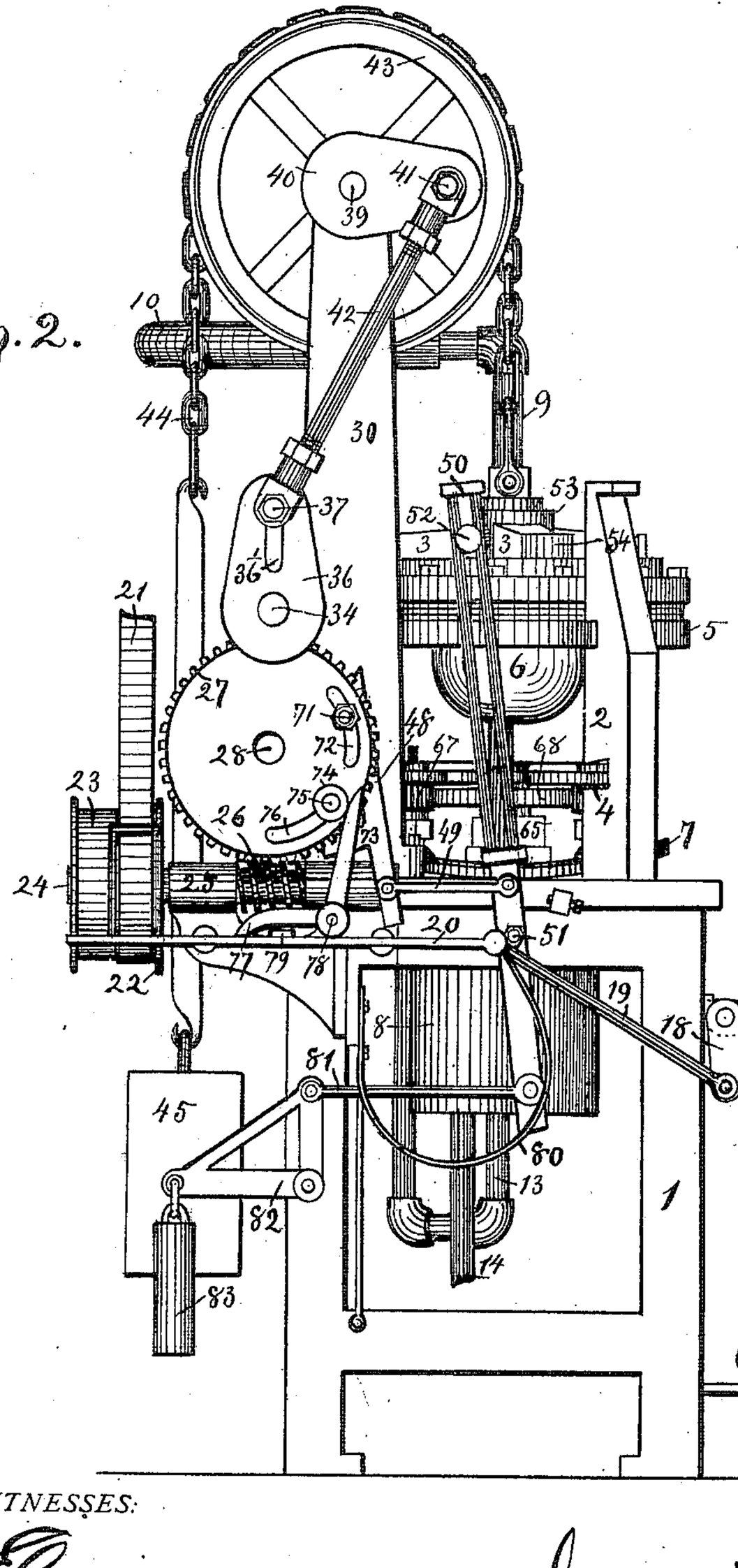
5 SHEETS—SHEET 2.

Fig. 2.



