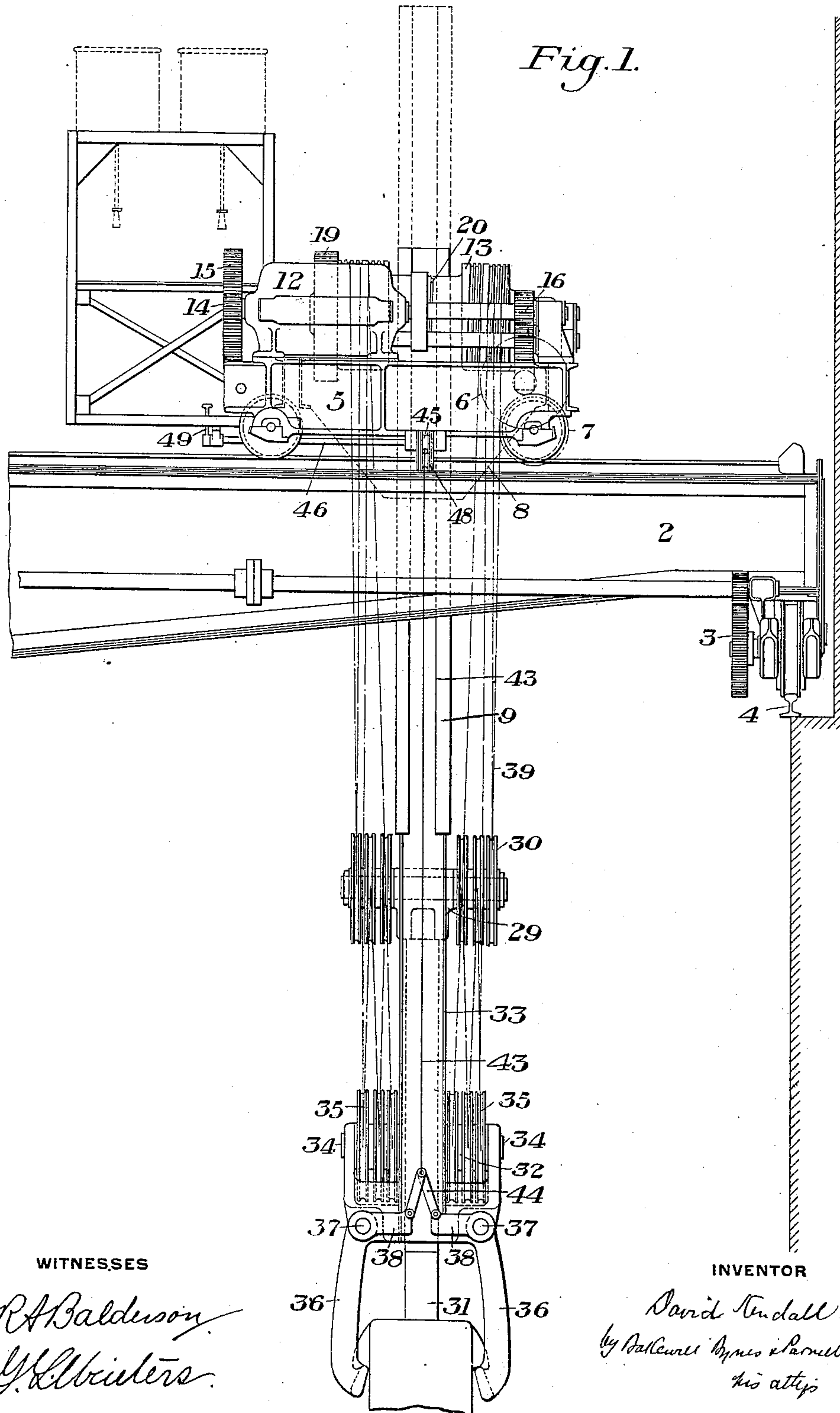


969,634.

D. KENDALL.  
INGOT STRIPPER.  
APPLICATION FILED MAY 17, 1909.

Patented Sept. 6, 1910.

6 SHEETS—SHEET 1.



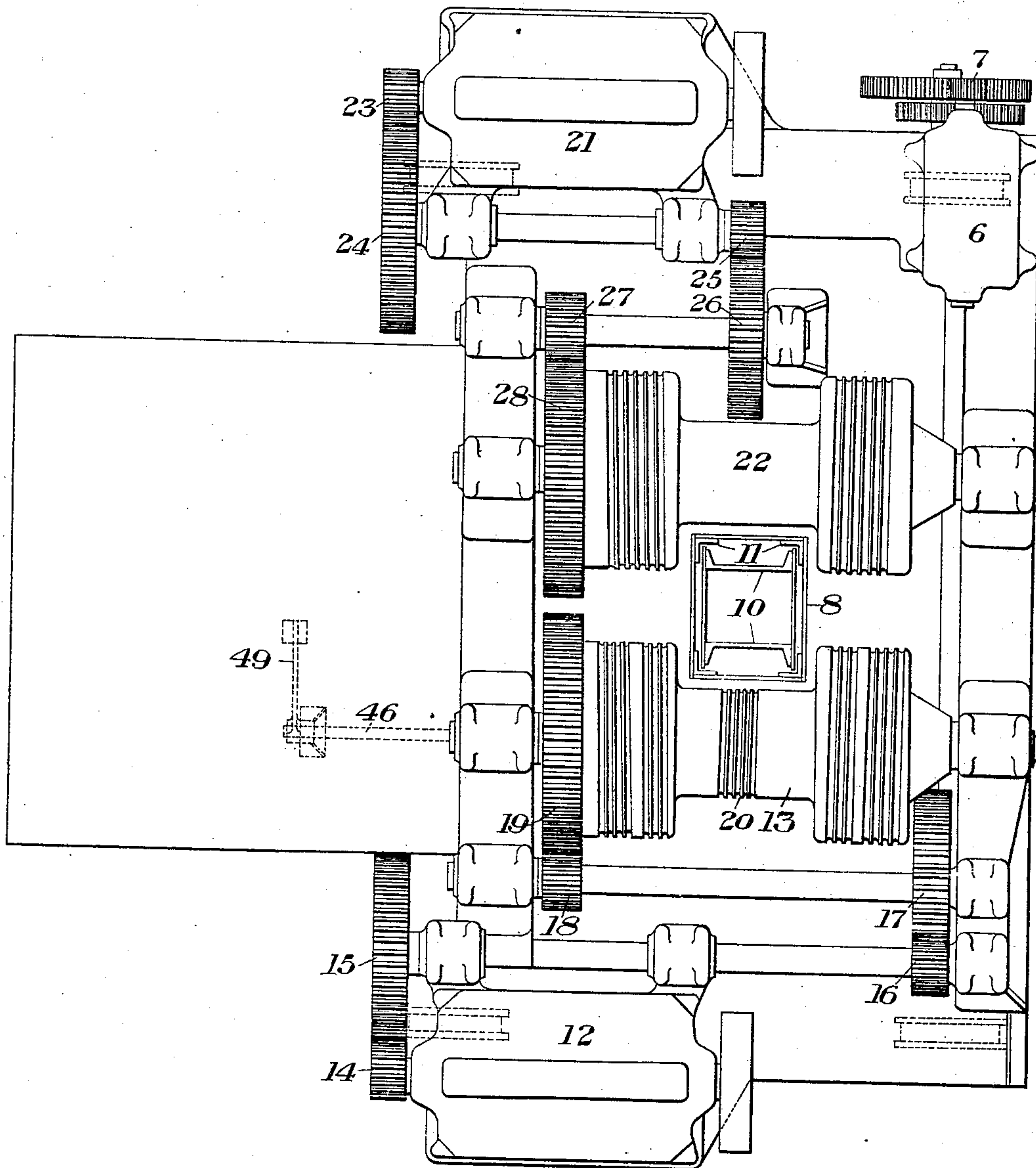
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Patented Sept. 6, 1910.

