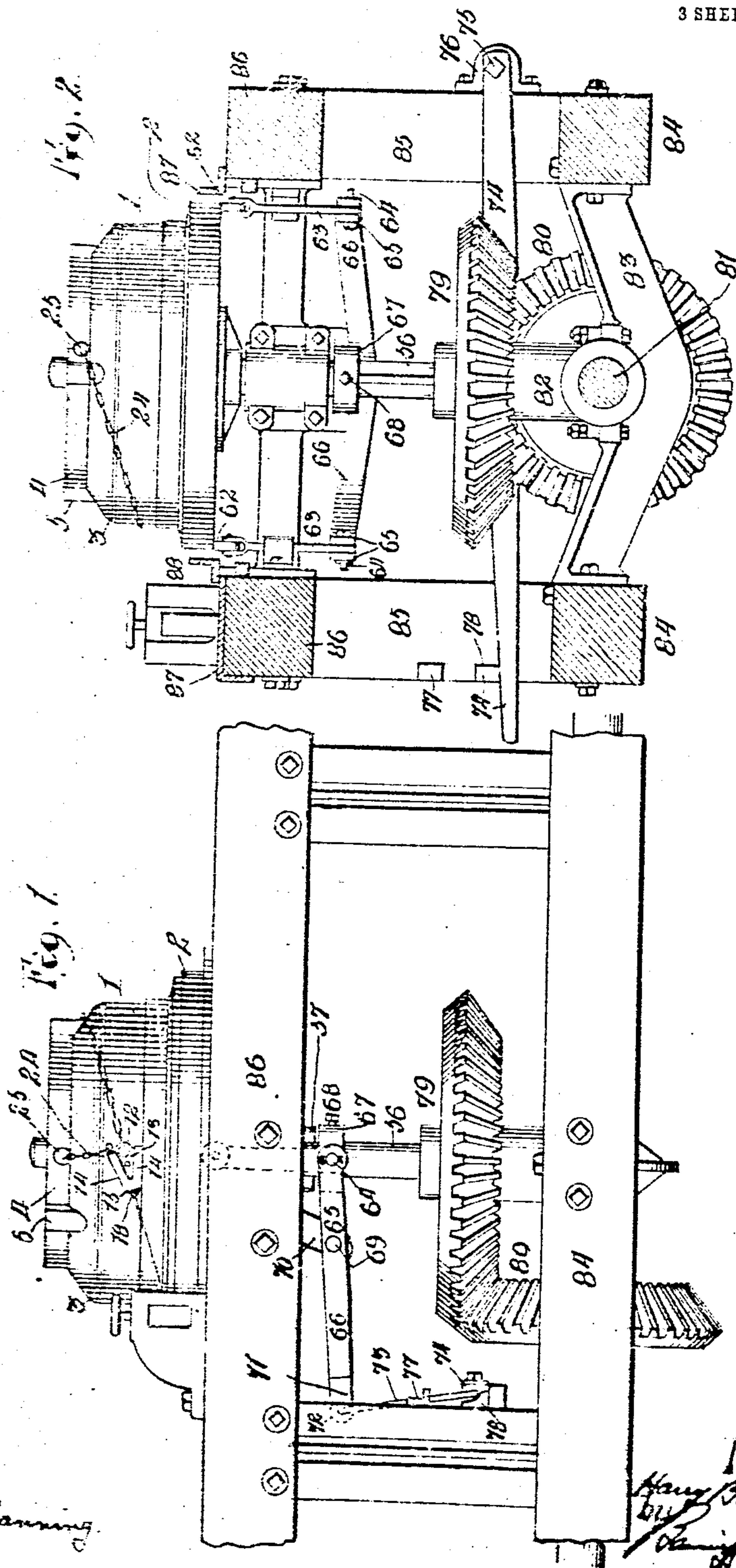


H. B. HUMPHREY.
WIREDRAWING BLOCK.
APPLICATION FILED JUNE 17, 1907.

905,077.

Patented Nov. 24, 1908.

3 SHEETS—SHEET 1.



Witnesses
W. P. Bond
Pierman & Banning.