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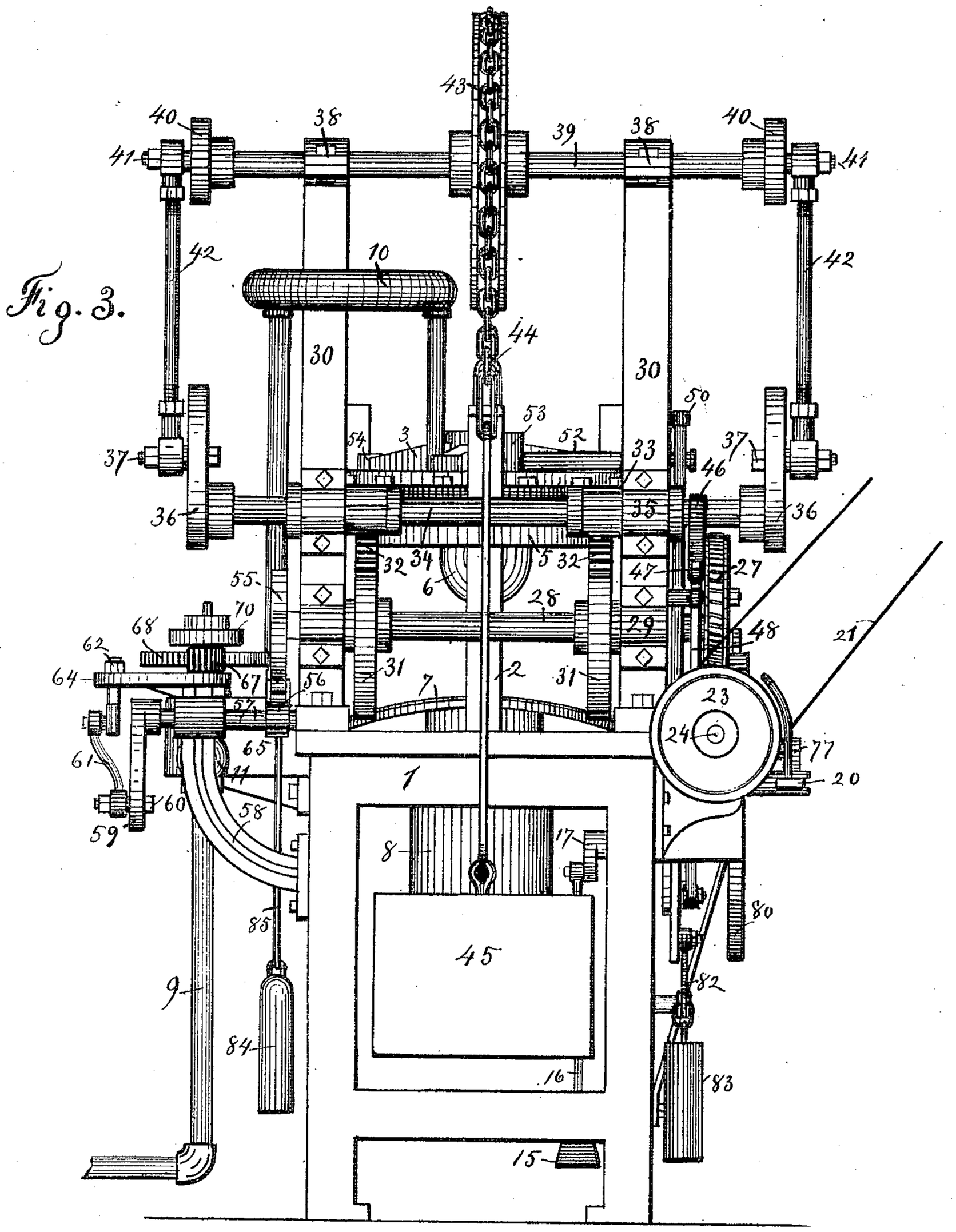
5 SHEETS—SHEET 3.

Fig. 3.