5 SHEETS—SHEET 2.

*Fig. 2.*



WITNESSES

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969,634.

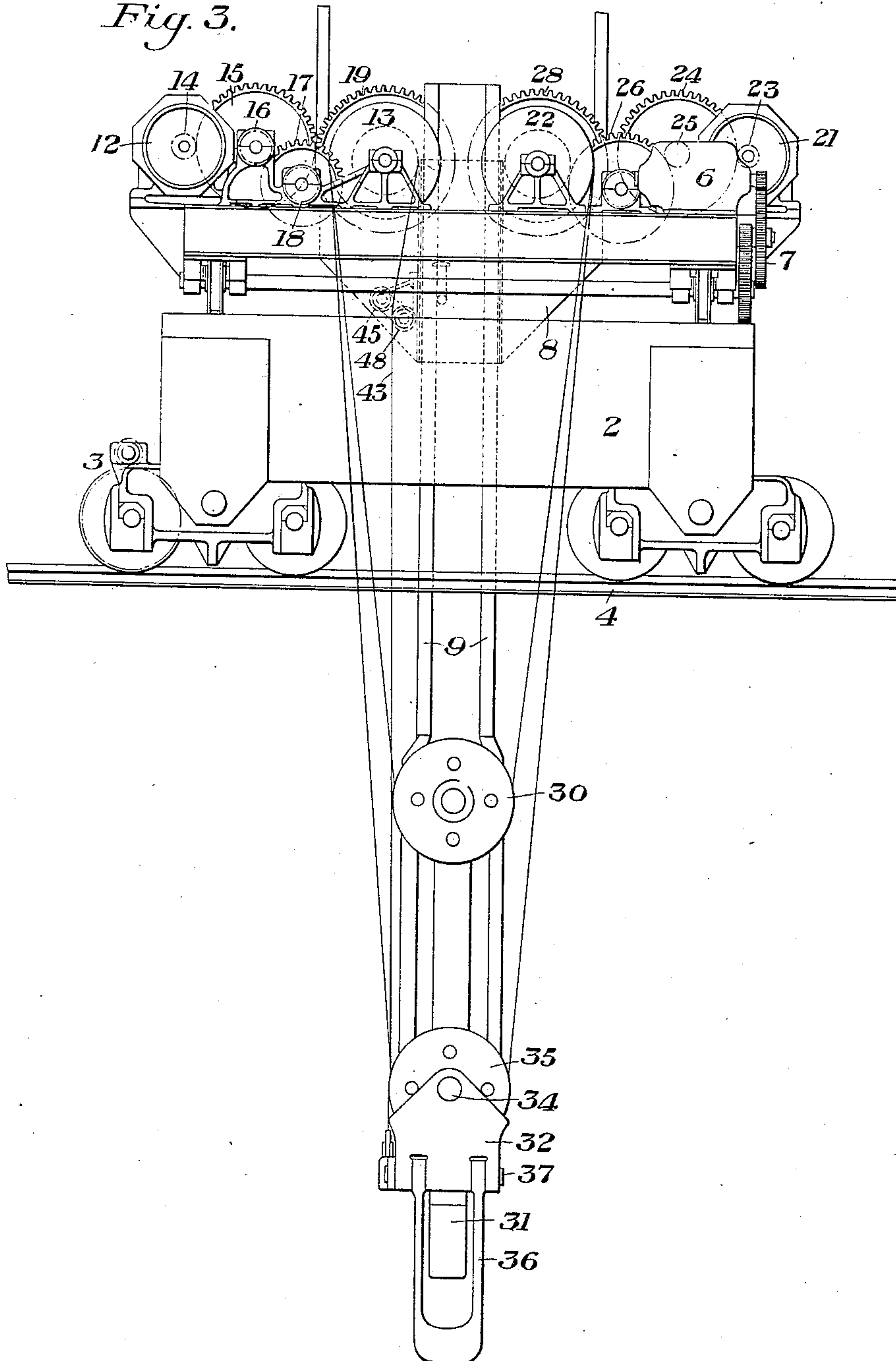
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5 SHEETS—SHEET 3.

Fig. 3.