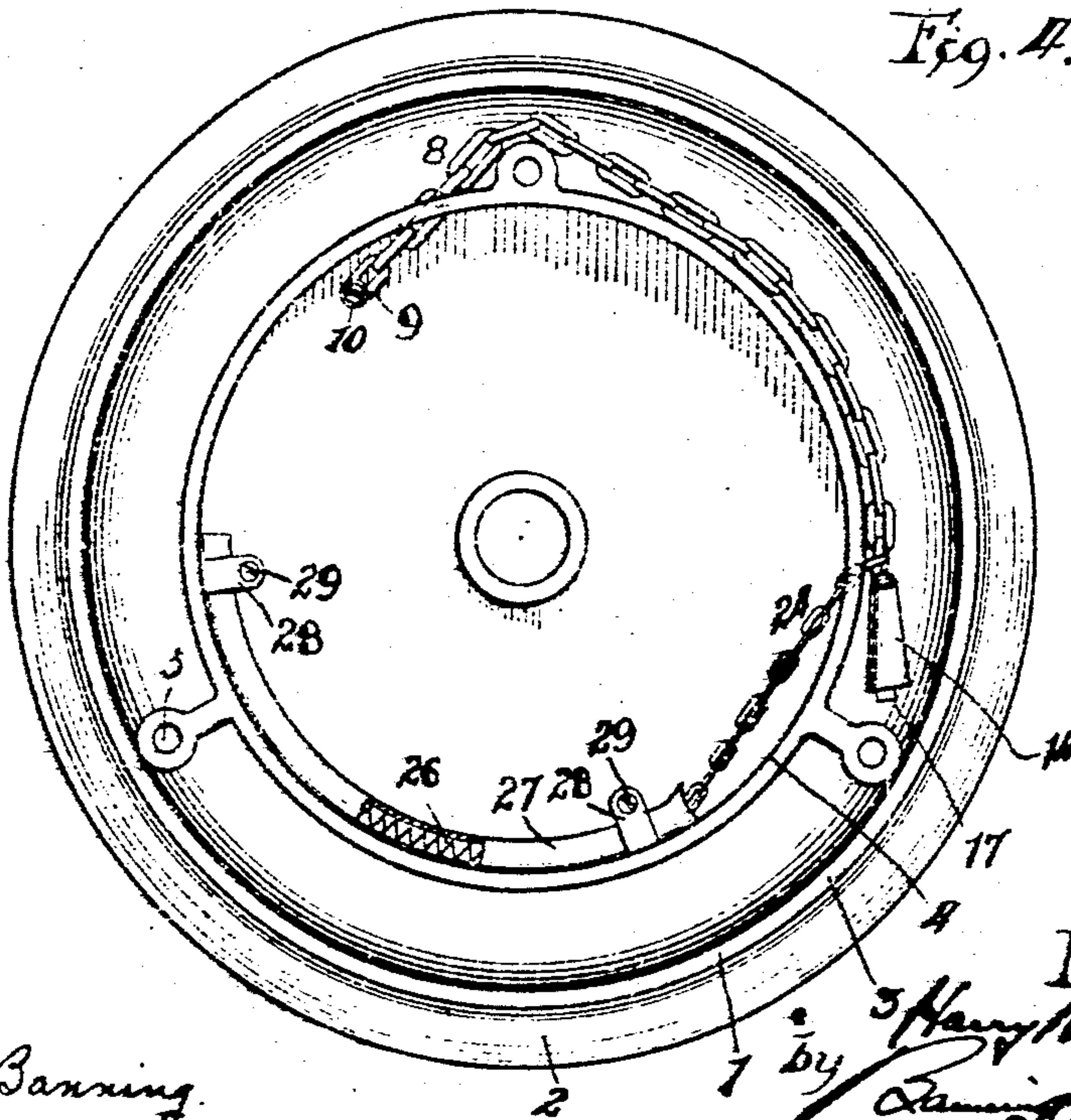
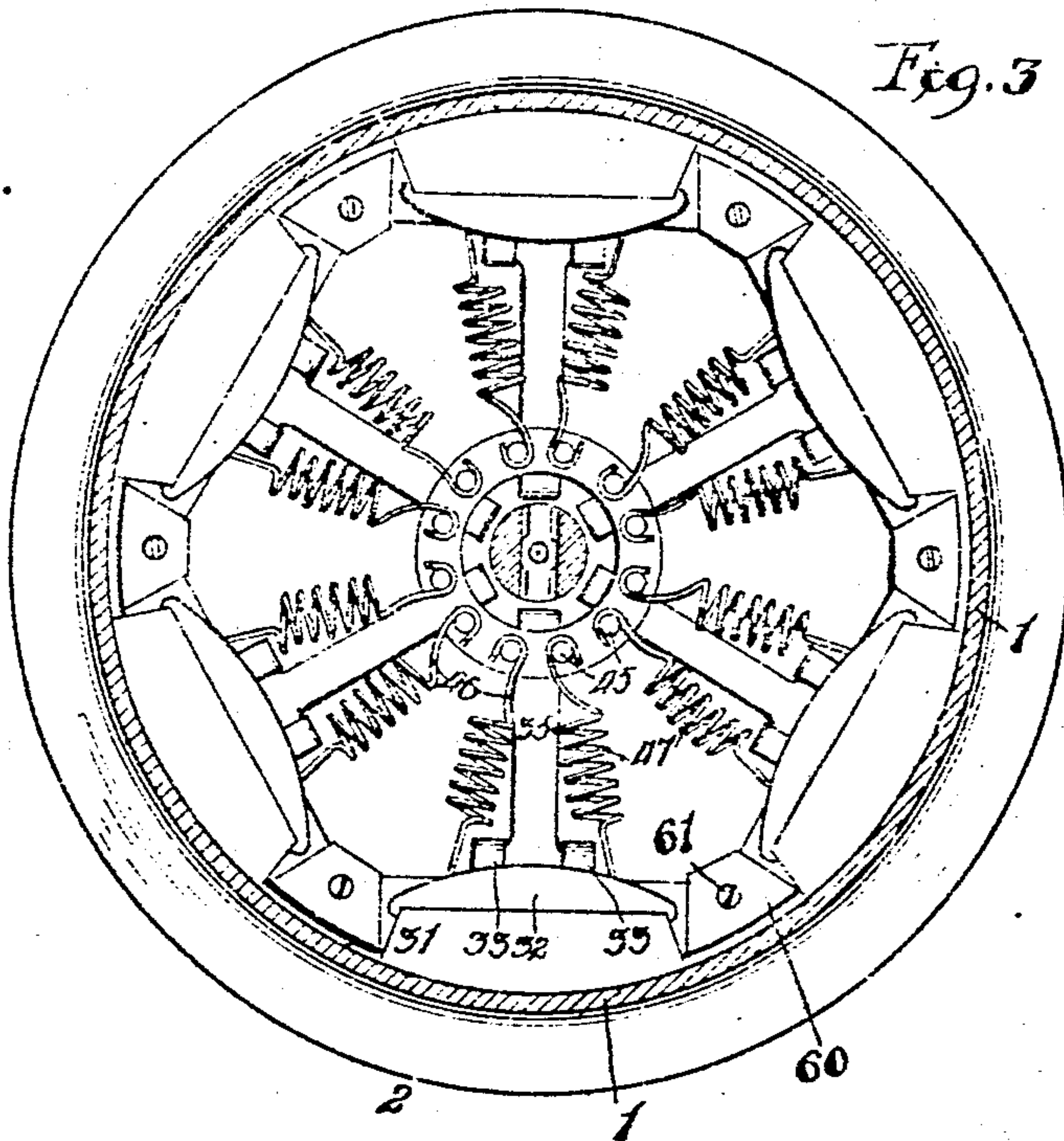
Inventor:
H. B. Humphrey
Pierman & Banning
Attys

