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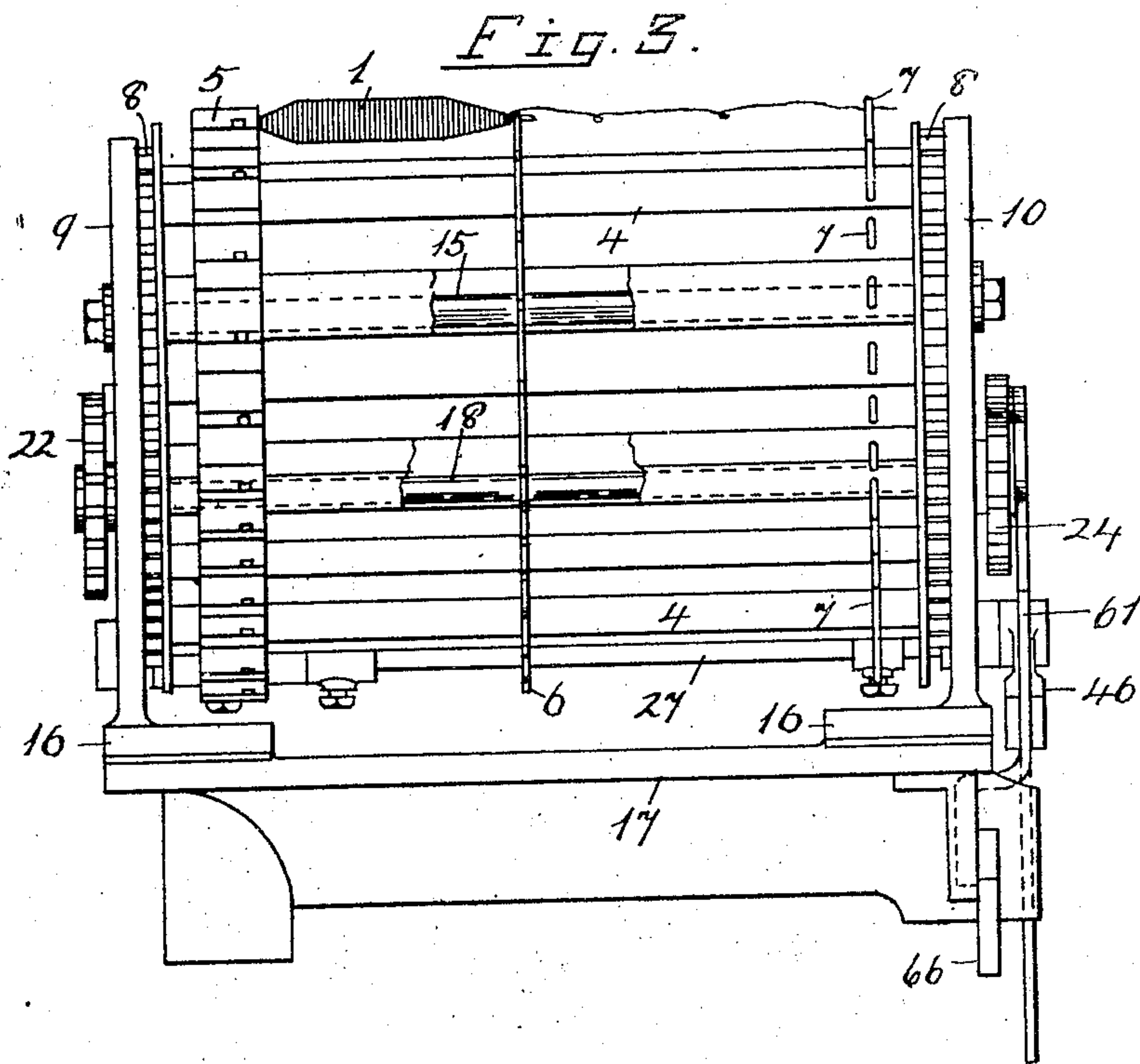
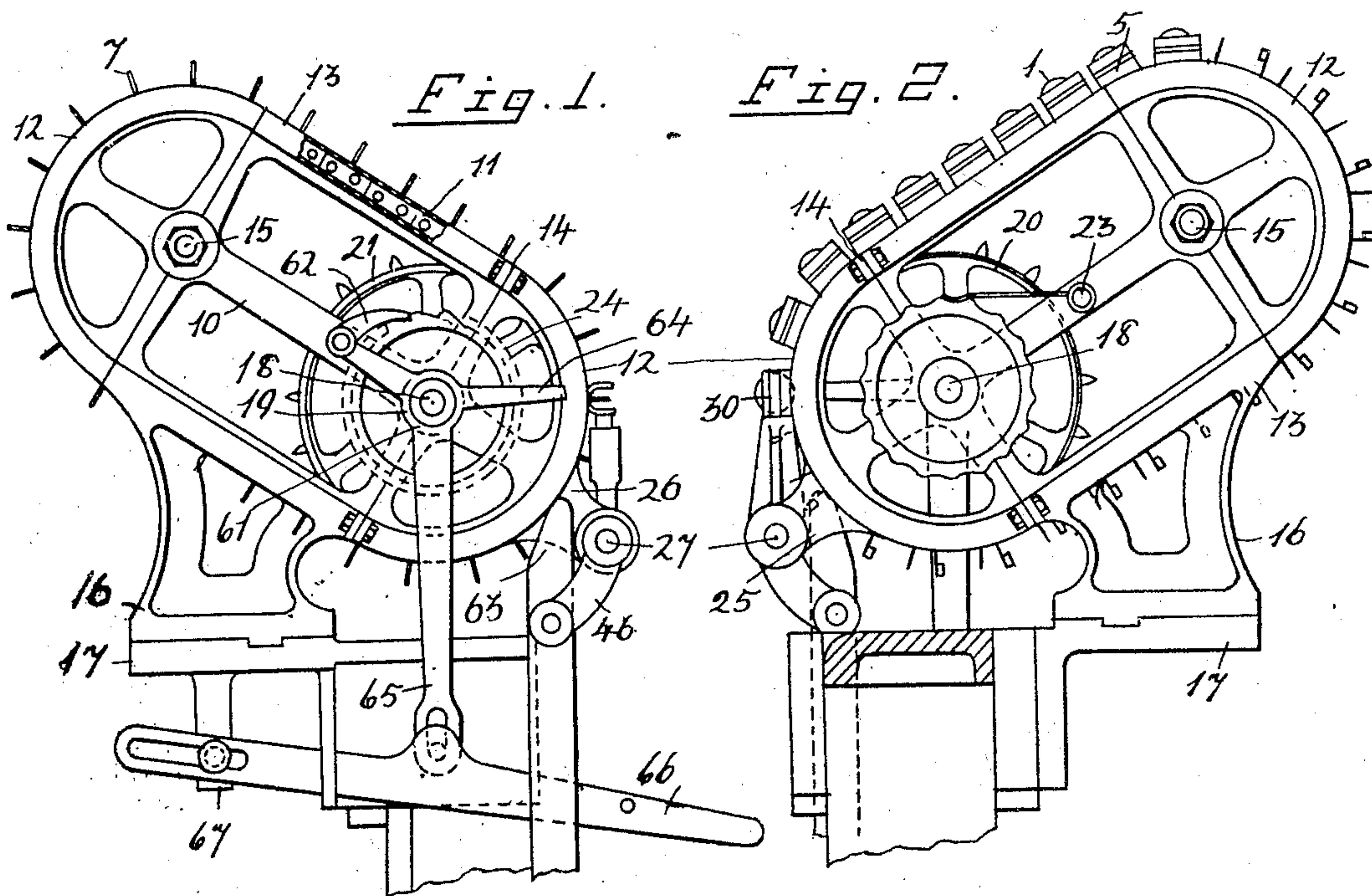
PATENTED AUG. 25, 1908.

