

No. 806,529.

PATENTED DEC. 5, 1905.

P. T. DODGE.
SLUG CASTING MACHINE.
APPLICATION FILED MAR. 3 1904.

5 SHEETS—SHEET 1.

Fig. 1.

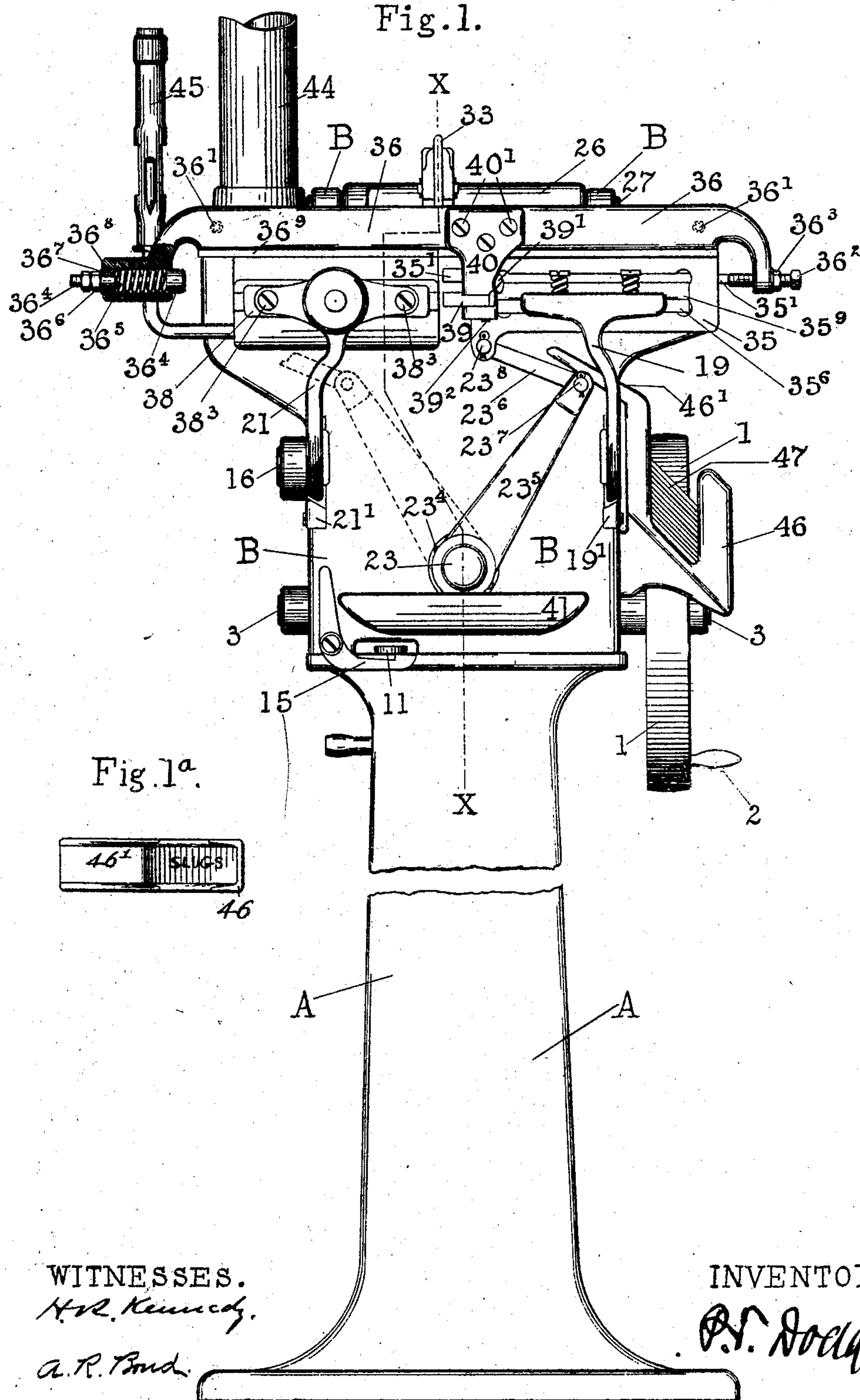


Fig. 1^a.