WITNESSES

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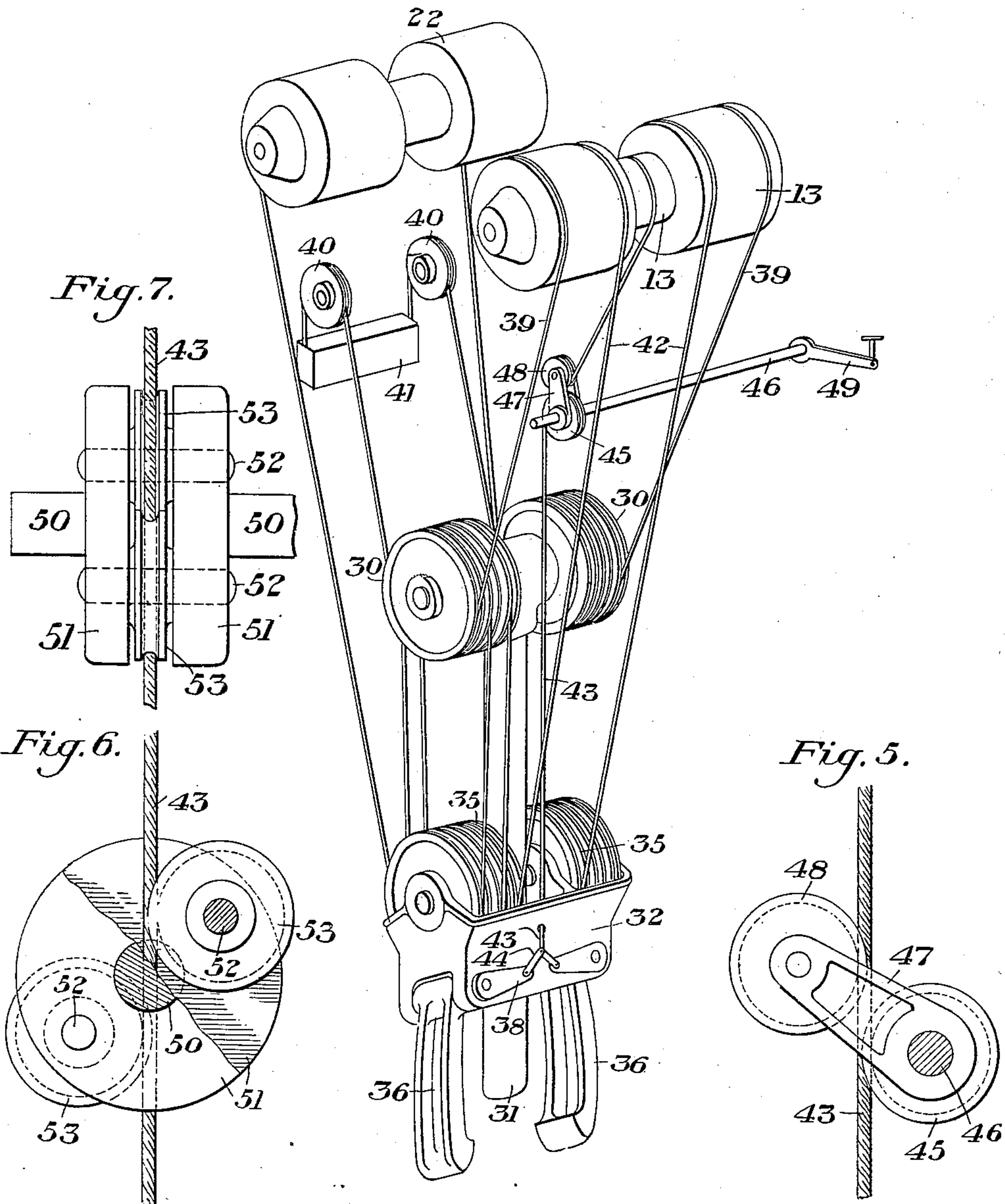
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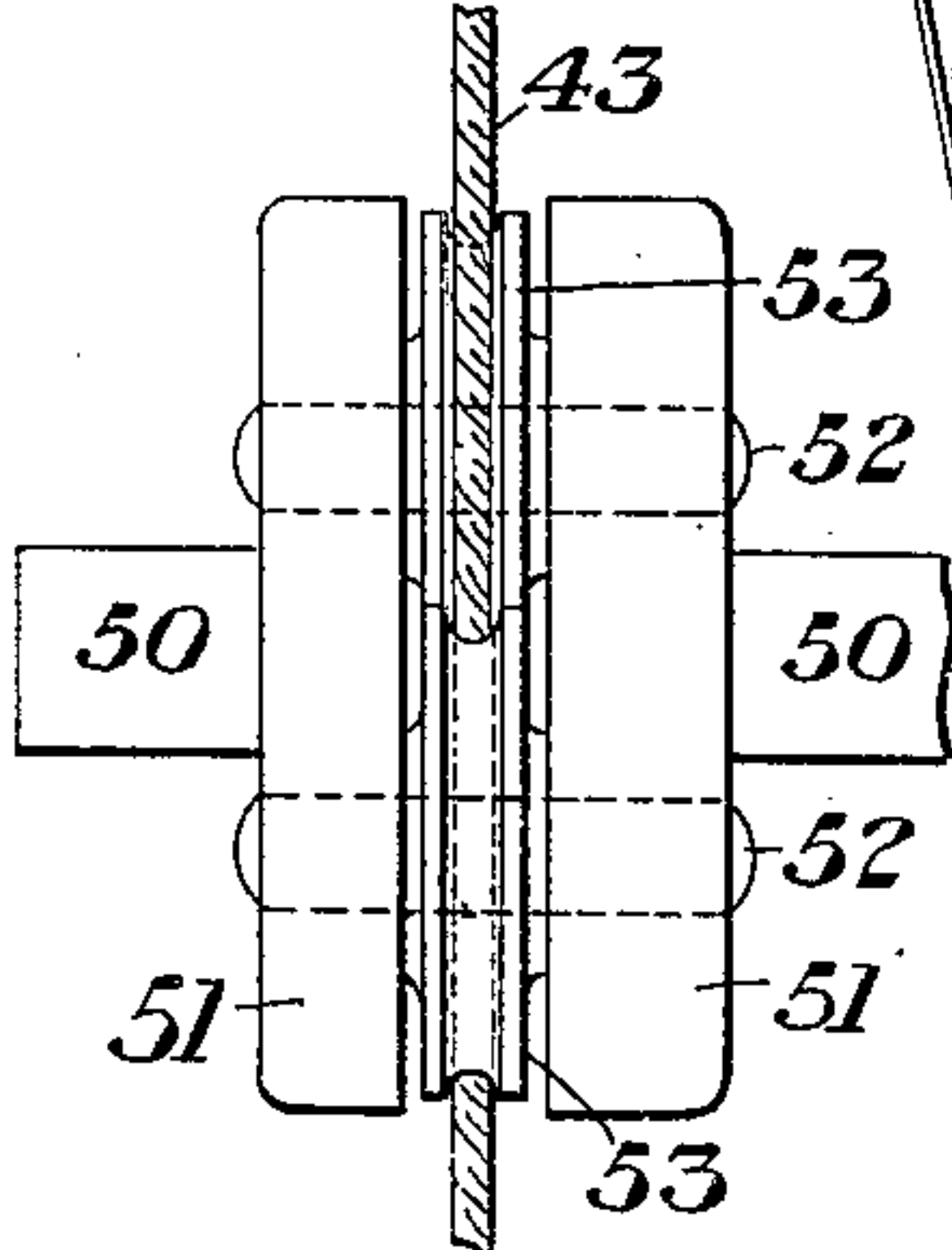
Patented Sept. 6, 1910.