J. W. CARR.

WEFT REPLENISHING LOOM.

APPLICATION FILED JUNE 19, 1907.

3 SHEETS—SHEET 1.

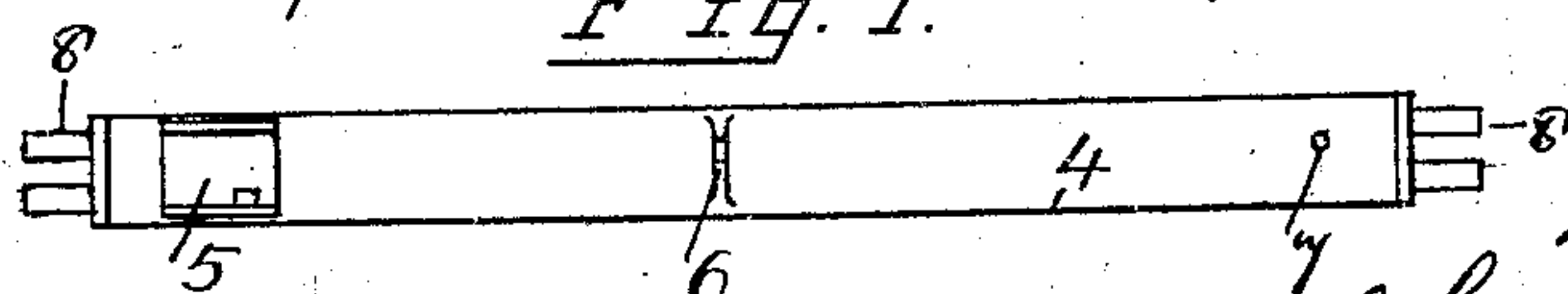
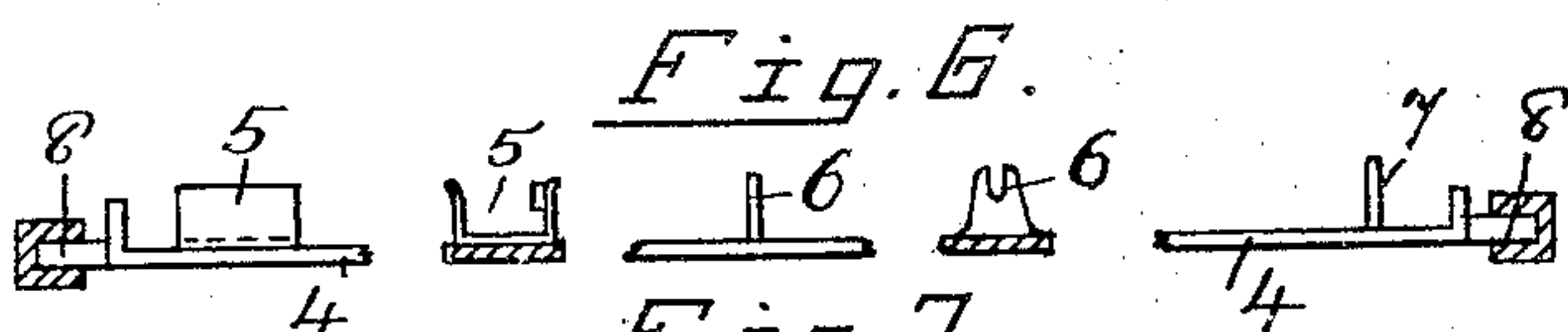