WITNESSES.
H. R. Kennedy.
A. R. Bond.

INVENTOR.

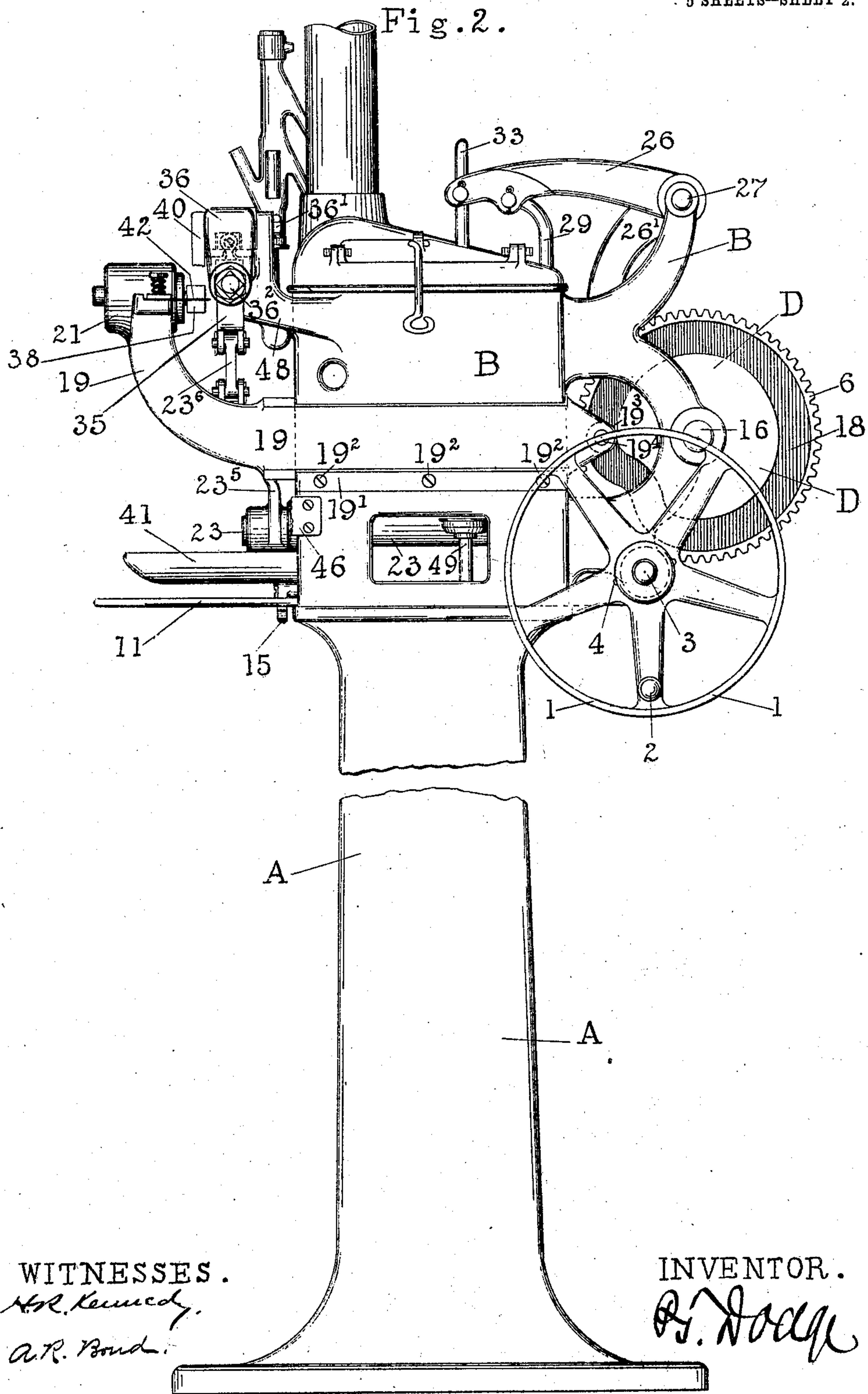
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5 SHEETS—SHEET 2.