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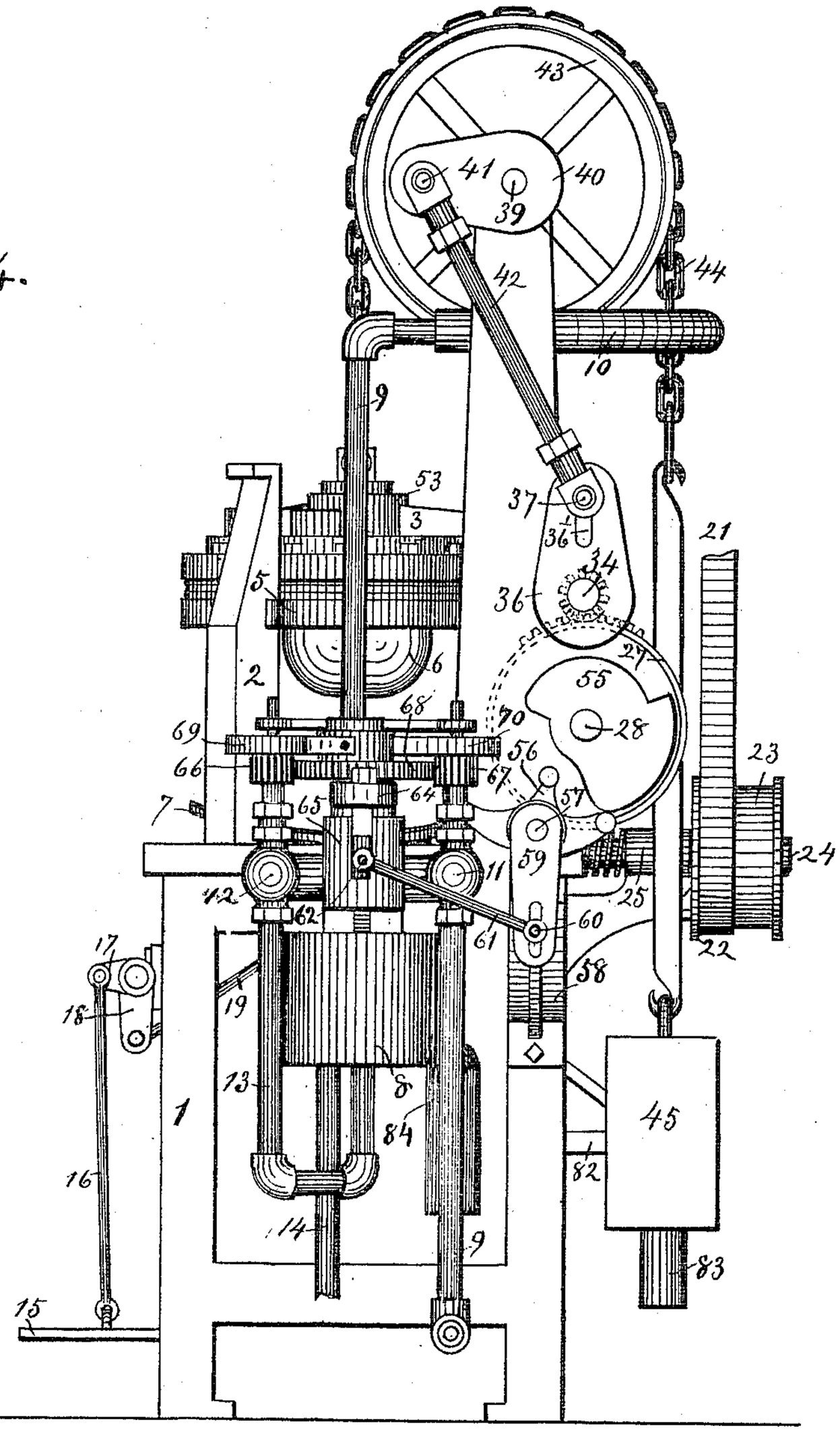
5 SHEETS—SHEET 4.

Fig. 4.



WITNESSES:

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5 SHEETS—SHEET 5.

Fig. 5.