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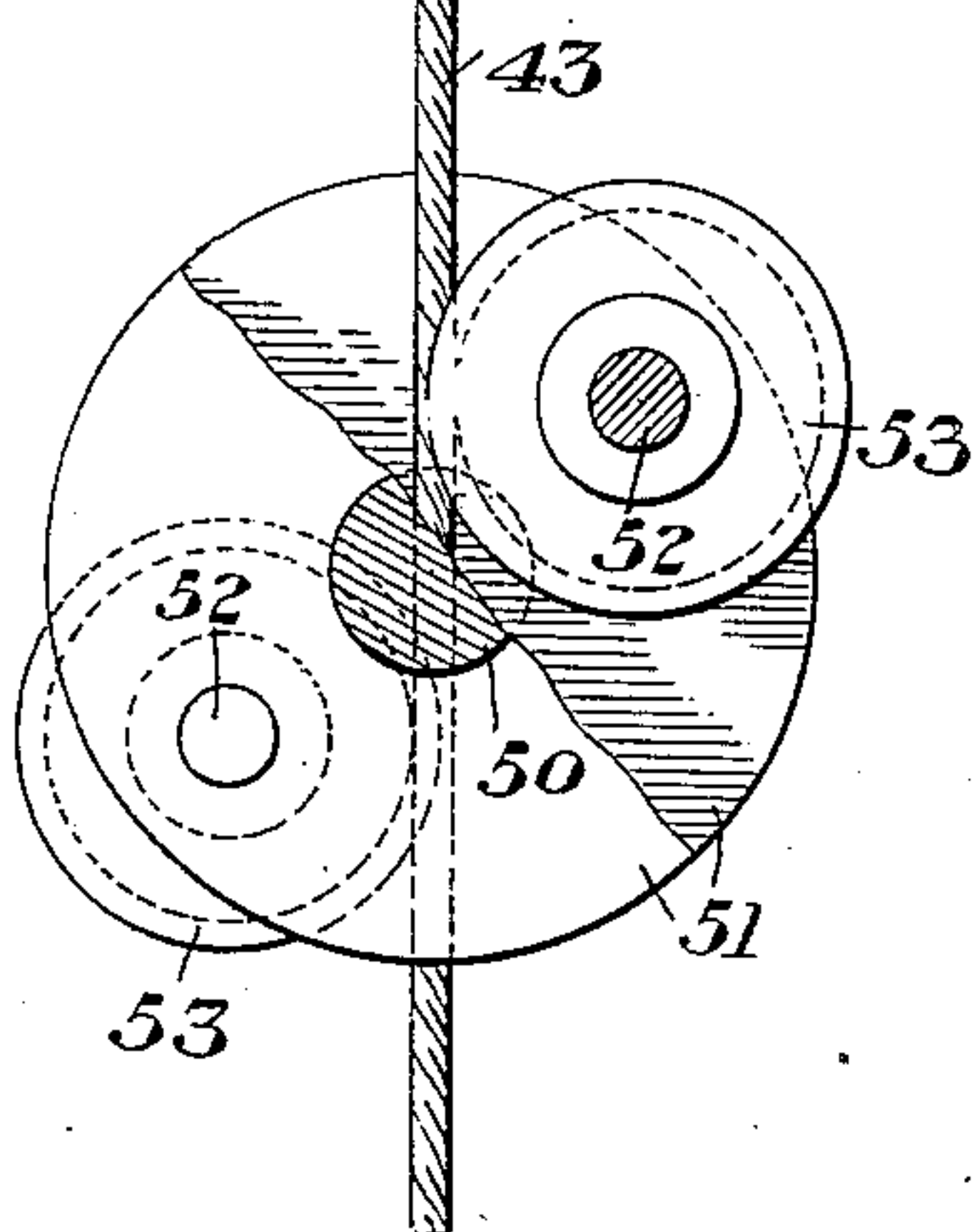
*Fig. 4.*



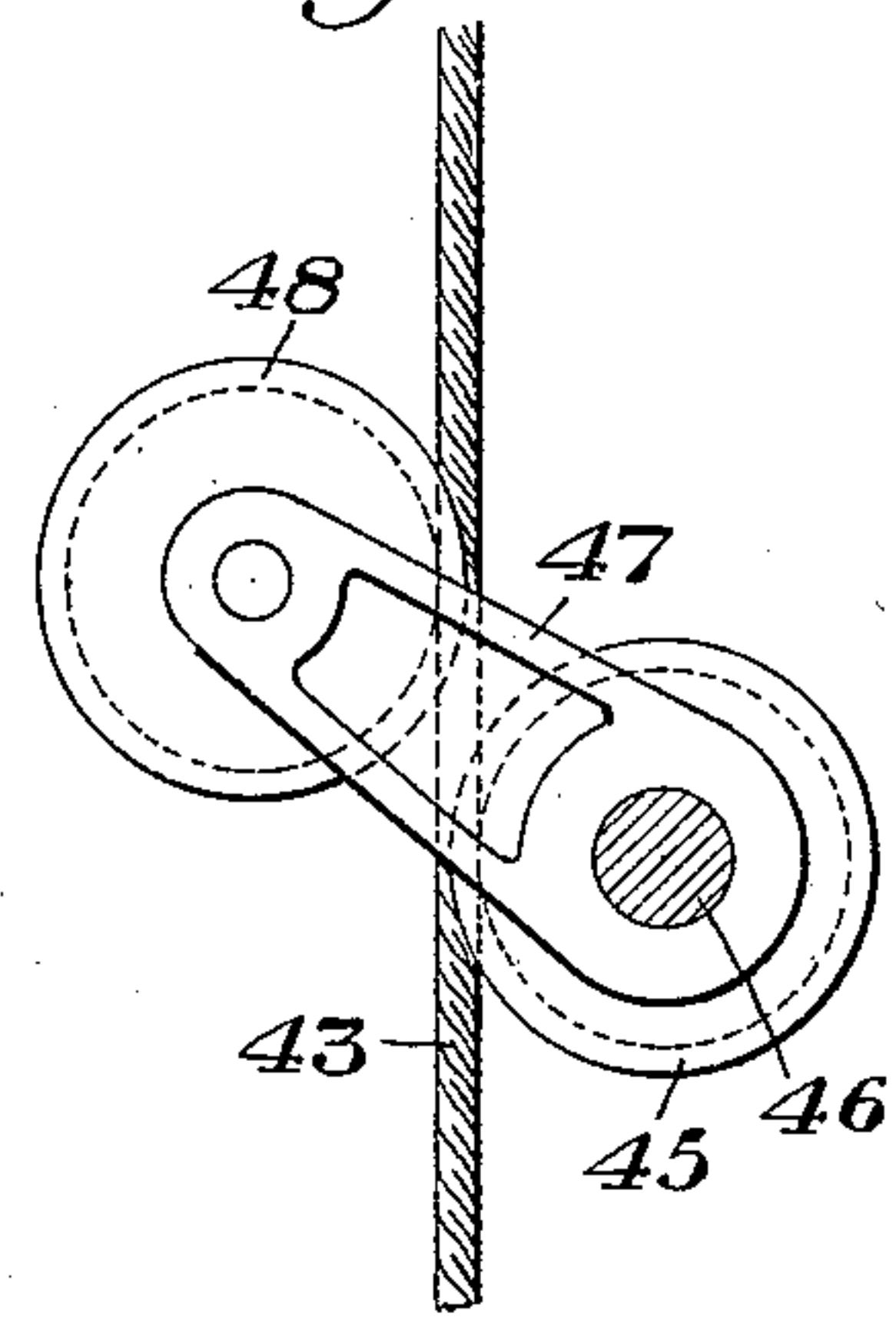
*Fig. 7.*



*Fig. 6.*



*Fig. 5.*



WITNESSES

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Patented Sept. 6, 1910.  
6 SHEETS—SHEET 5.

Fig. 8.