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5 SHEETS—SHEET 3.

Fig. 3.

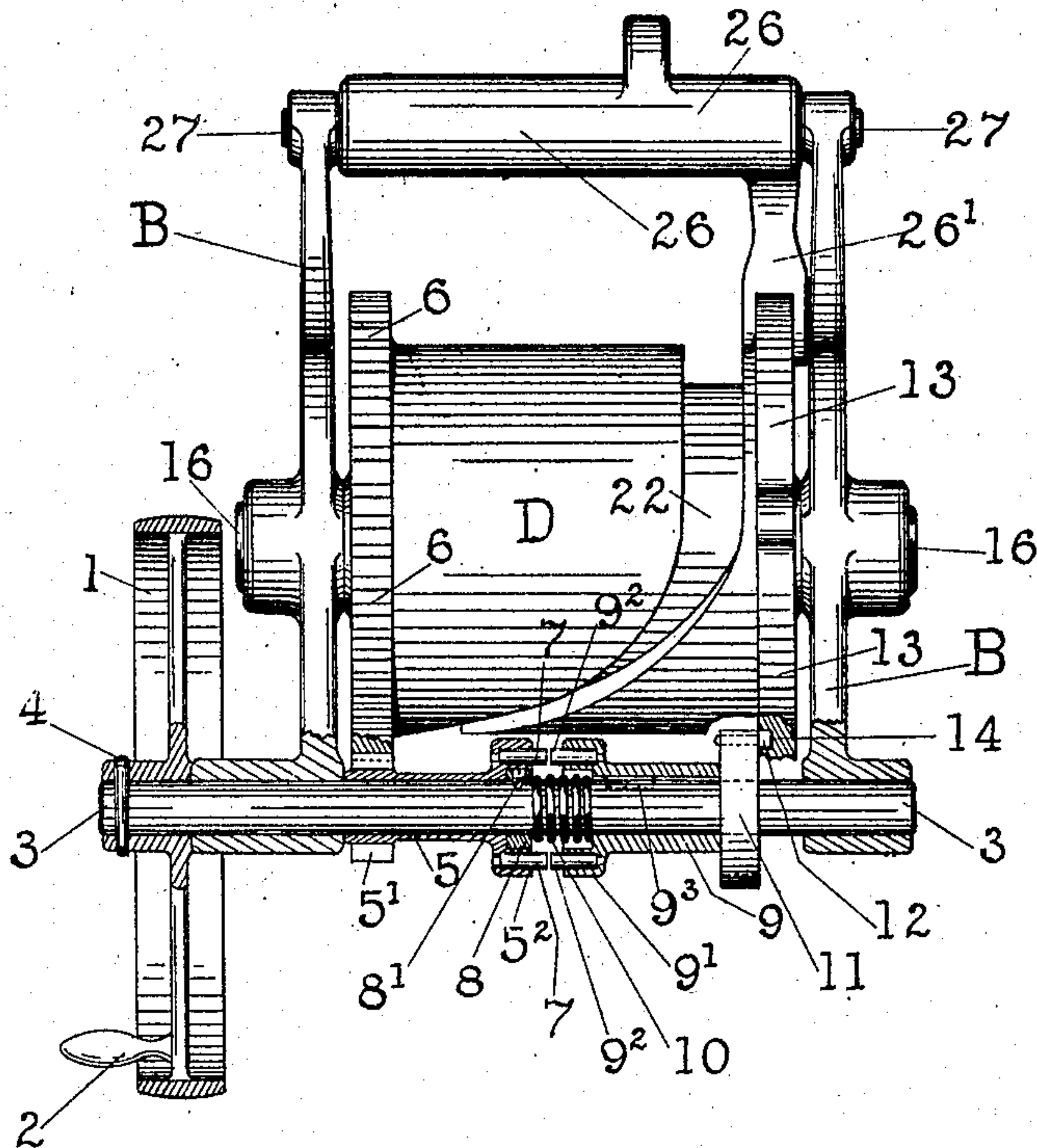


Fig. 4.