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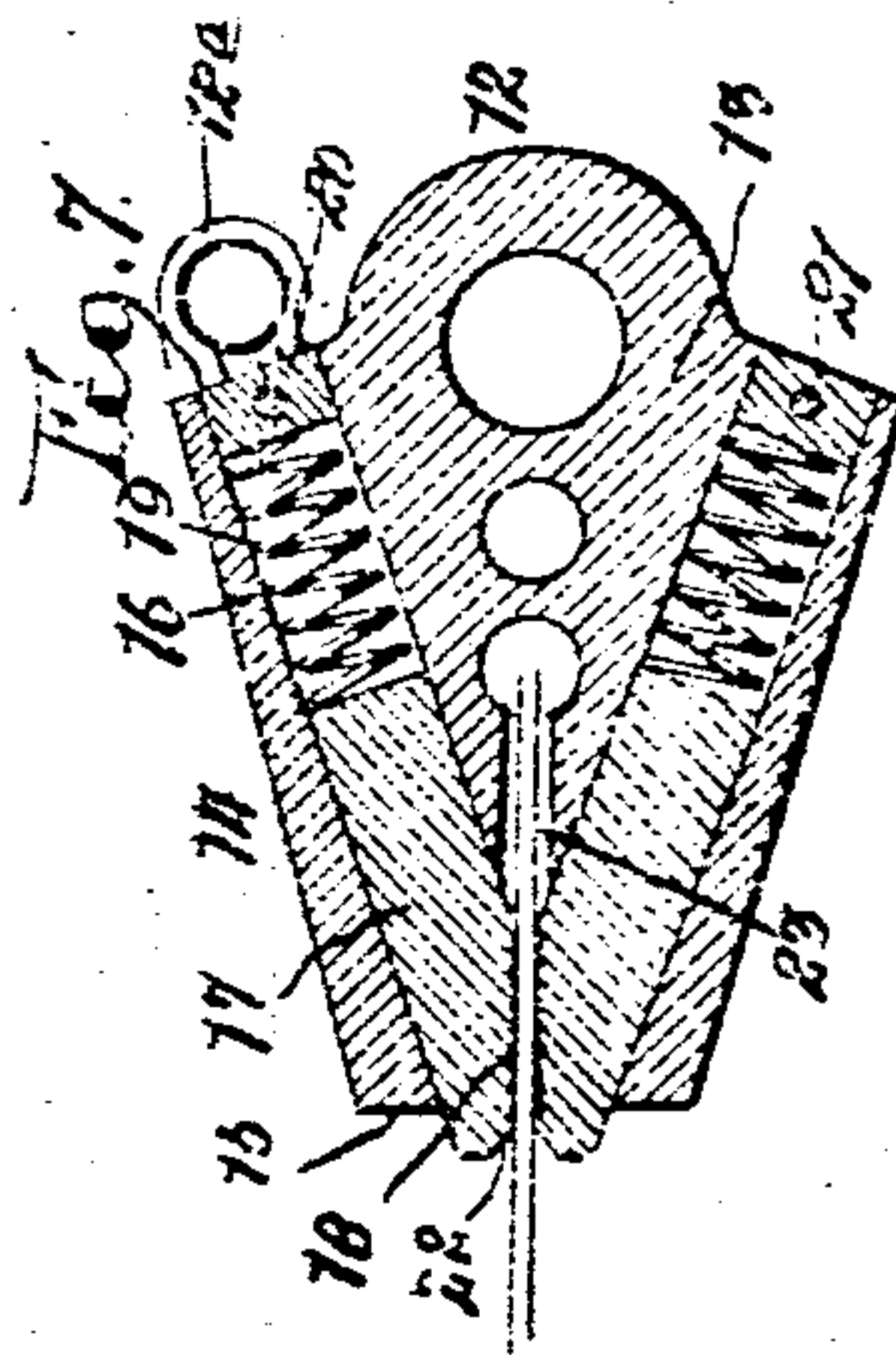
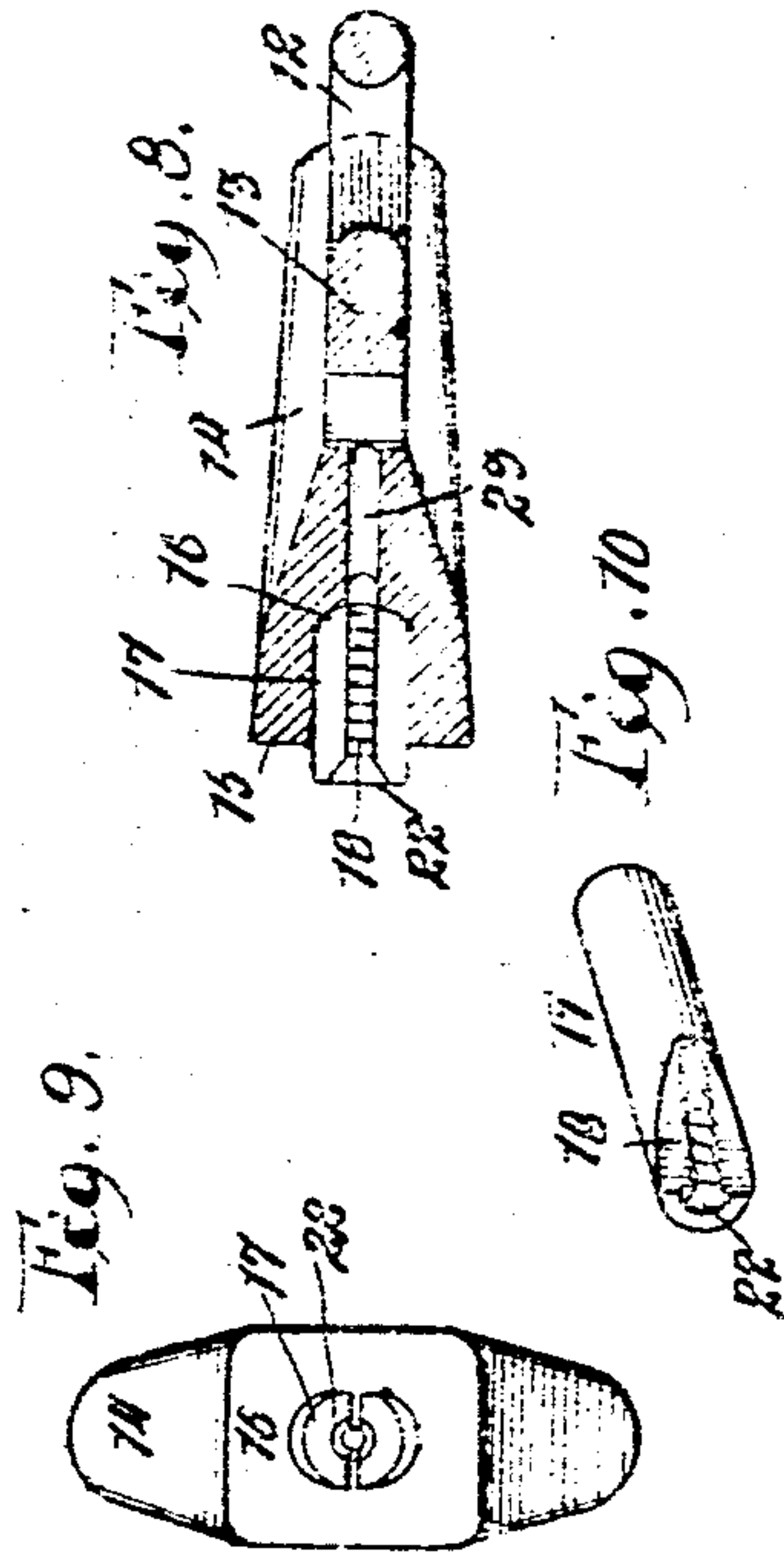