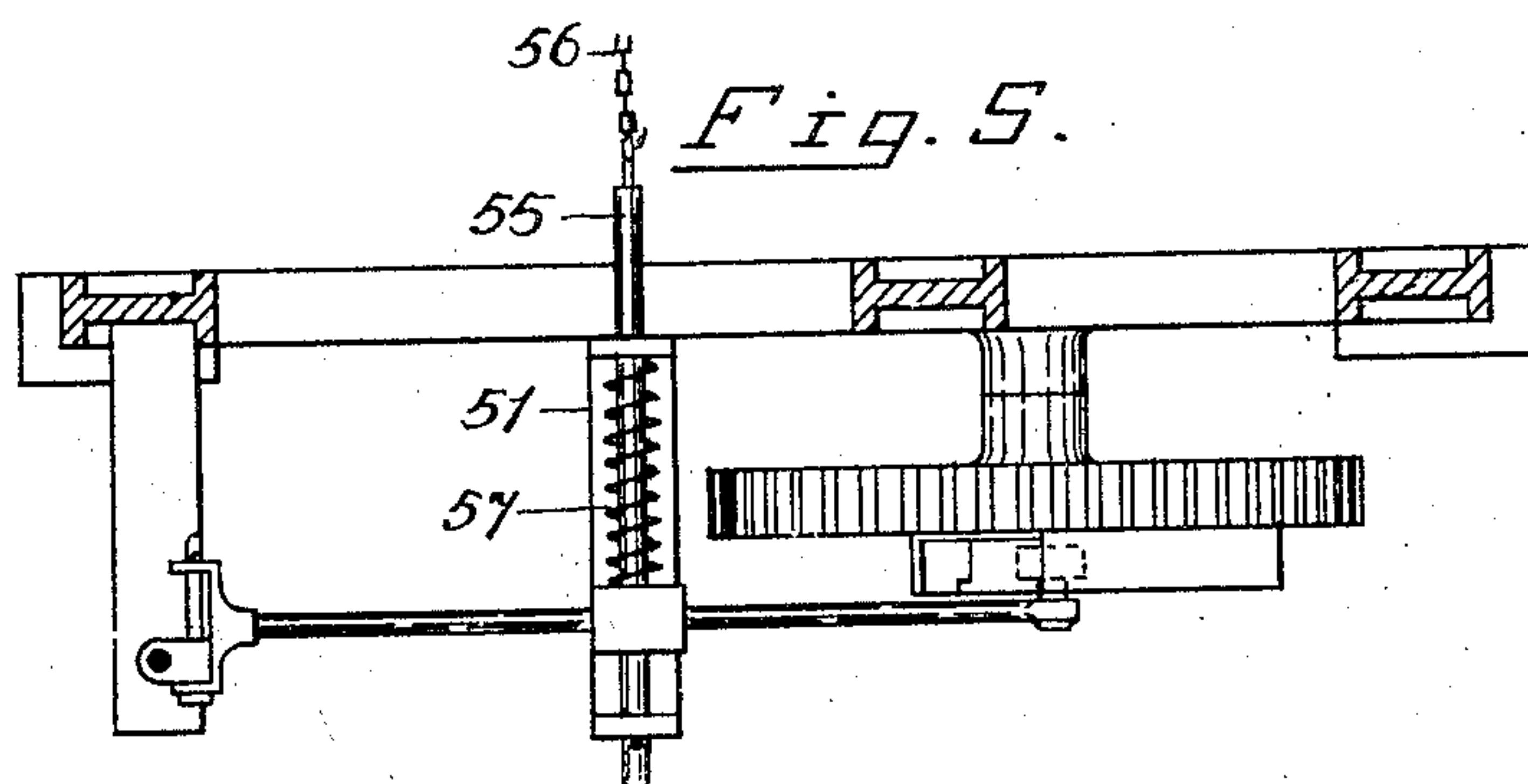
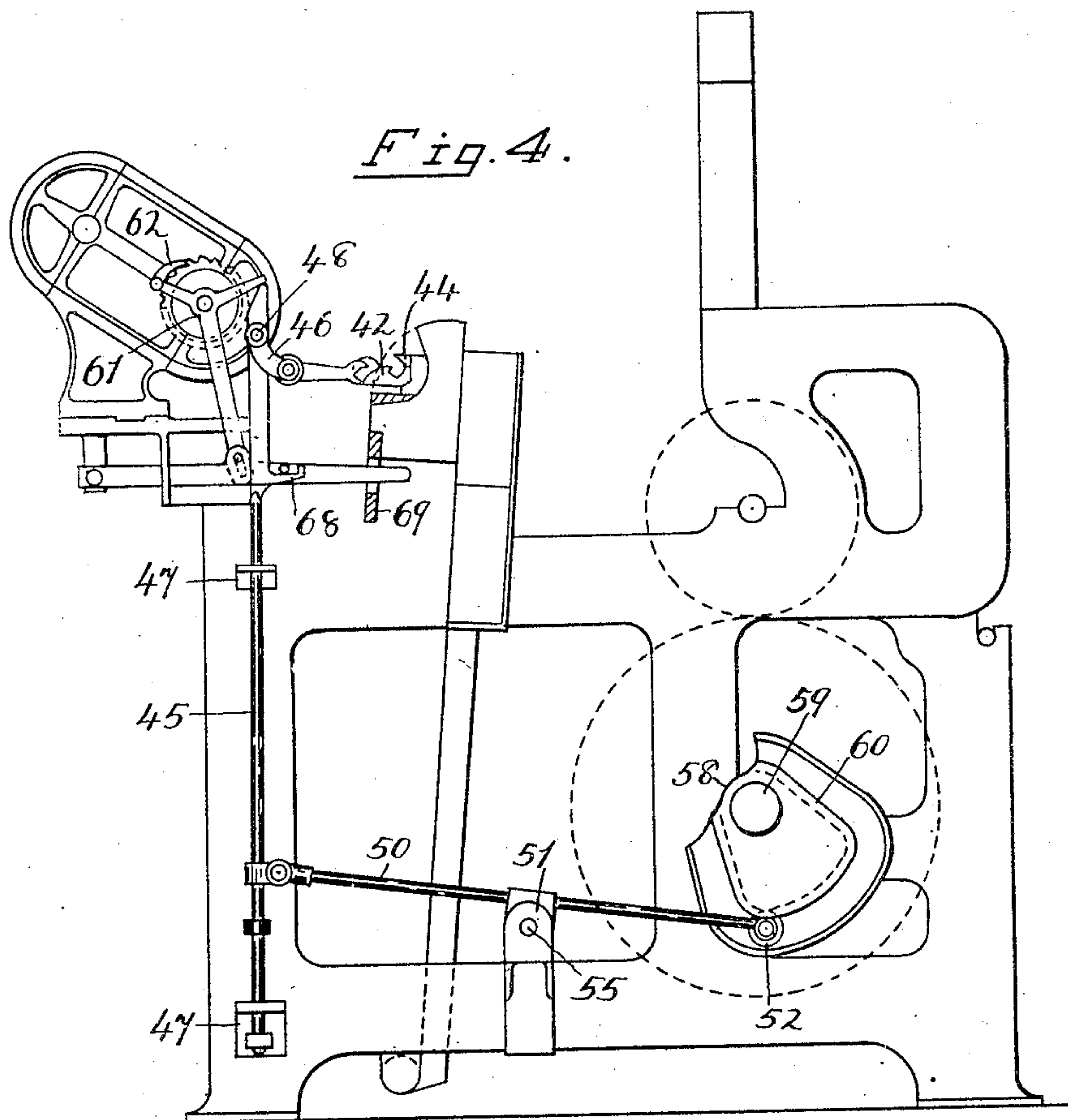


WITNESSES

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3 SHEETS—SHEET 3.