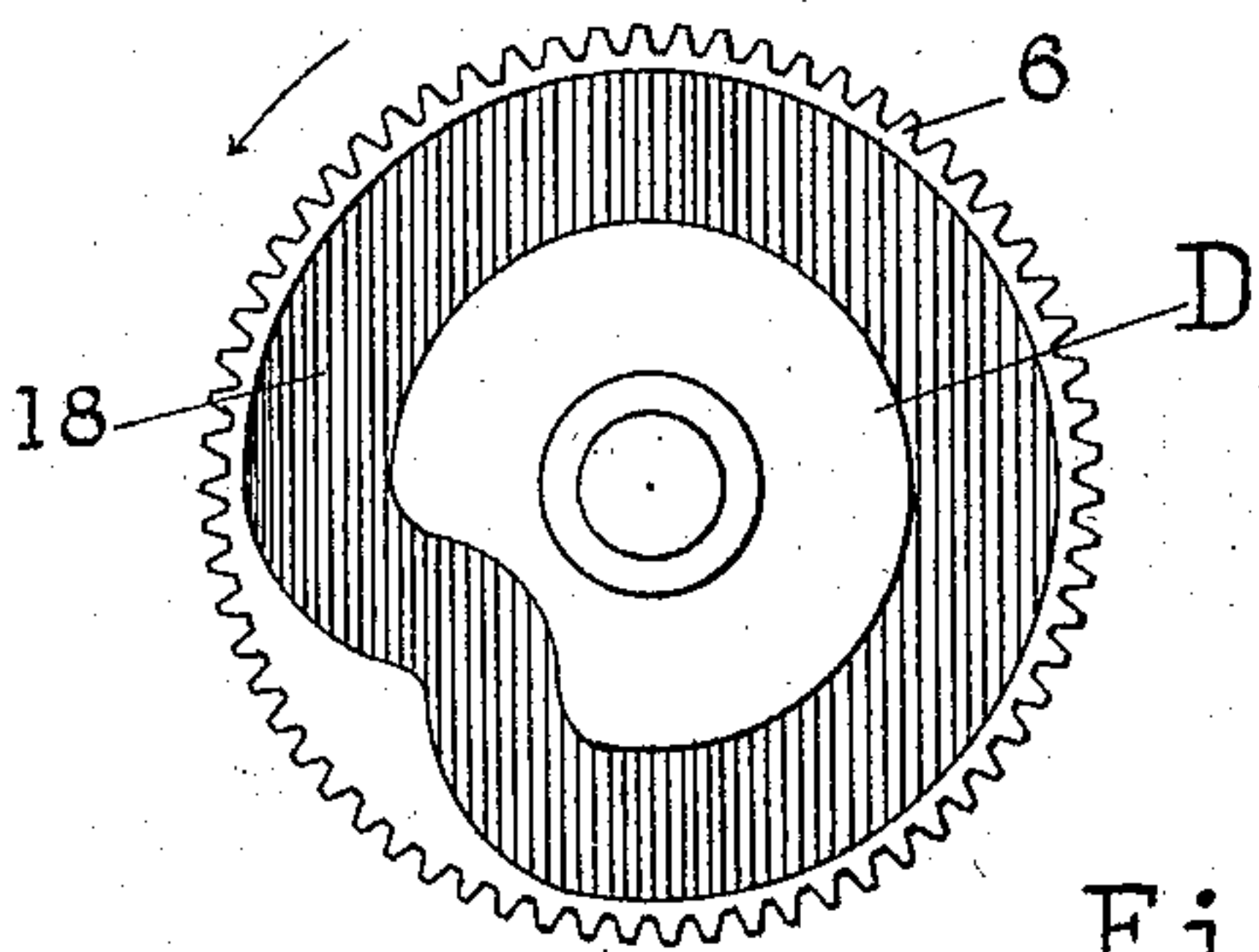


Fig. 5.