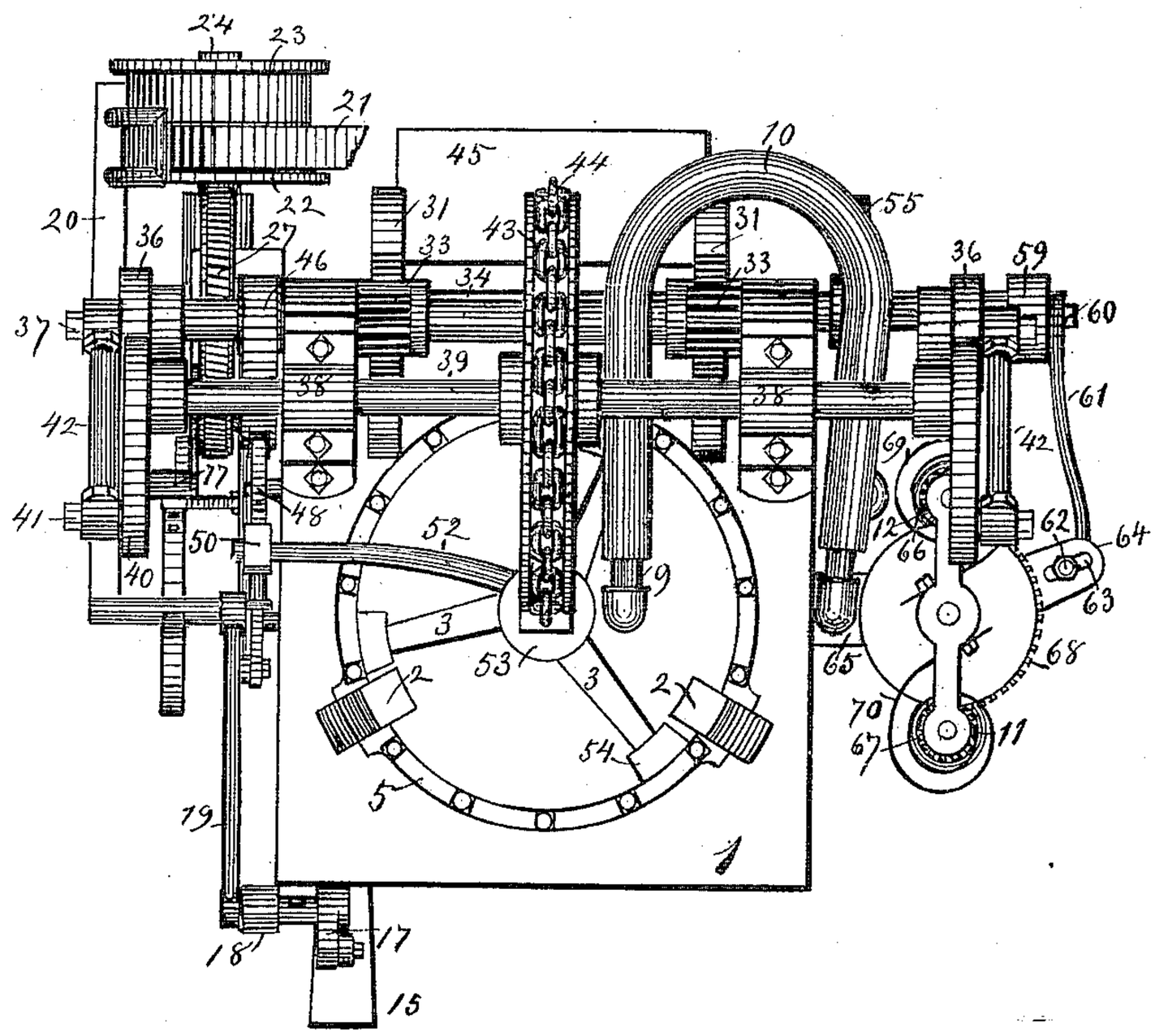
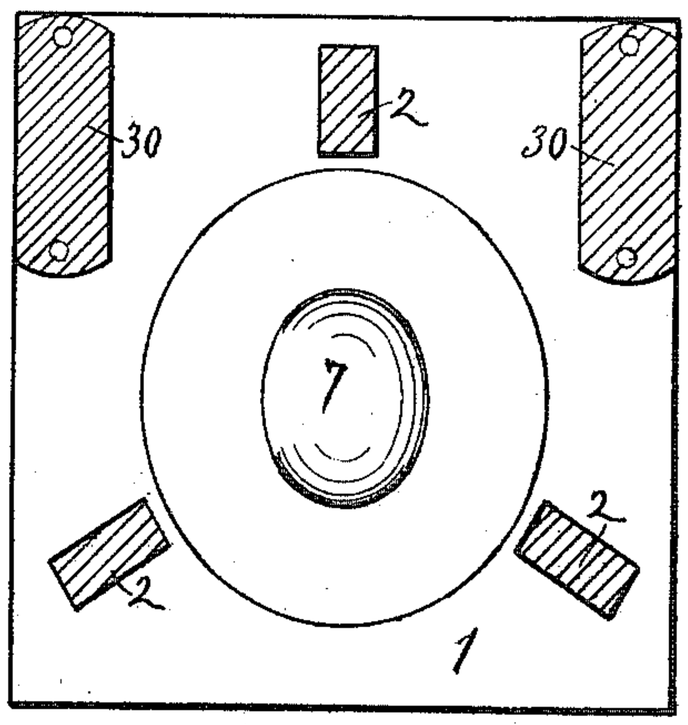


Fig. 6.