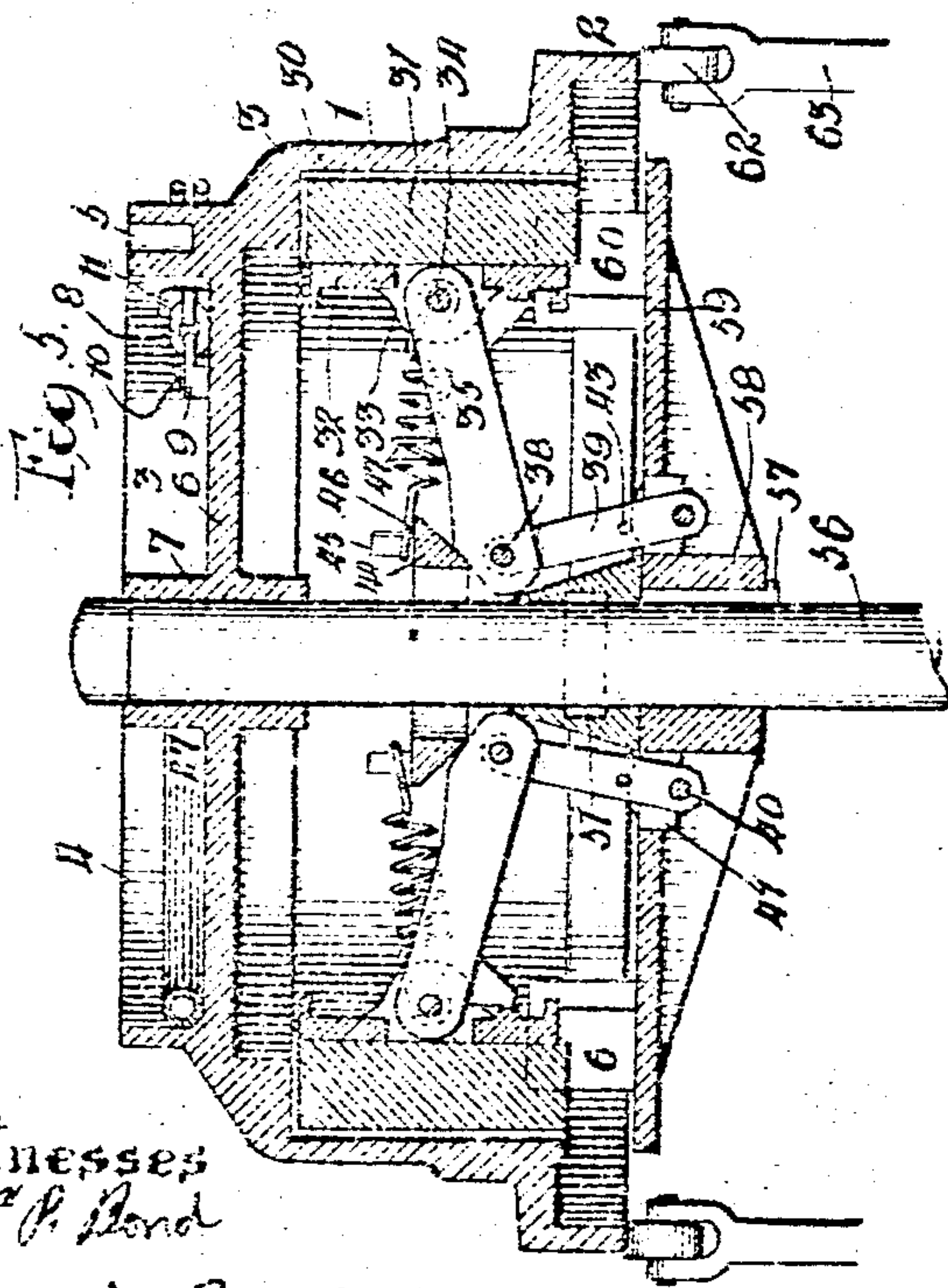
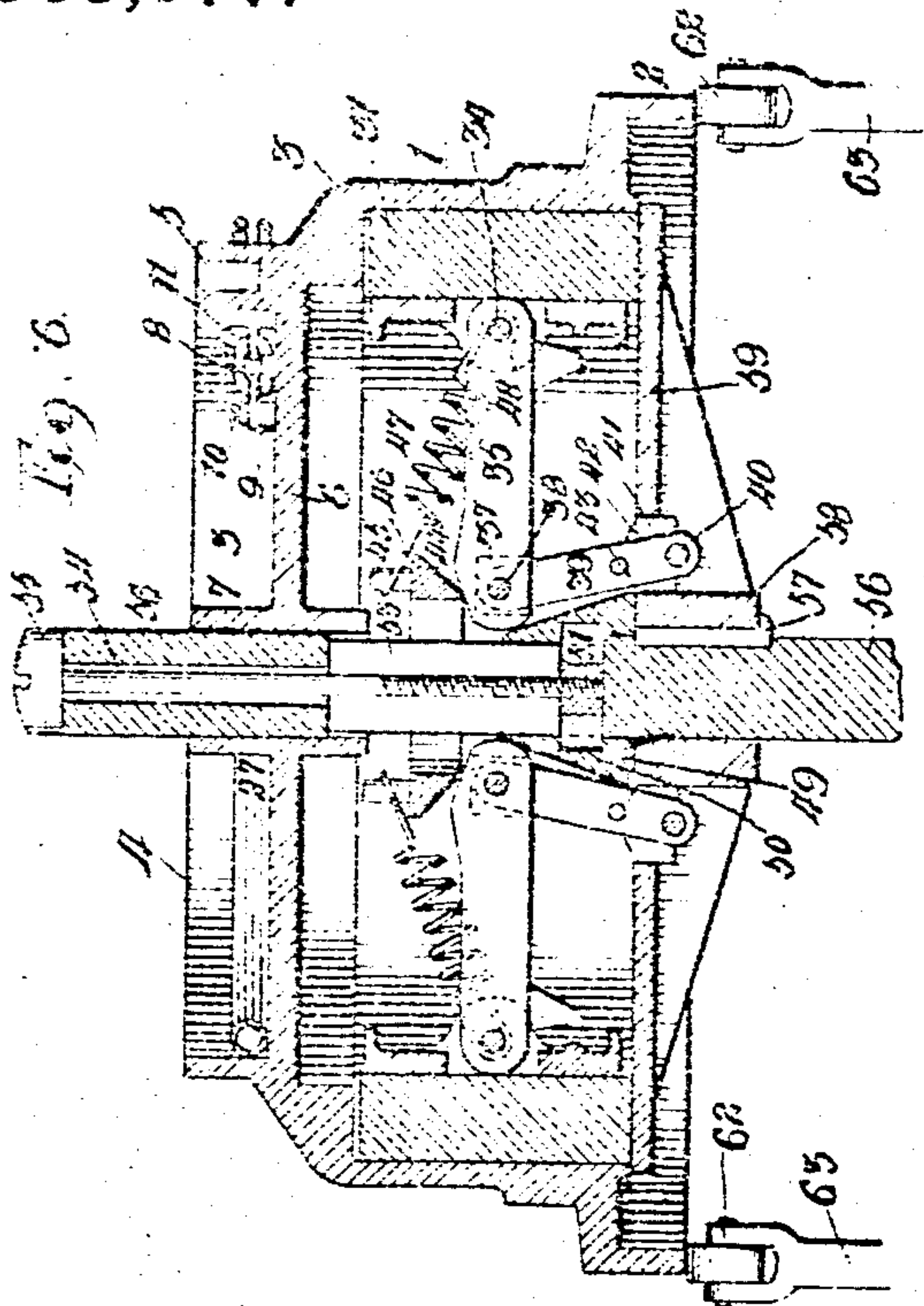
Witnesses
W. P. Bond
Pismon W. Banning.