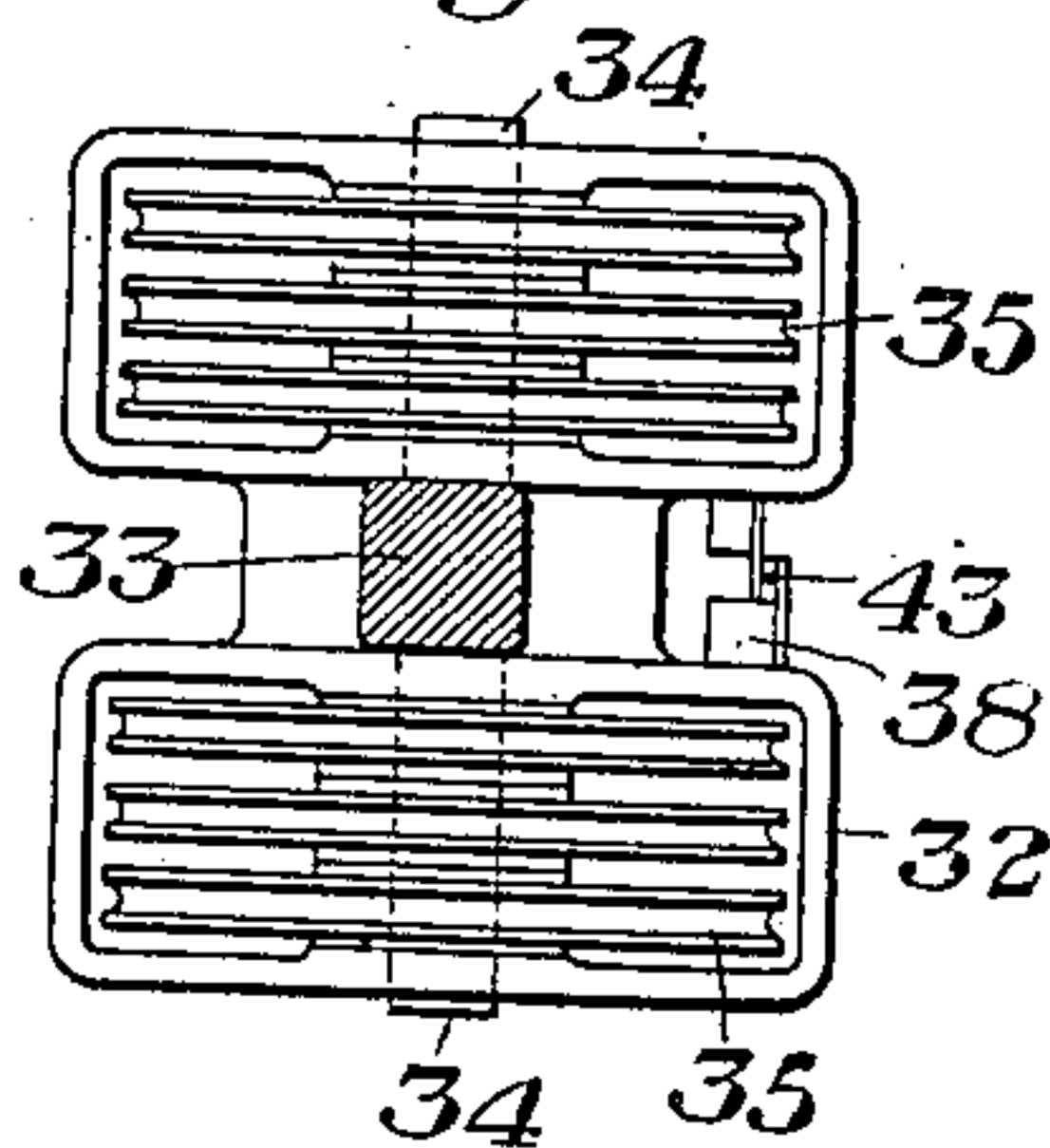


Fig. 9.

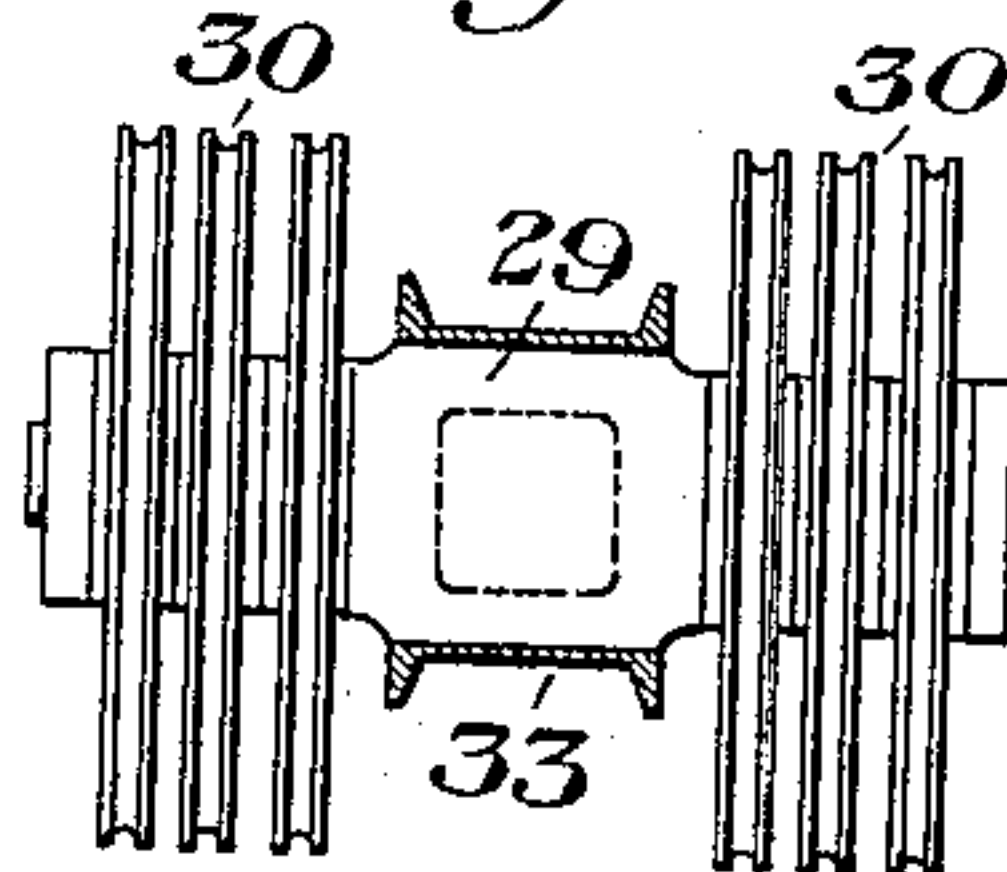


Fig. 10.