WITNESSES:

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UNITED STATES PATENT OFFICE.

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AUTOMATIC HYDRAULIC HAT-PRESS.

994,858. Specification of Letters Patent. Patented June 13, 1911.

Application filed September 24, 1910. Serial No. 583,639.

To all whom it may concern:

Be it known that I, JOHN MARSHALL, a citizen of the United States, residing at Fall River, in the county of Bristol and State of Massachusetts, have invented a new and useful Improvement in Automatic Hydraulic Hat-Presses, of which the following is a specification.

This invention relates to an automatic mechanism to operate machines for pressing hats, more especially to operate the hydraulic presses used in the manufacture of stiff hats. Such machines are now operated entirely by hand as follows: The hat after being softened by heat is inserted in a metal mold in the press floor, a rubber bag shaped like a hat and attached to the under side of the press head is then lowered within the hat, water under a powerful pressure is admitted to the press head inside of the rubber bag, which presses the hat accurately within the metal mold. To carry out this process the operator has to handle a number of levers successively and accurately, and the process requires good judgment as to the duration and amount of water pressure admitted, or the hats are irregularly pressed, and the rubber bags injured.

The object of this invention is not only to save the labor required in manipulating the levers, but to insure that the pressure applied as to time and quantity shall be exactly the same in every hat, and to otherwise remove the uncertainty of human operation by making the process automatic.

The invention is fully described in the following specification, and illustrated by the accompanying five sheets of drawings, in which,

Figure 1, is a front elevation of a hydraulic hat press with my improvements; Fig. 2, is a left-hand side elevation; Fig. 3, is a back elevation; Fig. 4, is a right-hand side elevation; Fig. 5, is a plan view over all; Fig. 6, a plan view of the press floor and hat mold.

In all the figures like numerals relate to like parts.

1, is the press frame; 2, the guide posts; 3, the locking arms which lock into recesses 4 in the posts; 5, is the hydraulic press head; 6, the rubber bag; 7, the hat mold in the press floor; 8, the waste water cooling tank; 9, the water admission pipes; 10, a flexible hose connecting the water admission pipes to the movable press head; 11, the water admission valve; 12, the water exit valve; 13, the water exit pipe leading to the cooling tank; 14, the waste water outlet from the tank.

All of the features thus far enumerated are common to hydraulic hat presses, have been long in use, and I make no claim to their invention. Hitherto they have all been operated by separate hand movements, and I will now proceed to describe the mechanism by which I make their movement automatic by power.

(See Fig. 1) 15, is a foot treadle which is depressed after a hat has been inserted in the mold in the press floor; 16, a rod connecting the treadle to crank 17, which actuates a right angle crank 18, and connecting rod 19, (see Fig. 2) to push the shifter bar 20, which shifts a motor belt 21, from loose pulley 22, to tight pulley 23, secured on the end of shaft 24, which is journaled in boxes 25, attached to the side of the press frame; secured to the shaft between the boxes is a worm 26, which meshes with a worm gear wheel 27, attached to one end of a shaft 28 arranged at a right angle to shaft 24, and which is journaled in boxes 29, (see Fig. 3) secured to the upright posts 30, rising from the machine frame; secured to this shaft between the posts are the segment gear wheels 31. These wheels have smooth peripheries excepting a segment of teeth 32, which mesh with and cause one revolution of the pinion gears 33; immediately above them on shaft 34, which is likewise journaled in boxes 35, secured to posts 30, and arranged parallel with shaft 28. At the outer ends of shaft 34, are secured cranks 36. These cranks have slotted wrist pin openings 36′, and adjustable wrist pins 37. At the top of the upright posts are boxes 38, in which is journaled shaft 39, parallel with the two lower shafts; at the outer ends of this shaft are secured cranks 40, having fast wrist pins 41; a connecting rod 42, connects the upper and lower cranks adjustably; midway on shaft 39, is secured a chain wheel 43, over which passes a chain 44, one end of which is connected to the center of the hydraulic press head, and the other end to a balancing weight 45. When the press head is up as shown in all the figures, and the mechanism is at rest to position a hat in the mold, the pinion gears 33, stand meshed with the center of the segment gears on wheels 31, a movement of these wheels causes cranks 36,

to turn half a revolution and then releases them, thereby drawing down cranks 40 and lowering the hydraulic press head upon the hat in the mold where it rests.