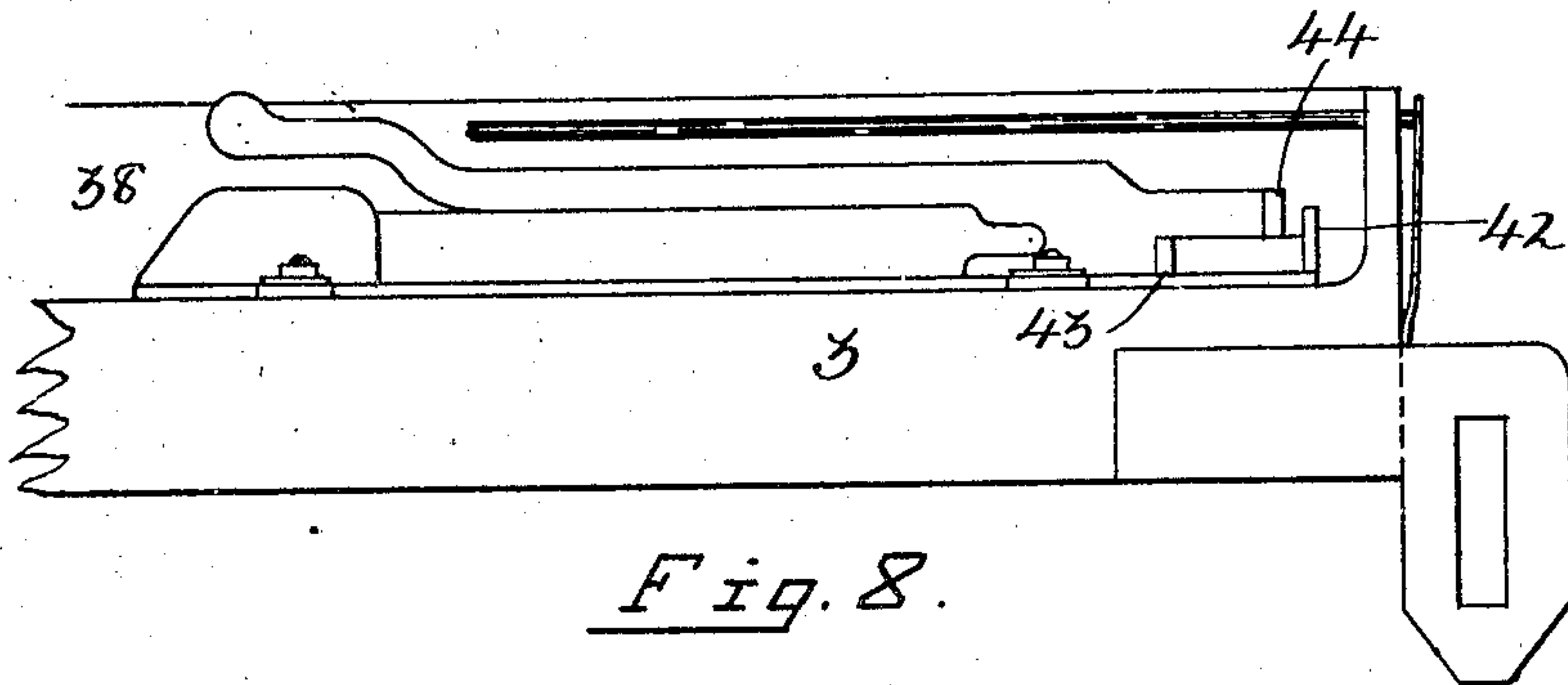


Fig. 8.