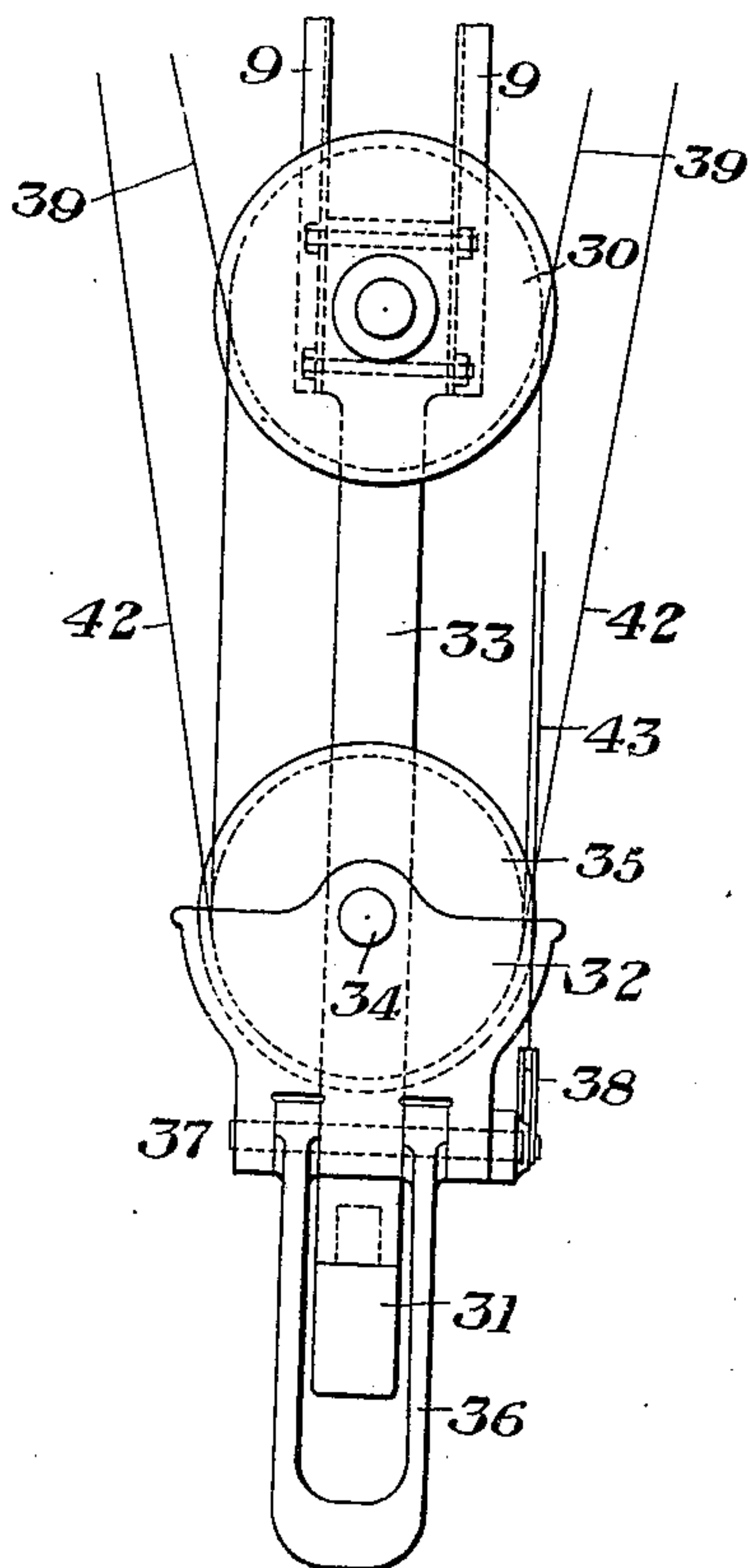
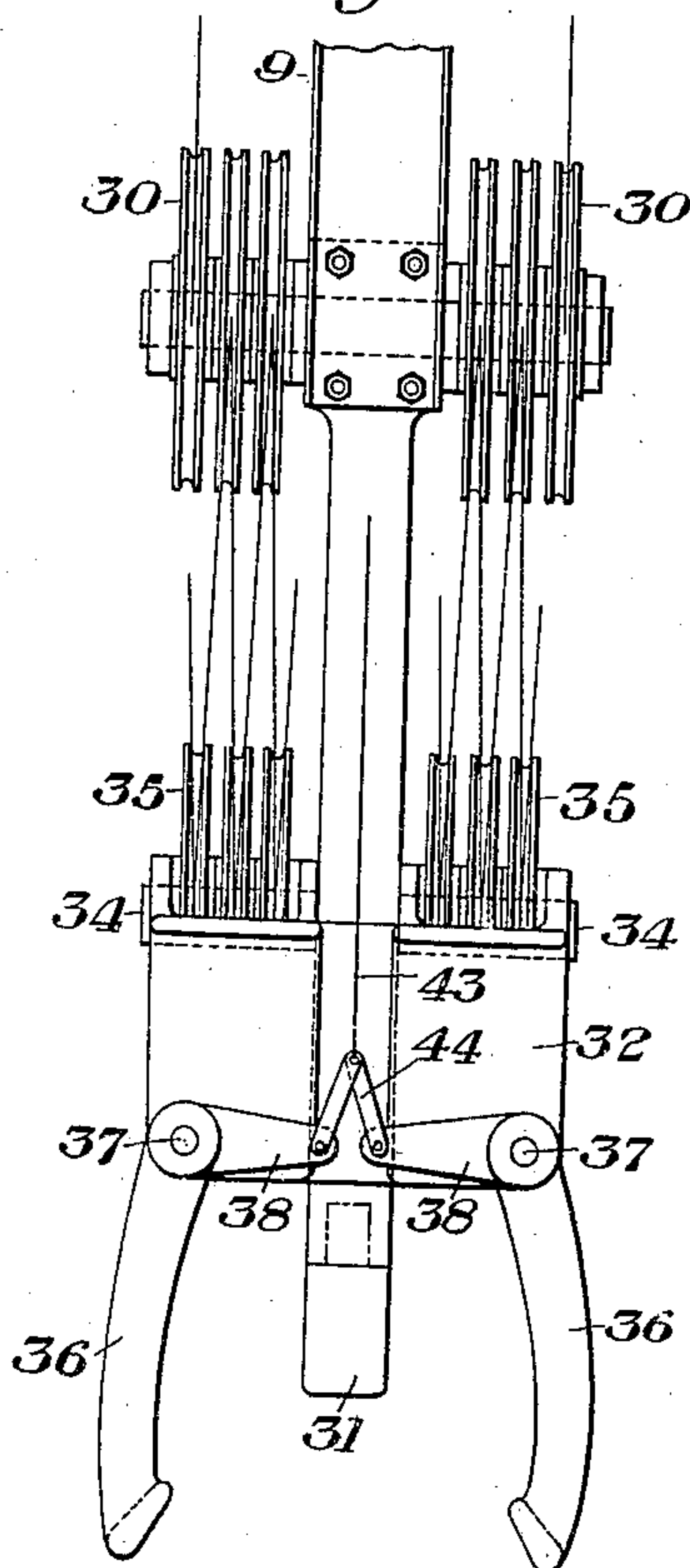


Fig. 11.



WITNESSES

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# UNITED STATES PATENT OFFICE.

DAVID KENDALL, OF ALLIANCE, OHIO, ASSIGNOR TO THE ALLIANCE MACHINE COMPANY, OF ALLIANCE, OHIO, A CORPORATION OF OHIO.

## INGOT-STRIPPER.

969,634.

Specification of Letters Patent.