On shaft 34, between box 35, and the worm wheel, is secured an arm 46, having a friction wheel 47, at its end, this arm revolves with the pinion gears to contact with an upright lever 48, which is pivoted on the machine frame, and connected at its lower end by a rod 49 (see Fig. 2) to an upright socket lever 50, also pivoted to the machine frame by pivot 51; sliding in the socket of this lever is an arm 52, which is made fast to the hub 53, which revolves about a central pivot in the hydraulic press head; radiating from this hub, are fixed locking, arms 3, terminating in blocks 54, which fit into recesses 4, in the guide posts 2, the revolution of the arm 46, is timed to contact with the lever 48, just after the press head is lowered upon the hat, and the movement of this lever rotates the arms 3, to lock the press head temporarily in position to resist the water pressure when admitted. Attached to the end of shaft 28, opposite the worm wheel, is a cam wheel 55, (see Fig. 4) having various sectors of circles arranged upon its periphery, these contact at specific times with a three-arm crank 56, arranged upon a shaft 57, journaled in bracket 58, projecting from the machine frame, (see Fig. 3). Secured to the end of the shaft is a crank 59, with an adjustable socket and wrist pin 60, upon which is journaled a connecting rod 61, having its other end also journaled upon an adjustable wrist pin 62, secured in a socket 63, (see Fig. 5) arranged in the end of crank 64; this crank is pivoted upon a hollow bracket 65, projecting from the machine frame and which is constructed as a water receptacle, upon either side of it and connected to it are water admission valve 11, and water exit valve 12, (see Fig. 4), upon the stems of these valves are secured pinion gears 66, 67, upon the top of crank 64, secured to it, and journaled upon the same pivot, is a segment gear wheel 68, the segment teeth of which alternately at fixed times controlled by the cam wheel 55, and the three-armed crank 56, mesh with the pinion gears on the valve stems, and act to open first the admission valve, and at proper duration of time the exit valve, as each valve is opened it coils a spring 69, 70, and as soon as the teeth of the segment gear leave the pinion gears, the valves are sharply closed by the reaction of the coiled springs, the water on being admitted to the hollow box passes through the admission pipe 9, to the flexible hose 10, and thence down into the hydraulic press head where it acts upon the rubber bag to press the hat; as soon as the admission valve is closed, and the exit valve opened, the water being under high pressure returns through the exit valve to the exit pipe 13, where it passes into the tank 8, and thence through the waste water pipe 14, in the usual manner. These various automatic movements have all been actuated by the worm gear wheel in a single revolution; as it nears the end of its revolution, a small friction wheel on the inner side of the worm wheel journaled on an adjustable pin 71, (see Fig. 2) fixed in a slot 72, in the worm wheel, contacts with an arm 73, projecting from the lever 48, thereby pushing it to throw the connected socket lever 50, over, and thus unlock the arms securing the hydraulic press head in the guide posts, immediately thereafter another small wheel 74, journaled on an adjustable pin 75, fixed in a slot 76, in the worm wheel on its outer side, (see Fig. 2) contacts with a right-angle pawl 77, pivoted to the machine frame at 78; its contact raises the arm of the pawl which had been locked behind the block 79, attached to the shifting bar 20, which actuated by the coil spring 80, immediately springs back, thereby shifting the motor belt from the tight to the loose pulley, thereby stopping the action of the machine. Just before the shifter bar is moved, the segments of gear teeth 32, on the periphery of wheels 31, have rotated sufficiently to again contact with the pinion gears 33, completing their revolution, and the revolution of cranks 35, which again rotate the chain wheel in a reverse direction to lift the hydraulic press head to the original open position shown in all the drawings, this action takes place simultaneously with the shifting of the motor belt.