Inventor:
H. B. Humphrey
by *[Signature]*
Att'y.

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3 SHEETS—SHEET 3.



Witnesses
W. P. Bond
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UNITED STATES PATENT OFFICE.

HARRY B. HUMPHREY, OF JOLIET, ILLINOIS, ASSIGNOR TO HUMPHREY & SONS, OF JOLIET, ILLINOIS, A COPARTNERSHIP.

WIREDRAWING-BLOCK.

No. 905,077.

Specification of Letters Patent.

Patented Nov. 24, 1908.

Application filed June 17, 1907. Serial No. 379,403.

To all whom it may concern:

Be it known that I, HARRY B. HUMPHREY, a citizen of the United States, residing at Joliet, in the county of Will and State of Illinois, have invented certain new and useful Improvements in Wire-drawing-Blocks, of which the following is a specification.

It is the practice, in the drawing of wire, to employ grippers for grasping the wire as it leaves the drawing die, and carrying the advance end of the drawn wire into position to be wound or coiled on the block; and it is likewise the custom to employ a block having a rising and falling movement, for the falling movement to connect the block with the revolving shaft, so as to revolve the block, and for the rising movement to disconnect the block from the shaft, and allow the shaft to revolve without revolving the block. The practice heretofore has been to employ grippers connected with the block and grasping the end of the wire for drawing the wire onto the block as the block is revolved; and to operate the block by means of a kick lever and connections, so that in the falling of the block more or less concussion or jar will occur as the block is caught and revolved.

The objects of the present invention are to construct and operate a gripper in direct connection with the block, so that as the end of the wire is caught by the gripper it, with the gripper, will be carried directly onto the revolving block; to furnish a flexible connection between the gripper and the block, for enabling the gripper to be lowered to catch and hold the end of the wire; to furnish an automatic means for gradually raising the gripper as the wire ascends or passes upward on the block; to construct a revolvable block and a gripper coacting to wind or reel the wire on the block; to gradually and positively connect the block with the revolving shaft, so as to prevent jar and concussion to any appreciable or injurious extent in starting the block; to construct and apply a friction clutch formed of several sections and operated to engage the block as the block descends, and to be disengaged from the block as the block ascends; to apply a friction clutch consisting of several sections, each section operated by links for forcing the shoe of each section into engagement with and disengaging the shoe of each section from the block; and to improve gen-

erally the construction, arrangement and operation of the grippers and the clutch connection for the block.

The invention consists in the features of construction and combinations of parts hereinafter described and claimed.

In the drawings Figure 1 is a front elevation, showing a single block and a portion of the supporting frame; Fig. 2 a side elevation of the supporting block and its driving shaft and gear, with the frame in section; Fig. 3 a sectional plan view of the block, showing the arrangement of the friction clutch; Fig. 4 a top or plan view of a block, showing the connection of the gripper with the block; Fig. 5 a sectional elevation, showing the block raised and the friction clutch disengaged; Fig. 6 a similar view to Fig. 5, showing the block lowered and the friction clutch engaged; Fig. 7 a sectional plan view of a gripper; Fig. 8 a longitudinal central section of a gripper; Fig. 9 an end or face view of a gripper; and Fig. 10 a perspective view of one of the gripper jaws.

The block of the present invention has a central section or portion 1, a lower flange or rim 2, an upper shoulder 3, and an upper flange or rim 4, with lugs 5 on the upper flange or rim having holes, for the reception of rods, to increase the height of wind for the wire. A cross plate 6 extends across the upper part of the block, and at the axial center is a hub 7, furnishing a bearing for revolving the block. A chain 8 is connected by an eye or loop 9, with a pin 10 extending up from the plate 6, and this chain 8 passes through a slot or opening 11 in the rim or flange 4, and its outer or free end is connected with the eye 12 of the gripper plate 13, which has sockets 14, in the construction shown, that join each other at the front or receiving end and form a nose 15, and each socket 14 has a passage or hole 16, each of which receives a gripper jaw 17, having a serrated gripper face 18; and each gripper jaw is held projected by a coiled spring 19, which allows of the necessary rearward movement for the entering of the end of the wire between the serrated or toothed faces of the jaws. The spring 19 is located between the rear end of each gripper jaw and a closing plug 20, held in place by a cross pin 21, or in any other suitable manner. Each gripper jaw, at its front or receiving

end, has a countersink 22, and the center or web of the gripper block or holder has a hole 23 for the passage of the end of the wire a sufficient distance beyond the gripping-faces of the jaws, so as to insure a firm bite on the wire, by which the wire will be drawn forward as the gripper jaw is carried around by the revolution of the block. The specific form of gripper shown and described forms no part of the present invention, and will constitute the subject matter of a separate application.