Patented Sept. 6, 1910.

Application filed May 17, 1909. Serial No. 496,435.

*To all whom it may concern:*

Be it known that I, DAVID KENDALL, of Alliance, Stark county, Ohio, have invented a new and useful Improvement in Ingot-Strippers, 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 front elevation of an ingot stripper, embodying my invention; Fig. 2 is a plan view of the same; Fig. 3 is an end view; Fig. 4 is a perspective view largely diagrammatic, showing the arrangement and manner of connecting the various hoisting ropes or cables; Fig. 5 is a detail view of the rope-shortening device for the tongs-operating rope or cable; Figs. 6 and 7 are detail views of a modified form of said device; Fig. 8 is a sectional plan view showing the lower cross head of the block; Fig. 9 is a similar view, showing the upper cross head or block; and Figs. 10 and 11 are respectively end and front views of the lower end portion of the stripping column, the ingot stripper and the two cross heads or blocks.

My invention has relation to ingot strippers, and is designed to provide an ingot stripper of simple and efficient character, having means whereby a slow and powerful stripping action may be exerted upon the mold to loosen it from the ingot, with lifting or hoisting gearing arranged to operate at a higher speed after the mold has been freed from the ingot.

A further object of the invention is to provide combined stripping and hoisting mechanism of this character, in which the stripping ropes or cables are made to assist in the lifting or hoisting action, the load in lifting being distributed between two sets of ropes or cables in a highly effective manner.

A still further object is to provide tongs-operating mechanism of simple and novel character.

The precise nature of my invention will be best understood by reference to the accompanying drawings, in which I have shown the preferred form of my invention, and which will now be described, it being premised, however, that various changes may be made in the details of construction and arrangement of the parts, without de-

parting from the spirit and scope of my invention as defined in the appended claims.

In these drawings, the numeral 2 designates the usual movable crane bridge which is provided with motor-driven gearing 3, by means of which it may be caused to travel back and forth on supporting tracks or girders 4.

5 designates a trolley or carriage which is mounted for cross travel on the bridge 2, being moved by the motor 6 and gearing 7. The trolley 5 has a depending guide frame 8, which receives and guides the vertically movable stripping column or leg 9. This column or leg may be conveniently constructed of channel members 10, suitably secured together, as indicated in Figs. 1 and 2, the frame 8 being provided with the guiding angles 11 at its corners, as shown in Fig. 2, permitting the column to slide freely through the guides while preventing it from turning or twisting.

12 is an electric motor mounted upon the trolley and which is geared to a spool-shaped drum 13, through the intermediate gears 14, 15, 16, 17, 18, and 19. This drum has its end portions of relatively large diameter suitably grooved for the reception of hoisting ropes or cables and its intermediate portion, which is preferably of one-half the diameter of the end portions, also grooved, as indicated at 20, for the purpose hereinafter described. 21 is another electric motor mounted upon the opposite side of the trolley from the motor 12 and which is geared to a second spool-shaped drum 22, through a train of reducing gearing 23, 24, 25, 26, 27 and 28. The drum 22 is similar to the drum 13 except that its central portion is not grooved. These two drums 13 and 22 are arranged upon opposite sides of the guide frame 8 and stripping column 9, in the manner shown in Fig. 2, the spool shape of the two drums enabling them to receive the stripping column between them with a minimum separation of their two axes. The drum 13 constitutes the hoisting drum for lifting the ingot from the mold after the mold has been stripped from the ingot, while the drum 22 constitutes the stripping drum which exerts the power to strip the mold from the ingot.

Secured to the leg or column 9, is a cross head or block 29, having a fixed shaft upon



which are loosely mounted two series of sheaves 30, one series of three sheaves upon each end portion of said shaft. Socketed or otherwise secured in the lower portion of the cross head 29 is a bull-nose or ingot stop 31, which extends downwardly in the usual manner for contact with the upper end of the ingot to be stripped.

32 designates a lower block or cross head which may be guided for vertical movement upon a depending extension 33 of the column 9 in the manner shown in Fig. 1, or which may be guided by the bull-nose or ingot stop 31 in the manner shown in Figs. 8, 10 and 11. The cross head 32 is provided with the two short shafts 34, one at each side of the ingot stop, and upon each of these shafts are revolvably mounted three grooved sheaves 35, these sheaves being respectively in vertical alinement with the sheaves 30 of the upper cross head or block.

36 designates the mold-engaging grips or tongs, which are pivoted at 37 to the lower cross head and which have the inwardly extending actuating arms 38. These tongs or grips are so balanced as to always tend to hold them in open position so that they will readily slide over the upper portion of an intermediate mold.

Secured to and leading from the hoisting drum 13, one from each end portion thereof, are two ropes or cables 39, which pass down and around the outside sheaves 30 of the upper cross head or block, and thence upwardly over sheaves or pulleys 40, which are secured to the trolley frame, the free ends of the two ropes being connected to a suitable slack take-up device 41, which may be of the form shown in my prior patent, No. 840,807. Also secured to and leading from the hoisting drum 13, are two other ropes or cables 42, which pass down and around two of the sheaves 35 of the lower cross head, thence up and around corresponding sheaves 30 of the upper cross head, thence down and around other sheaves in the lower cross head, and from thence passing upwardly and having their front ends secured to the stripping drum 22.

43 designates a single rope or cable, whose upper end is connected to the central portion of the hoisting drum 13, and extends down and is connected at its lower end to links 44, which are attached to the inwardly extending arms 38 of the tongs or grips 36. The rope 43 passes through a shortening device which, in the form shown in Figs. 4 and 5, consists of a grooved wheel 45, mounted on a rock shaft 46. Said shaft has arms 47, in which is journaled another grooved wheel or pulley 48, the rope 43 passing between the two wheels or pulleys 45 and 48 in the manner clearly shown in Figs. 4 and 5. The shaft 46 may be actuated in any suitable manner, as by the foot lever 49.

It will be readily seen that when the shaft 46 is rocked, the movement of the pulley 48 from the position shown in Fig. 5 to the position shown in Fig. 4 will deflect the rope or cable 43 out of its straight line, and thus shorten it to a sufficient extent to effect the closing of the tongs or grips 36 into the gripping position shown in Fig. 1.

Figs. 6 and 7 show a modified form of the rope-shortening device, adapted to be operated by a motor, and more particularly intended for use with heavy strippers or other heavy ingot-handling apparatus. This device consists of a divided shaft 50, the adjacent ends of the shaft sections having disks or flanges 51, connected by pins 52 upon which are loosely journaled grooved sheaves 53, between which the tongs-operating rope or cable passes freely. Any suitable motive device may be applied to the shaft 50, and when such shaft is rotated, a certain amount of rope will be coiled up, depending on the distance through which the shaft is rotated. In the normal position of the device shown in Figs. 6 and 7, the rope or cable can be moved freely up or down.