The socket lever 50, is connected at its lower end (see Fig. 2) by a connecting rod 81, to a bell crank 82, pivoted on the side of the machine frame, which raises the balance weight 83, when the socket lever locks the press head arms in the guide posts, the drop of this weight assists the arms to unlock the press head sharply and automatically. When the worm wheel actuates the movement as aforesaid, a balance weight 84, on the other side of the machine (see Figs. 3 and 4) is attached by a rod 85, to one arm of the three arm crank 56, and serves to hold the tips of the arms which are provided with friction wheels in contact with the sectors of cam 55, as it engages them. It is thus shown that one revolution of the worm gear wheel constitutes a cycle during which all the movements necessary to manipulate the hat press are automatically and mechanically made. It is only necessary for the operator in attendance to insert a hat, and push down the foot treadle with his foot, then pass to the next machine and do likewise, for several machines; after each machine is started, it takes care of itself,

and stops itself when the operation is completed, in readiness for the operator to remove the finished hat and supply another.

Although the automatic movements as herein described and illustrated, are applied to a hydraulic hat press, they are equally applicable to a hat press operated by compressed air, or by any fluid pressure by which hats are pressed.

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

1. In an automatic hat press, the combination of a press frame, a worm shaft journaled in boxes attached to said frame, means to put said shaft in motion, a second shaft journaled in boxes attached to said press frame at right angles to said worm shaft, a worm wheel affixed to one end of said right angle shaft, meshing with the worm on said worm shaft, said worm wheel at fixed periods of time in its rotation, putting in motion automatically and consecutively means to press a hat.

2. In an automatic hat press, the combination of a press frame, a shaft driven by power attached thereto, said shaft operating a worm engaging a worm wheel affixed to one end of a shaft at right angles to said power shaft, an arm made fast to said right angle shaft adjacent to said worm wheel, a lever with which the end of said arm contacts periodically, a connecting rod connecting said lever to a socket lever pivoted at the side of said press frame, an arm slidably movable in said socket lever and terminating in a hub centrally pivoted upon said press head; arms radiating from said hub adapted to lock said press head automatically in said press frame after said press head is lowered into pressing position, said lock arms being actuated at predetermined and fixed periods of time in the rotation of said worm wheel.

3. In an automatic hat press, the combination of a press frame, a shaft driven by power attached thereto, said shaft operating a worm engaging a worm wheel affixed to one end of a shaft at right angles to said power shaft, a cam affixed to the other end of said right angle shaft, said cam having various sectors arranged upon its periphery, a crank arranged with various arms contacting with said sectors at definite periods of time and rotation of said cam, said crank being connected by an adjustable rod with another crank attached to a horizontal segmental gear wheel provided with a segment of teeth meshing into pinion gears arranged upon each side of said gear wheel, said pinion gears being attached to the stems of water admission and exit valves, said teeth operating said valves automatically and alternately at fixed periods of time in their rotation to admit and discharge water pressure to and from said hat press, said valves operating automatically at predetermined and fixed periods of time in the rotation of said worm wheel.

4. In a hat press of the character described combining water admission and exit valves, the combination with the stems of said valves of pinion gears rotated automatically at fixed periods of time by a segment gear contacting with said pinion gears to open said valves, said segment gear simultaneously coiling helical springs, said springs having one end attached to the hub of said segment gear wheel, and the other end to the stems of said valves, said springs being automatically coiled when said valves are opened, said springs reacting to close said valves automatically as soon as said segment gear teeth pass out of contact with said pinion gear teeth in alternation.

5. In an automatic hat press, the combination of a press frame, a shaft driven by power attached to said frame, said shaft operating a worm engaging a worm wheel affixed to one end of a shaft at right angles to said power shaft, tight and loose pulleys arranged upon said power shaft, a shifting belt arranged upon said pulleys, a shifter bar arranged to shift said belt between said pulleys, means attached to said worm wheel to move said shifter bar to shift said belt and stop said hat press automatically at a predetermined time in the rotation of said worm wheel.

6. In an automatic hat press, the combination of a press frame, a shaft driven by power attached to said frame, said shaft operating a worm engaging a worm wheel affixed to one end of a shaft at right angles to said power shaft, each revolution of said worm wheel actuating automatically and consecutively means, first, to lower a press head upon the floor of said press frame, second, to lock said press head to said press frame, third, to admit and discharge liquid under pressure beneath said press head, fourth, to unlock said press head, fifth, to raise said press head, sixth to stop the rotation of said worm wheel.

In testimony whereof I, JOHN MARSHALL, have signed my name to this specification in the presence of two subscribing witnesses, this 21st day of September 1910.

JOHN MARSHALL.

Witnesses:
A. E. CREY,
BRONSON S. BURR.