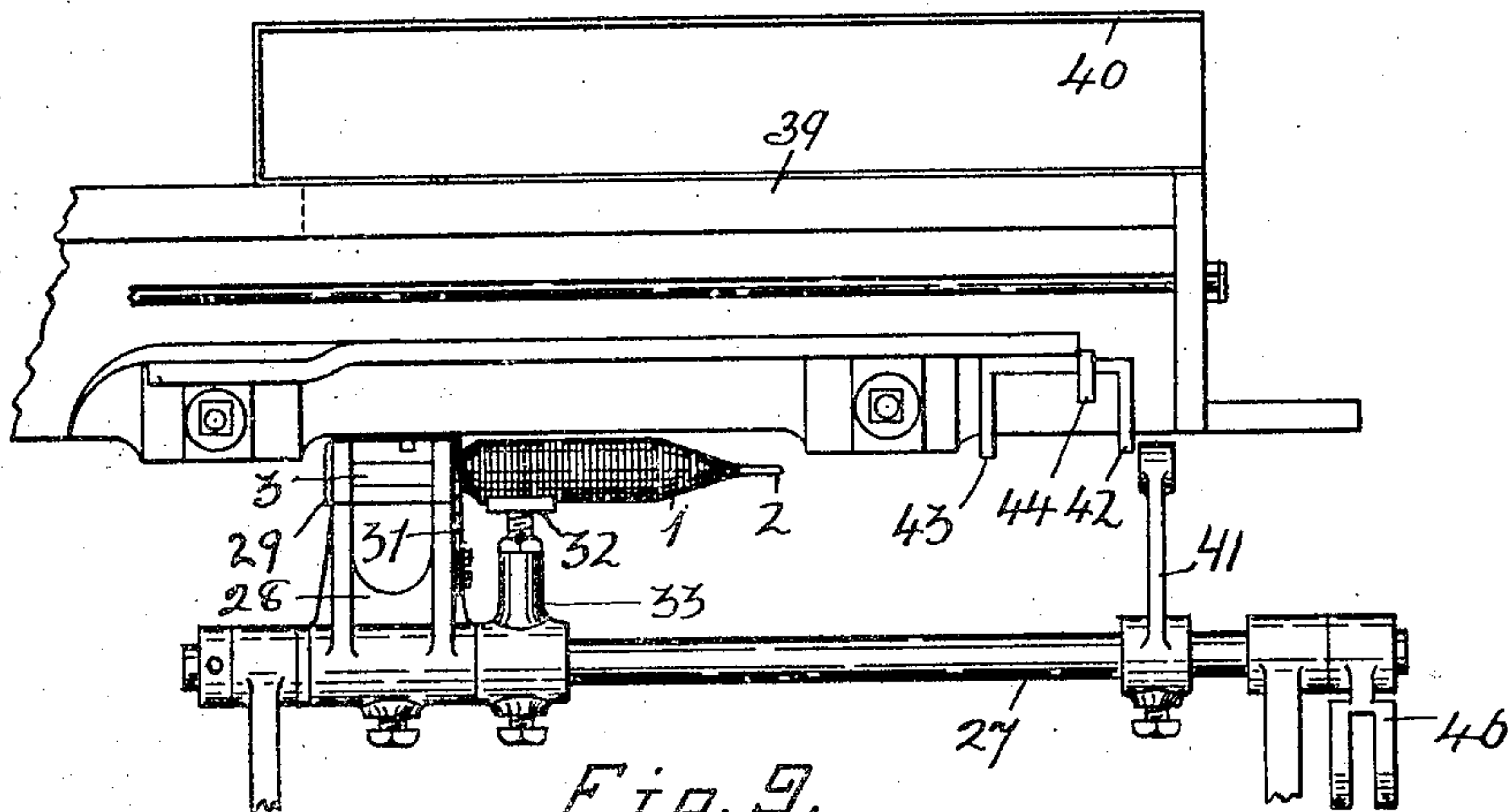


Fig. 9.

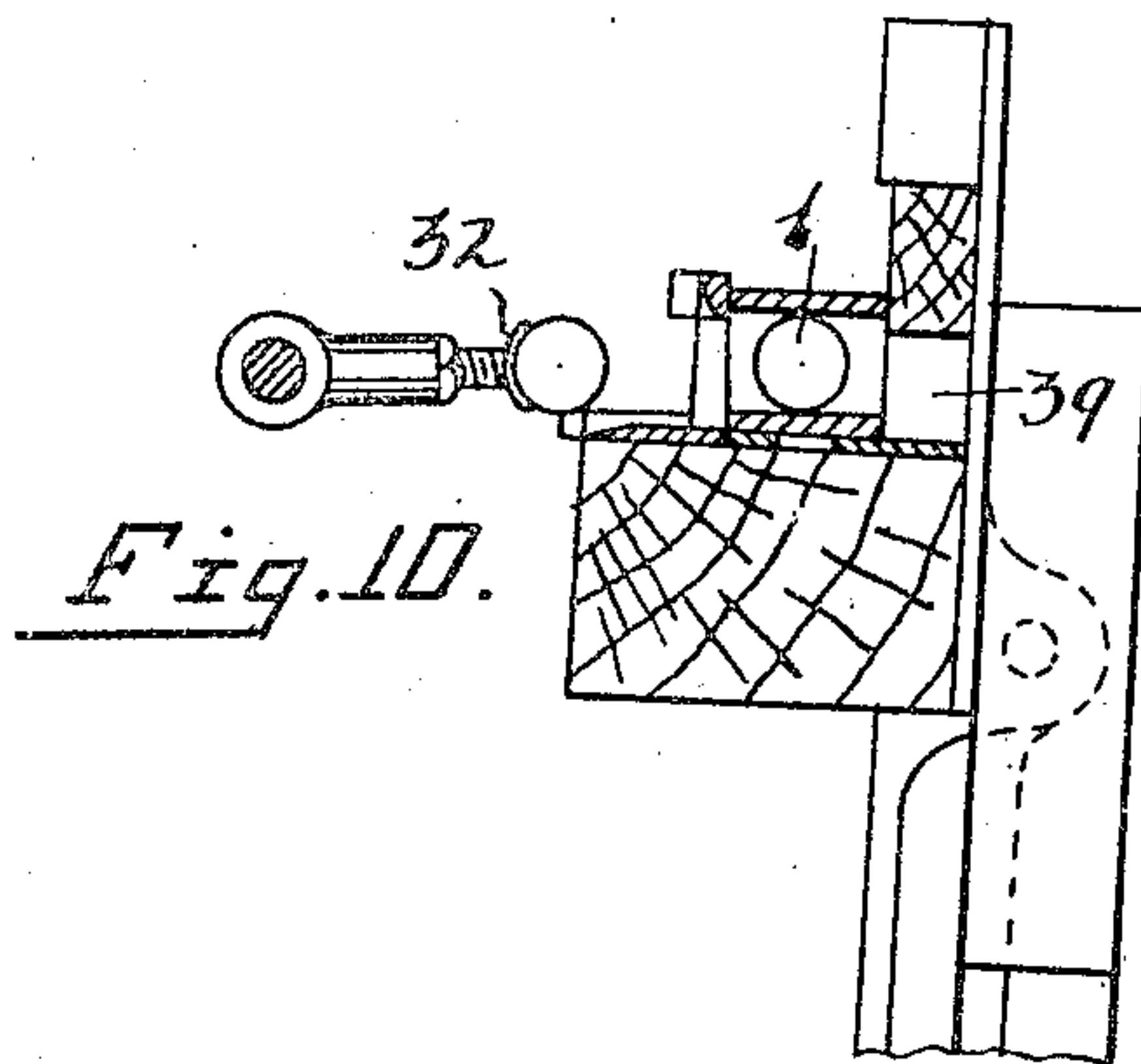


Fig. 10.