The operation of the stripper is as follows. Assuming the parts to be in the position shown in Fig. 1, with the bull-nose resting on the ingot and the tongs closed over the ears of the ingot mold, the stripping drum 22 is first operated and winds up the ropes or cables 42, the hoisting drum 13 acting as a dead end for these ropes or cables. In this operation, the two cross heads act in the manner of a multiple fall-and-tackle, giving a powerful stripping action. The lower stripping cross head 32 is raised and the ingot stop and the upper cross head remain stationary, because the downward thrust, due to the pressure on the sheaves 30, is nearly as great as the upward pull on the sheaves 35 of the lower cross head. The difference between these pressures is made up by the weight of the ingot mold of the lower cross head, and the ratio of number of turns of rope can be so proportioned that the downward thrust on the upper cross head plus the weight of the above mentioned parts will be greater than the upward pull on the lower cross head. As soon as the mold has been freed from and starts to leave the ingot, the stripping drum 22 is stopped and the hoisting drum 13 is started. This raises the mold, together with both cross heads, at a higher rate of speed, owing to the fact that there is only a single purchase on the cross head 30. The ropes 42 will continue to hoist the lower cross head, the stripping drum 22 acting as the anchorage for these ropes. Both cross heads will, however, be moved up together, since equal amounts of both the ropes or cables 39 and 42 are wound up at each revolution of the drum 13. After the ingot mold



has been lifted clear of the ingot, it may be carried on and set down in an empty ingot buggy or car in the usual manner, and the trolley returned and centered over another filled ingot mold. The hoisting drum 13 is then operated in the lowering direction and the ingot stop comes in contact with the ingot, the ropes or cables 42 meanwhile winding over their sheaves.

As above stated, the stripping tongs 36 are always so mounted as to hold them in open position and they thus pass freely over the ears of the ingot mold. As soon, therefore, as the ingot stop has come in contact with the ingot, the rope or cable 43 is shortened by the operation of the device before described, and consequently actuates the tongs 36 to close their lower ends under the ears of the mold. Inasmuch as the diameter of the central portion of the hoisting drum 13 to which the rope or cable 43 is connected is one-half the diameter of the end portions of the drum to which the ropes or cables 39 and 42 are connected, it will be readily seen that the upper cross head or block and the rope 43 will move at exactly the same vertical speed which is, of course, necessary in order to maintain the proper tension on the rope or cable 43, when the mechanism is being hoisted or lowered.

It will be seen that by connecting the ends of the stripping cables 42 to the hoisting drum, this drum is made to serve as the dead ends for these ropes or cables during the stripping operation; while during the hoisting operation, these ropes or cables are wound upon the hoisting drum, together with the ropes or cables 39. This distributes the load equally upon the four ropes or cables, giving a lifting action upon both cross heads and a maximum lifting speed, inasmuch as both the cross heads will move upwardly at a rate of speed substantially equal to one-half the rate at which the ropes or cables are wound upon the drum 13.

It will be obvious that various changes may be made in the details of construction and arrangement. Thus, the two cross heads may be constructed in various ways; the arrangement of the hoisting gearing may be changed and various other changes may be made without departing from the spirit and scope of the invention.

I claim:

1. In an ingot stripper, a stripping head or block, and a hoisting head or block, means including a drum for actuating the stripping head or block independently of the hoisting head or block, a drum operating the stripping head or block, and ropes or cables geared to the stripping head or block, and connected to both of the said drums, substantially as described.

2. In ingot-stripping mechanism, a stripping drum, a hoisting drum, independent

motors geared to the drums, a stripping cross head, a hoisting cross head, stripping ropes or cables geared to the two cross heads and connected to both drums, and hoisting ropes or cables connected to the lifting cross head and to the hoisting drum, substantially as described.

3. In ingot-stripping mechanism, a hoisting drum, a stripping drum, independent motors for actuating the drums, a hoisting cross head, a stripping cross head movable toward and away from the hoisting cross head, ropes or cables connected to the hoisting drum and to the hoisting cross head, and other ropes or cables connected at one end to the hoisting drum and at the other end to the stripping drum, substantially as described.

4. In ingot-stripping mechanism, a hoisting drum, a stripping drum, a motor for each drum, a stripping cross head having a plurality of sheaves mounted thereon, a hoisting cross head also having a plurality of sheaves, hoisting ropes or cables connected at one end to the hoisting drum and passing around sheaves on the hoisting cross head, and stripping ropes or cables connected at one end to the hoisting drum and at the other end to the stripping drum and having a plurality of turns or passes over the sheaves on both cross heads, substantially as described.

5. In ingot-stripping apparatus, a movable carriage or trolley having a depending guide frame, a stripping leg or column vertically movable through the guide frame, a hoisting cross head secured to said column, a stripping cross head movable toward and away from the hoisting cross head, a stripping drum mounted at one side of the column, a hoisting cross head at the opposite side of the column, stripping cables connected to both cross heads and to both drums, and hoisting cables connected to the hoisting drum and to the hoisting cross head, substantially as described.

6. In ingot-stripping mechanism, a pair of drums having central portions of reduced diameters, and a stripping column or leg mounted for vertical movement between said portions of reduced diameters, substantially as described.

7. In ingot-stripping mechanism, a lifting drum having end portions of equal diameters and an intermediate portion of smaller diameter, hoisting cables connected to the end portion of said drum, mold-engaging tongs or grips, and an actuating rope or cable connected to the tongs or grips and to the central portion of said drum, substantially as described.

8. In ingot-stripping mechanism, a hoisting cross head or block, a stripping cross head or block, a hoisting drum having a central portion of reduced diameter, a strip-



ping drum, stripping cables connected to both cross heads and to both drums, hoisting cables connected to the hoisting cross head and to the hoisting drum, mold-engaging  
5 devices carried by the stripping cross head, and an actuating rope or cable for said devices connected to the reduced portion of the hoisting drum, substantially as described.

9. In ingot-stripping mechanism, a hoist-  
10 ing cross head or block, a stripping cross head or block, a hoisting drum having a central portion of reduced diameter, a stripping drum, stripping cables connected to  
15 cables connected to the hoisting cross head and to the hoisting drum, mold-engaging devices carried by the stripping cross head, and an actuating rope or cable for said devices connected to the reduced portion of the  
20 hoisting drum, together with means for changing the length of said rope or cable to close the mold-engaging devices, substantially as described.

10. In mechanism of the character de-

scribed, gripping devices, or tongs, means 25 for raising and lowering the tongs, a closing rope connected to the tongs, and a rope-shortening or deflecting device for said rope, comprising a shaft, a sheave or pulley carried by said shaft eccentrically thereof, and 30 means for rotating said shaft, substantially as described.

11. In mechanism of the character described, gripping devices, or tongs, means 35 for raising and lowering the tongs, a closing rope connected to the tongs, and a rope-shortening or deflecting device for said rope, comprising a shaft having a pair of grooved sheaves, pulleys journaled eccentrically of the shaft and adapted to engage opposite 40 sides of a rope or cable, and means for rotating the shaft, substantially as described.

In testimony whereof, I have hereunto set my hand.

DAVID KENDALL.

Witnesses:

HOMER KENDALL,  
J. J. BROWN.