The gripper, whether of the form shown, or other form, has a flexible connection with the block by means of the chain 8, and after the wire is caught and commences to wind onto the block the gripper, as a whole, rises to be kept clear of the wire, and for this purpose, in the construction shown, a chain 24 is attached to the eye 12^a of the gripper head or plate, and this chain 24 passes through a hole or opening 25 in the rim 3, and is attached to one end of a coil spring 26, which spring is located and operates in a casing 27, attached to the inner face of the rim 3 by brackets or ears 28, and set screws 29, or in any other suitable manner. The spring 26, when the gripper as a whole is lowered to grip the end of the wire, is expanded by the act of pulling the gripper down to position to catch the end of the wire, and with this downward movement the chain 24 passes down with the gripper, and after the gripper is attached to the wire and the block starts to revolve and wind the wire on the block, the spring 26 self-retracts, drawing back the chain 24 and raising the gripper gradually with the rise of the wire on the block.

The operation of the gripper will be understood from the foregoing description, but briefly is as follows: The wire is inserted between the jaws of the gripper, and with the start of the rotation of the block, the gripper will be drawn toward the block, and the jaws will be forcibly engaged with the wire, holding the wire firmly caught, and as the gripper passes around with the rotation of the block the wire will follow and will be wound onto the block, and when the necessary amount of wire has been wound or reeled onto the block the gripper can be released, either by cutting the caught end of the wire or otherwise, leaving the reel of wire free to be removed from the block, and leaving the gripper in position on the block to catch the forward end of the next section of wire and reel another portion of the wire onto the block.

It will be seen that with the gripper of suitable formation connected directly with the block, only one grip is necessary on the end of the wire, so that only the short piece of wire caught by the gripper is all that need be cut off and thrown away, while with

grippers having no direct connection with the block and which, of necessity, must grab the wire several times in order to bring the end of the wire into position to wind on the block, all of the gripped portion of the wire must be cut off and thrown away. The gripper is positive in its action, and will operate and catch the wire and carry the wire to the block with the revolving of the block.

The interior of the block has an annular chamber or recess 30, in which is located and operates the friction clutch. The friction clutch of the present invention consists of six sections in the arrangement shown, but a greater or less number of sections could be used, if so desired. Each section of the friction clutch consists of a shoe 31 of wood or other suitable material held in a supporting head 32, each head 32 having ears 32^a, between which ears is attached, by a pivot pin 34, one end of a link 35 and, as shown, a stop lug 36 depends from the under face of the link 35, to prevent the free end of the link from descending too far. The free end of each link 35 has a slot or passage 37, in which is attached, by a pin or pivot 38, the upper end of an arm or link 39, the lower end of which is attached by a pin or pivot 40 between ears or plates 41 of the table or platform supporting the block, and the plates or ears 41 have a curved upper face 42 over which a pin 43 rides to maintain the proper throw of the arm or link 39 in the operation of each shoe of the friction clutch. A collar or ring 44, having a beveled under face is located above the series of links 35, and this ring, on its upper face, has projecting pins 45, to which is connected a loop or eye 46 of a coiled spring 47, the other end of which has a loop or eye 48 entered onto the pivot or pin 34 or otherwise having a fixed point of attachment, so that the spring will act and maintain the proper relation between the shoe of each section and the links or arms which operate the shoe.

A conical bearing 49 furnishes a support for the free ends of the links 35, and this bearing has a cross hole 50 in which is located a block or nut 51, receiving the threaded end of an adjusting rod 52, so that, by turning the rod, the block with the conical bearing can be raised or lowered, for which purpose a slot 53 is formed in the driving shaft; and the rod 52 has its stem extending upwardly through a hole 54 in the driving shaft, with a head 55 on the end of the stem, the head having a nick or other means which will enable the rod 52 to be turned in the nut or cross head 51 and properly adjust the cone as required to take up or compensate for wear on the shoes of the friction clutch.

The shaft 56, in which is the slot 53 and

passage 54, has attached thereto, by a key 57 or otherwise, a collar 58 supporting the bottom or driving plate 59 of the block; and, as shown, the driving plate has a series of stops 60, each attached thereto by a screw 61 or otherwise, which blocks are engaged by the ends of the shoes, and serve to furnish a connection for driving the friction clutch, for the friction clutch, when the shoes are engaged with the face of the block to rotate or drive the block. The rim or flange 2, in the arrangement shown, rides on rollers 62 in the slotted end of rods or bars 63, and these bars are connected each by a pin or pivot 64, with the slotted end 65 of each arm 66 of a cradle, the arms of the cradle extending around a stop collar 67, fixedly attached to the driving shaft 56 under the hub 57 by a set bolt 68 or otherwise. Each arm 66 of the cradle at its slotted end 65 carries a pin or pivot 69, by means of which the cradle is pivotally mounted on the end of a hanger or support 70, and at the free end of the cradle is an arm 71 having an eye 72, to which is connected one end of a rod 73, the other end of which is connected to a kick-off lever 74 as usual, which lever, at its attached end, is mounted on a pin or pivot 75 carried by an ear 76 or otherwise, and co-operates with an upper stop 77 and a lower stop 78, as usual in the construction and arrangement of kick-off levers, for raising and lowering a wire block.

The driving shaft 56 is driven by a bevel gear 79, which meshes with a bevel gear 80, on a driving shaft 81 supported in suitable journal boxes or bearings 82 on cross plates or bars 83, attached to the front and rear side pieces 84 of the main frame, and the side pieces 84 are connected by uprights 85 with the upper pieces 86, on the front one of which is mounted the usual draw die 87, and, as shown, a protecting flange 88 is carried by the upper supporting frame pieces 86, and encircles the lower rim of the block to prevent the falling down of the drawn wire as wound on the block, as usual.

The operation of the clutch, to which this part of the invention particularly relates, is as follows: The kick-off lever, when in its raised position, will elevate the block through the engagement of the flange or track 2, with the rollers 62, and the raising of the rollers through the bar 63, and the spider or cradle, and with such elevation of the block the outer end of the links 35 will be drawn inwardly, withdrawing the shoes 31 from engagement with the inner face of the block, as shown in Fig. 5, allowing the table or platform 59, with the stops 60, to revolve, carrying around the sections of the friction clutch without imparting movement to the block. The disengagement of the kick-off lever from the upper stop 77, and the engagement thereof with the lower stop

78, carries down the block, and with the descent of the block the outer end of the links 35 are forced outward, causing the shoes 31, of the friction clutch, to impinge and firmly bind against the inner face of the block, so that, with the rotation of the platform or table 59, and the stops 60, the friction clutch, by its engagement with the inner face of the block, will revolve the block. The engagement of the friction clutch, with the block, will be gradual, thereby giving a gradual rotation to the block, so that no jar or concussion will occur in starting the revolution of the block, which is very desirable in the operation of the block, and particularly so where the gripper is connected with and drawn forward by the block, as with a gradual increase of rotation of the block, no sudden draw or pull will be exerted on the wire, which would tend to break off the wire at the point caught by the gripper. The cone bearing 49 enables the proper adjustment of the descent of the block to be obtained, for taking up of wear in the use of the friction clutch, and the springs serve to insure an inward draw on the shoe by which the shoes, when the block is raised, are maintained out of contact with the coacting surface of the block. The friction clutch of the present invention is automatic in its operation, and by its use a perfect connection between the block and the driving platform or table is obtained, without the production of jar or concussion that might cause injurious effects.