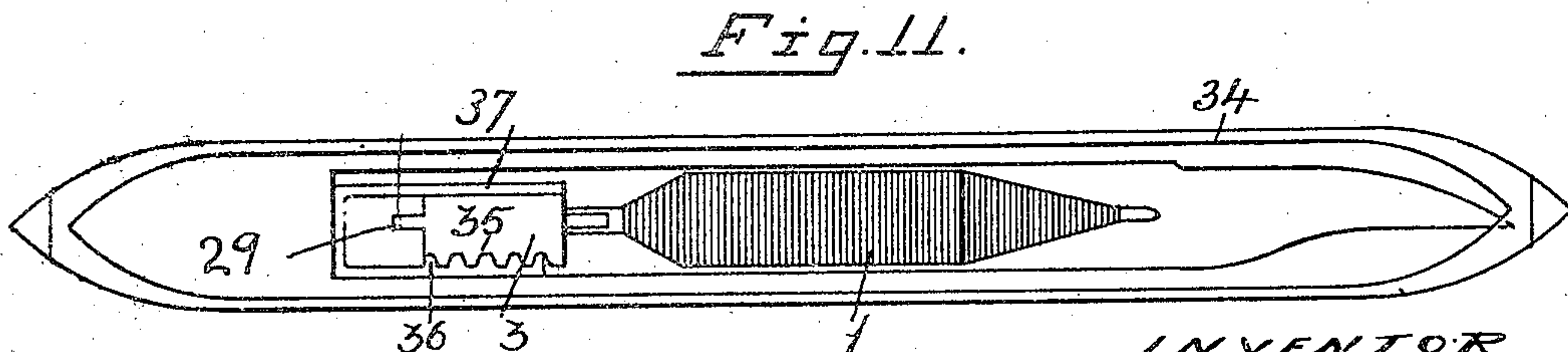


Fig. 11.

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UNITED STATES PATENT OFFICE.

JOHN WILLIAM CARR, OF MANCHESTER, ENGLAND, ASSIGNOR TO WILLIAM WINDLE
PILKINGTON, OF PRESCOT, ENGLAND.

WEFT-REPLENISHING LOOM.

No. 896,800.

Specification of Letters Patent.

Patented Aug. 25, 1908.

Application filed June 19, 1907. Serial No. 379,752.

To all whom it may concern:

Be it known that I, JOHN WILLIAM CARR, a subject of the King of Great Britain and Ireland, and resident of Manchester, in the county of Lancaster, England, have invented new and useful Improvements in Weft-Replenishing Looms, of which the following is a specification.

This invention relates to improvements in that kind of filling replenishing apparatus for looms in which a cop on a cop carrier is transferred from a magazine to grippers on a rocking plate, which on the failure of the filling in the shed is operated by means of the filling fork so as to turn the grippers from a vertical into a horizontal position, so that when the slay beats up the new cop is pushed into the shuttle from the front and the spent cop pushed out at the back thereof, for which an application for a patent has been filed by me and another in the United States Patent Office on August 26th. 1904, Serial No. 222357.

The improvements consist chiefly in the constructive arrangement of the magazine or hopper from which the fresh cops supported by spindles fixed in carriers or blocks are supplied as required, in combination with mechanism for advancing the cops after each change and inserting a fresh cop into the grippers on the rocking plate, and for operating said rocking plate so as to bring the cop in the grippers into the position required for inserting it into the shuttle and ejecting the spent cop.

On the drawing attached hereunto, Figures 1 and 2 represent side elevations of the magazine; Fig. 3 a front elevation of the same; Fig. 4 a side elevation of the loom with parts omitted and showing the magazine in position; Fig. 5 a plan of part of the loom; Figs. 6 and 7 several views of the means for carrying the cop spindles in the magazines; Figs. 8, 9 and 10 several views of the shuttle box, means for transferring the cop spindles from the magazine to the shuttle and spent cop and spindle chute, and Fig. 11 a side elevation of the shuttle with the cop and spindle in position.

In the improved apparatus illustrated, the cops 1 are carried by cop spindles 2, fixed each at one end in a block 3 of rectangular cross section, see Fig. 11, and these blocks fit into the shuttle as hereinafter described.

In the magazine, the spindles are kept separate from one another and are gripped in carriers by which they are advanced. These carriers consist each of a bar 4, Figs. 6 and 7, provided with a spring jaw 5 at one end, and a saddle support 6 in the center and a stud or hook 7 at the other end for the purpose of securing the end of the thread of the cop. The ends of the carriers are provided with projections 8 adapted to slide in curved grooves and to form units of a rack and the projections are preferably formed as round pins as shown and they may be furnished with rollers.

The magazine consists of an endless apron formed of the bars 4 which lie together longitudinally, and two side frames 9 and 10 provided with endless grooves 11 upon their inner faces into which grooves the ends of the projections 8 of the bars 4 engage. These projections enter into the grooves 11 only for a portion of their length, sufficient space being left between the sides of the frame and the ends of the bars for the teeth of a wheel for advancing them, to engage. The side frames are preferably formed in sections to facilitate the machining of the grooves and for this purpose the two ends 12 are formed semi-circular and the center part 13 rectangular with straight parallel grooves therein, the sections being joined together by the bolted flanges 14 and the transverse bolt 15. Each frame is formed with a foot 16 which can be bolted to a bracket 17 fixed to the loom frame.

The two side frames carry a shaft 18 in bearings formed in the bosses 19, and upon this shaft are fixed two sprocket wheels 20 and 21 the teeth of which are so formed and pitched as to engage between the projections 8 of the carriers 4. Upon the same shaft outside the frames are fixed at one side a scallop wheel 22 with indents of the same angular pitch as that of the sprockets into which indents bears a spring fixed to the side of the frame at 23, and at the other side a ratchet wheel 24.

The side frames also carry two ears 25 and 26 having bosses forming bearings for a rocking shaft 27. This shaft carries means hereinafter termed "gripper" for receiving a cop spindle and presenting the same in the path of the shuttle box so that when the weft has given out in the shuttle, the forward motion

of the slay forces the spent cop spindle through the shuttle by contact with the spindle presented, and the grip in the shuttle being greater than that of the before mentioned gripper, the fresh cop spindle is retained in the shuttle.

The carriers are advanced by one unit after each change of cops in the manner hereinafter described and insert a cop spindle into the aforesaid gripper on the rocking shaft 27. This gripper consists of a double standard 28, Figs. 2 and 9 slotted at the top on one side for the reception of a projection 29 Fig. 11 at the outer end of the spindle block 3, and at the other side also with a slot 30, Fig. 2 into which the spindle enters, a spring 31 bearing against the block so that it is gripped in its proper position in the standard. A cradle 32 adapted to support cops of various diameters and adjustable in a standard 33 fixed on the rocking shaft 27 is used, the end of the spindle being left free to allow the weft to be freely drawn off it. The rocking shaft is turned a quarter turn on the failure of the weft by means of a vertical rod actuated by a cam, and, as before stated presents the cop spindle to the shuttle when in the shuttle box, in proper position to be inserted in the shuttle, as shown by Fig. 4.