The gradual start of the wire block, by reason of the gradual engagement of the friction clutch with the block, is very desirable in connection with a wire gripper having a direct connection with the wire block as in the present invention, for the reason that with a gradual start of the rotation of the block no sudden pull or strain will be placed on the caught wire as would be the case with a sudden jerk in starting the block, and the danger or liability of breaking the wire with the initial start of the gripper is reduced to a minimum, thereby reducing the amount of waste for the wire caught by the gripper. The exterior of the wire block, by its section 1, furnishes a face onto which the wire winds readily, and as the wire rises and the gripper is automatically raised by the action of the tension spring, the gripper is maintained out of contact or interference with the winding of the wire on the block, and when the face of the section 1 of the block is entirely filled with the wire, and it is desired to increase the amount of wire wound, the block, by reason of the upper shoulder 3, will drop inside of the wound wire, so as to be out of the way of the rise of the wire on the block and not interfere with the further upward winding of the wire.

The wire gripper and block of the present

invention enables the operator to make the connection between the block and the wire by a single grip on the wire, dispensing with the necessity of making several grips on the wire before the wire is brought to the old construction of block to be caught thereon, which results in a great saving of time in placing the wire on the block which, in connection with the reducing of the danger of breakage to a minimum, makes the wire block and gripper of the present invention exceedingly desirable and useful in wire drawing mechanism.

What I claim as new and desire to secure by Letters Patent is:

1. In a wire drawing block, the combination of a revoluble block, a gripper for the wire, a flexible connection between the gripper and block leading from the interior of and the upper end of the block, and means connected with the gripper and adapted to operate and raise the gripper with the revolving of the block as the wire is drawn onto the block, substantially as described.

2. In a wire drawing block, the combination of a revoluble block, a gripper for the wire, a draw chain fixedly attached at one end to the block and at the opposite end to the gripper and leading from the interior of and the upper end of the block, a lift chain fixedly connected at the outer end to the gripper and means yieldably connecting the inner end of the lift chain with the block, the connecting means having a direct pull on the lift chain and automatically raising the gripper with the revolving of the block as the wire is drawn onto the block, substantially as described.

3. In a wire drawing block, the combination of a revoluble block, a gripper for the wire, a draw chain fixedly attached at one end to the block and at the opposite end to the gripper and leading from the interior of and the upper end of the block, a lift chain connected at one end to the gripper, and a spring within the interior of and carried by the block and having the opposite end of the lift chain connected thereto, the spring having a direct pull on the lift chain and automatically raising the gripper with the revolving of the block, substantially as described.

4. In a wire drawing block, the combination of a revoluble block, a gripper for the wire, a draw chain fixedly attached at one end to the block and at the opposite end to the gripper and leading from the interior of and the upper end of the block, a lift chain connected at one end to the gripper, a spring within the interior of and carried by the block and having the opposite end of the lift chain connected thereto, the spring having a direct pull on the lift chain and automatically raising the gripper with the revolving of the block, and a curved casing located

within the interior of the block and inclosing the spring for maintaining the spring in a direct line of pull in automatically raising the gripper, substantially as described.

5. In a wire drawing block, the combination of a horizontally revoluble and vertically reciprocable block and a driving shaft member therefor, a revoluble friction clutch vertically movable with the block and revoluble with the driving shaft member, said clutch consisting of a plurality of sections, each section having a shoe adapted to frictionally engage the block, a horizontal endwise movable link for each shoe, having its outer end pivotally connected to the shoe and a swinging vertical arm for each link, each arm pivotally connected to the driving shaft member and to the horizontal link and a bearing on the shaft member for the inner end of each link, whereby the weight of the descending block will force the horizontal links endwise outwardly and engage the shoes with the block for revolving the block, substantially as described.

6. In a wire drawing block, the combination of a horizontally revoluble and a vertically reciprocable block and a driving shaft member therefor, a revoluble friction clutch vertically movable with the block and revoluble with the driving shaft member, said clutch consisting of a plurality of sections, each section having a shoe adapted to frictionally engage the block, a horizontal endwise movable link for each shoe, having its outer end pivotally connected to the shoe and a swinging vertical arm for each link, each arm pivotally connected with the driving shaft member and the inner end of the horizontal link, and a bearing on the shaft member for the inner end of each link, whereby the weight of the descending block will force the horizontal links endwise outwardly and engage the shoes with the block for revolving the block, and a spring for each shoe operative to raise the shoe with the upward movement of the block and maintain the shoe raised and stop the revolving of the block, substantially as described.

7. In a wire drawing block, the combination of a horizontally revoluble and a vertically reciprocable block and a driving shaft member therefor, a revoluble friction clutch vertically movable with the block and revoluble with the driving shaft, said clutch consisting of a plurality of sections, each section having a shoe adapted to frictionally engage the block, a horizontal endwise movable link for each shoe, having its outer end pivotally connected to the shoe and a swinging vertical arm for each link, each arm pivotally connected with the driving shaft and with the inner end of the horizontal member whereby the weight of the descending block will force the horizontal links endwise outwardly and engage the shoes with the block

for revolving the block, a spring for each shoe operative to raise the shoe with the upward movement of the block and maintain the shoe raised and stop the revolving of the block, and an adjustable bearing on the driving shaft, common to the inner ends of all of the links for adjusting the position of the links in operative relation to press the shoes against the block with the downward movement of the block, substantially as described.

8. In a wire drawing block, the combination of a horizontally revoluble and a vertically reciprocable block and a driving shaft member therefor, a revoluble friction clutch vertically movable with the block and revolving with the drive shaft, said clutch consisting of a plurality of sections, each section having a shoe adapted to frictionally engage the block, a horizontal endwise movable link for each shoe having its outer end pivotally connected to the shoe and a swinging vertical arm for each link, each arm pivotally connected with the driving shaft member and with the inner end of the horizontal link, whereby the weight of the descending block will force the horizontal links endwise outwardly and engage the shoes with the block for revolving the block, a spring for each shoe operative to raise the shoe with the upward movement of the block and maintain the shoe raised and stop the revolving of the block, and a supporting ring around the shaft above the horizontal links and having the inner end of each spring connected therewith, for the springs to furnish a yieldable support for the clutch as a whole when raised, substantially as described.

9. In a wire drawing block, the combination of a horizontally revoluble and a vertically reciprocable block and a driving shaft member therefor, a revoluble friction clutch vertically movable with the block and revoluble with the driving shaft, said clutch consisting of a plurality of sections, each section having a shoe adapted to frictionally engage the block, a horizontal endwise movable link for each shoe having its outer end pivotally connected to the shoe and a swinging vertical arm for each link, each arm pivotally connected with the driving shaft member and with the inner end of the horizontal link, whereby the weight of the descending block will force the horizontal links endwise outwardly and engage the shoes with the block for revolving the block, a spring for each shoe operative to raise the shoe with the upward movement of the block and maintain the shoe raised and stop the revolving of the block, an adjustable bearing on the driving shaft common to the inner ends of all of the links for adjusting the position of the links in operative relation to press the shoes against the block with the downward movement of the block, and a support around the shaft and having the

end of each spring connected thereto for the springs to furnish a yieldable support for the clutch as a whole when raised, substantially as described.

10. In a wire drawing block, the combination of a horizontally revoluble and vertically reciprocable block and a driving shaft member therefor, a revoluble friction clutch vertically movable with the block and revoluble with the driving shaft, said clutch consisting of a plurality of sections, each section having a shoe adapted to frictionally engage the block, a horizontal endwise movable link for each shoe having its outer end pivotally connected to the shoe and a swinging vertical arm for each link, each arm pivotally connected with the driving shaft member and with the inner end of the horizontal link, whereby the weight of the descending block will force the horizontal links endwise outwardly and engage the shoes with the block for revolving the block, a spring for each shoe connected at its outer end with the shoe and operative to raise the shoe and stop the revolving of the block, an adjustable bearing on the driving shaft common to the inner ends of all of the vertical links for adjusting the position of the links in operative relation to press the shoes against the block with the downward movements of the block, a supporting ring around the shaft above the links and having the inner end of each spring connected therewith for the springs to furnish a yieldable support for the shoes, and means for reciprocating the block, substantially as described.

11. In a wire drawing block, the combination of a horizontally revoluble and vertically reciprocable block, a plurality of revoluble shoes, the several shoes constituting a driving clutch member laterally movable for frictionally engaging the shoes and block and vertically movable with the block for disengaging the shoes from the block, a yieldable and laterally movable support for each shoe, said support consisting of an endwise movable horizontal link, a swinging vertical arm for the inner end of the link and a lift spring, a continuously revoluble shaft having connected therewith the lower end of each swinging vertical arm of the clutch driving member, a bearing on the shaft for the inner ends of the links, and a breakable connection between the shaft and the shoes, said connection consisting of stops carried from the shaft and entering between and engaging with the ends of the shoes, substantially as described.

12. In a wire drawing block, the combination of a horizontally revoluble and vertically reciprocable block, a plurality of revoluble shoes, the several shoes constituting a driving clutch member laterally movable for engaging the shoes and block and vertically movable with the block for disengag-

ing the shoes from the block, a yieldable and laterally movable support for each shoe, said support consisting of an endwise movable horizontal link, a swinging vertical arm for the inner end of the link and a lift spring, a continuously revoluble shaft, a bearing on the shaft for the inner ends of the links, a horizontal plate attached to and revoluble with the shaft and having connected therewith the lower end of each swinging vertical arm of the clutch driving member, and a breakable connection between the plate and the shoes, said connection consisting of stops carried from the shaft and entering between and engaging with the ends of the shoes, substantially as described.

13. In a wire drawing block, the combination of a horizontally revoluble and vertically reciprocable block, a plurality of revoluble shoes, the several shoes constituting a driving clutch member laterally movable for engaging the shoes and block and vertically movable with the block for disengaging the shoes from the block, a yieldable and laterally movable support for each shoe, said support consisting of an endwise movable horizontal link, a swinging vertical arm for the inner end of the link and a lift spring, a continuously revoluble shaft, a bearing on the shaft for the inner ends of the links, a horizontal plate attached to and revoluble with the shaft and having connected therewith the lower end of each swinging vertical arm of the clutch driving member, and a series of stops on the horizontal plate for engagement with and disengagement from the shoes with the descent and ascent of the block, substantially as described.

14. In a wire drawing block, the combination of a horizontally revoluble block member and a driving shaft member therefor, which permits of operative vertical movement between said members, a friction clutch between the block and the shaft, said clutch having a shoe which is adapted to frictionally engage the block, a horizontal link the outer end of which is pivotally connected to said shoe, the inner end of said link having pivotal connection to the driving shaft and adapted to press against a bearing portion supported by the shaft, and means constructed and arranged to impart vertical movement

to one of the members and through said member to one end of the link and cause a movement of the outer end of the pivoted link in a radial direction in order to operate the clutch mechanism, substantially as described.

15. In a wire drawing block, the combination of a horizontally revoluble block member, a driving shaft member therefor with a relative vertical movement between said members, a friction clutch between the block and the shaft and rotatable from and with the shaft, said clutch having a plurality of shoes adapted to frictionally engage the block, a horizontal link for each shoe, each link having the shoe pivotally connected to its outer end and each link having a pivotal connection for its inner end with the driving shaft, a bearing on the driving shaft against which the inner ends of the links are adapted to press, and means constructed and arranged to impart vertical movement to one of the members and through said member move the pivoted links outwardly in a radial direction to operate the clutch mechanism, substantially as described.

16. In a wire drawing block, the combination of a horizontally revoluble block member, a driving shaft member therefor with a relative vertical movement between said members, a friction clutch between the block and the shaft and rotatable from and with the shaft, said clutch having a plurality of shoes adapted to frictionally engage the block, a horizontal link for each shoe, each link having the shoe pivotally connected to its outer end and each link having a pivotal connection for its inner end with the driving shaft, a lift spring for each shoe maintaining each shoe out of engagement with the block, a bearing on the driving shaft against which the inner ends of the links are adapted to press, and means constructed and arranged to impart vertical movement to one of the members and through said member move the pivoted links outwardly in a radial direction to operate the clutch mechanism, substantially as described.

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