To secure the cop spindle in its longitudinal position in the shuttle 34, the block 3 is provided on its underside 35 with a series of grooves and a plate 36 provided with corresponding projections is fixed in the shuttle which grooves and projections engage with each other and thus hold the spindle in position and it will be clear that the longitudinal position of the spindle relatively to the shuttle may vary. Above the spindle block 3, Fig. 11, in the shuttle, a spring finger 37 is fixed which allows the cop spindle to be pushed in from the front and out at the back. The shuttle box front 38 is provided with a slot as shown on Fig. 8 and the back with a slot 39, through which the spent cop spindle is forced and afterwards it falls into an inclined chute 40 and is delivered into a skip at the side of the loom.

With an apparatus changing the cop spindle it is necessary to provide the apparatus and shuttle with a self threading arrangement and any suitable known one may be used. For the purpose of facilitating the threading of the shuttle and for supporting and carrying forward the ends of the thread of the cop, I propose to use the following arrangements. As before stated, the ends of the threads of the cops are lapped on to studs or hooks 7 of which there is one for every bar or unit of the apron. These hooks 7 place, at each change, the thread from the cop transferred to the gripper 28 into the forked end of an arm 41 which is fixed on the rocking shaft 27. When the gripper 28 is turned into a horizontal position to transfer

the cop to the shuttle, the weft thread between the spindle tip and the hook 7 is turned with it and held in the direction of the cop spindle in front of the slay. As the latter beats up, the thread passes behind a hook 42 Figs. 4, 8 and 9 fixed to the slay beam in front of the shuttle box over a ledge 43 and under a projection 44 so as to be held in front of the shuttle. When the shuttle is picked after the change of cops, the weft thread being held by the hook 42 and its attachment to the hook 7, along the shuttle front, is in a position for engaging with a suitable threading device on the shuttle.

The rocking shaft is turned on the failure of the weft in the shed by a vertical rod 45 Fig. 4 and which is connected to an arm 46 on the said shaft and moves in a guide 47 fixed to the frame side and its movement is limited by adjustable stops. The rod is carried by a pin 48 passing through the said arm and is supported by one end of a lever 50 fulcrumed upon a bracket 51. The other end of the lever carries a bowl 52 which by the movement of the weft fork carrier on the failure of the weft is shifted so as to engage with a grooved cam 53 fixed on the tappet shaft 59 of the loom. Preferably I fix the lever 50 on a shaft 55 adapted to slide longitudinally in its bearings in the bracket 51 fixed to the loom frame, and connect this shaft to the weft fork carrier by a chain 56 passing over guide pulleys or by equivalent connections so as to be pulled by the weft fork carrier against the pressure of a spring 57 to one side, whereby the bowl 52 is brought upon an unshrouded part 58 of the cam 53 and entering the groove, lifts the rod 45, holds it in its highest position while the slay beats up and the change of cops is effected, and then moves it down again, until when the bowl reaches the unshrouded part 58 of the cam again, the lever 50 is pulled sidewise by the spring 57 and the parts come to rest till the next change. To prevent the lever from being pulled sidewise as soon as the weft fork is released, a flange 60 is cast on the cam, which retains the bowl till the downward movement of the lever is completed.

The rod 45 is as stated connected near the top to an arm 46 fixed on the rocking shaft 27 and as the rod is moved upwards by the cam, the rocking shaft is turned by a quarter turn and places the gripper into a horizontal position, so that when the slay beats up, the cop is transferred to the shuttle.

To advance the sprocket wheels and carriers by one division after each change of cops, the ratchet wheel 24 Figs. 1 and 3, has a pitch of teeth to correspond with the width of the carriers forming the apron. A three limbed bell crank lever 61 is mounted loose on the shaft 18, one limb carrying a pawl 62 which engages with the ratchet

wheel 24. When the vertical rod 45 is moved upwards by the cam, a projection 63 adjustably fixed to its end comes against the second limb 64 of the bell crank and moves it back, till the pawl engages with the next tooth. The third limb 65 supports in a slot in its end, a pin passed through a finger 66, which is supported at its outer end on a stud or its equivalent fixed in a bracket 67, the stud passing through a long slot in the finger. When the bell crank lever is turned by the rod 45, the limb 65 moves the finger 66 forward, and at the same time a projection 68 Fig. 4 on the rod 45 raises the finger up as shown so that it passes through a slot in a plate 69 fixed to the front of the slay when the change of cops is effected by the beating up of the slay. Before the next beat occurs the rod 45 has descended again and the finger 66 has dropped down into a slanting position, in which it is encountered by the plate 69 at the beating up of the slay and pushed to the front. Thereby the bell crank is turned by its limb 65 and the pawl advances the ratchet by one tooth and the apron by one division, whereby a fresh cop is inserted into the grippers, which have returned to their vertical position as the rod 45 is pulled down by the lever 50 and the cam 53, and the apparatus is ready for the next change.

The apron is held in position while the pawl moves back by the scallop wheel 22, Fig. 2, which has the same number of indents as the ratchet wheel has teeth, and a spring 70 fitting into the scallops is fixed to the side frame 10.

I claim as my invention:

1. In a filling replenishing loom, the combination of a cop magazine consisting of two side frames each formed with an endless groove and of bars adapted to slide with their ends in said grooves and provided with devices for holding cop carriers, and mechanism put into action by the filling fork on the failure of the filling in the shed adapted to advance said bars the width of one bar each time.

2. In a filling replenishing loom the combination of a magazine for carrying the spare cops and spindles consisting of two side frames each having an endless groove following a semi-circular path at each end of the frames and an endless apron formed of separate bars in contact along their sides and adapted to slide in said grooves with their ends, and two sprocket wheels carried by a shaft between the frames and adapted to engage the ends of the bars, the bars each having means for gripping the cop spindle and securing the end of the filling, and means adapted to intermittently rotate said shaft.

3. In a filling replenishing loom the combination of a magazine for carrying the spare cops and spindles and consisting of two ob-

long side frames with semi-circular ends fixed in vertical and parallel planes to a bracket for attachment to the loom frame, the frames being provided each with an endless groove on the inside and following the outline of the frames, a rotatable shaft mounted centrally between the frames at one end and carrying two sprocket wheels fixed thereto, an endless apron formed by a number of independent bars the ends of which are forked so as to engage the teeth of the sprocket wheels and formed to slide in said grooves, the bars each being provided with a spring clip at one end adapted to grip the enlarged end of the cop spindle, a concave support for the end of the spindle, near the center and a stud at the other end for tying the end of the filling thereto a ratchet wheel fixed at one end of the said spindle, a scallop wheel fixed at the other end of the same and a spring engaging with one detent thereof, a pawl engaging said ratchet wheel carried by a three armed lever pivoted on said shaft and means adapted to intermittently advance and return said pawl.

4. In a filling replenishing loom the combination of a magazine for carrying the spare cops and spindles and consisting of two side frames having semi-circular ends, rigidly secured together in vertical and parallel planes and having each an endless groove following the outline of the frames, a transverse shaft mounted between the frames, two sprocket wheels fixed to the said shaft, and an endless apron consisting of separate bars adapted to slide in the said grooves at their ends and to engage with the teeth of the sprocket wheels, said bars each being furnished with a clip at one end adapted to grip the base of the cop spindle, a support near the center for the free end of the spindle and a stud at the other end for fastening the end of the filling to, and means adapted to advance the apron a unit of its length at a time, operated by mechanism controlled by the filling fork.

5. In a filling replenishing loom the combination of a cop magazine consisting of two side frames each formed with an endless groove, bars adapted to slide with their ends in said grooves and provided with devices adapted to hold the cop spindles, a rocking shaft provided with grippers adapted to receive a cop spindle from the magazine and hold it, mechanism put into action by the filling fork on the failure of the filling adapted to turn the rocking shaft so as to turn the grippers from a vertical into a horizontal position, a shuttle box and a shuttle each open from front to rear, a spring in said shuttle adapted to allow the spent cop spindle to be pushed out by the cop spindle in the gripper when the slay beats up and to retain said last named spindle on its backward movement, mechanism adapted to return the gripper into a vertical position after delivery of

the cop spindle, and mechanism adapted to advance the magazine bars by one and transfer a fresh cop spindle to the gripper.

6. In a filling replenishing loom the combination of a cop magazine consisting of two side frames each formed with an endless groove, bars adapted to slide with their ends in said grooves and provided each with a pair of jaws adapted to hold a block in which the cop spindle is fixed, a forked bracket adapted to support the spindle tip and a pin adapted for fixing the end of the filling thereto, a rocking shaft carrying a gripper adapted to receive and hold the said block when inserted thereinto, a support for the cop and a hook adapted to seize the filling fixed to said pin, a filling fork, means operated thereby for actuating the rocking plate and means for advancing said bars for transferring a fresh cop spindle to the gripper.

7. In filling replenishing looms, the combination of a magazine for carrying spare cops and spindles and consisting of two side frames with endless grooves and an apron formed of disconnected bars adapted to slide in said grooves at their ends and to carry each a cop spindle, said apron being moved by pitched tooth wheels fixed to a transverse shaft, a device for transferring a cop spindle from the magazine to the shuttle when in the shuttle box and consisting of a spring gripper device carried by a rocking shaft into which gripper the cop spindle is forced by the forward movement of the apron, said rocking shaft carrying also a finger for bringing the end of the weft into line with the front of the shuttle, and having an arm fixed to the rocking shaft for turning it through about ninety degrees; a ratchet wheel upon one end of said transverse shaft and a three armed bell crank lever and pawl for turning same; an indent wheel having as many indents as there are teeth in the ratchet wheel, and a positioning spring engaging one indent at one time; a vertically disposed rod connected to the arm of the rocking shaft at one end and at the other end to and supported by one end of a lever of the first order fulcrumed to the loom frame, and carrying a bowl at the other end which is adapted to engage with a cam plate rotated on the tappet shaft of the loom and is normally out of engagement, said rod having a finger for actuating the bell crank lever and a flexible connection from said lever to the filling fork for drawing said lever into engagement with the cam when the thread gives out or breaks whereby the rocking shaft is operated.

8. In a filling replenishing loom the combination of a cop magazine consisting of two

side frames each formed with an endless groove and bars adapted to slide with their ends in said grooves in contact with each other and each provided with devices for holding a cop spindle, two sprocket wheels carried on a shaft and adapted to engage the ends of the bars, a scallop wheel and a ratchet wheel fixed on said shaft, a spring adapted to engage with the scallops, a rocking shaft carrying a gripper for the cop spindle block, a support for the cop and a hook adapted to seize the filling end, a lever on the rocking shaft and a vertical rod articulated to the same, a three armed bell crank lever loosely mounted on the shaft of the sprocket wheels, one arm carrying a pawl adapted to engage with said ratchet wheel, a two armed lever fixed on a spindle, a bracket fixed to the loom frame and adapted to support said spindle and allow it to slide longitudinally in its supports, a chain attached to said spindle and so connected to the filling fork that when the fork is pulled forward on the failure of the filling in the shed, said shaft and lever are pulled to one side, and a spring adapted to return said shaft and lever to their normal position when released by the filling fork; a cam on the tappet shaft of the loom and a bowl on one end of said two armed lever adapted to be brought into engagement with said cam when said lever is moved sidewise by the filling fork, the other end of the lever being connected to the vertical rod in such a manner as to allow of its lateral movement, and to lift it, a second arm of said bell crank lever adapted to be moved by the end of said vertical rod when raised by the cam and lever and thereby push back the pawl for one tooth of the ratchet wheel, a finger adapted to slide and turn on a fixed stud at one end and engaging at its middle with a pin into a slot of the third arm of the bell crank lever, a projection on the vertical rod adapted to lift the other end of the finger when said rod is raised by the cam, a slotted plate fixed to the loom slay adapted to allow the said finger when raised to pass through the slot and to strike it when lowered and push it back into its normal position and thereby turn the ratchet wheel by means of the pawl attached to the bell crank lever.

In testimony whereof I have hereunto affixed my signature in the presence of two witnesses.

JOHN WILLIAM CARR.

Witnesses:

C. BOLLÉ,
RIDLEY G. URQUHART.