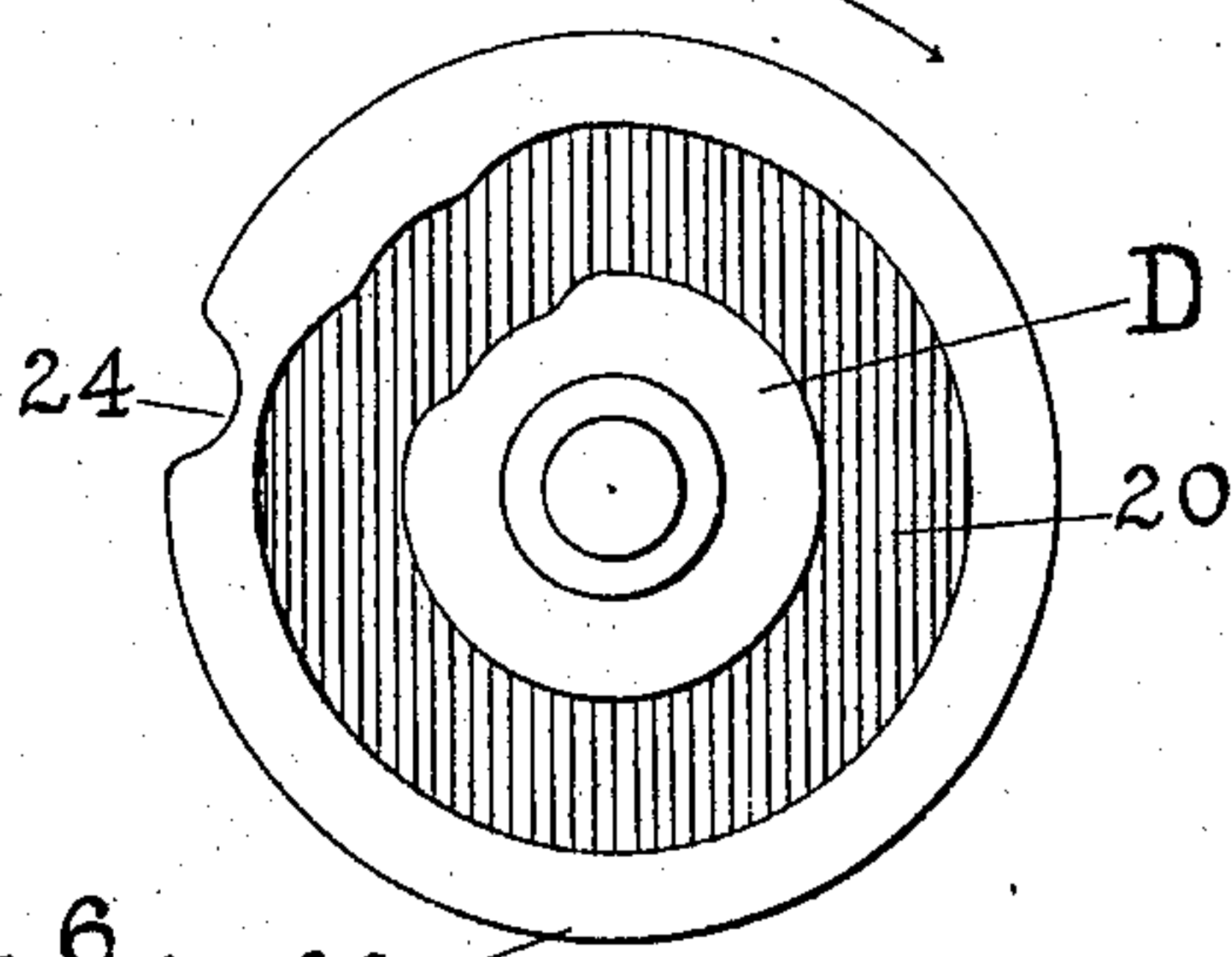
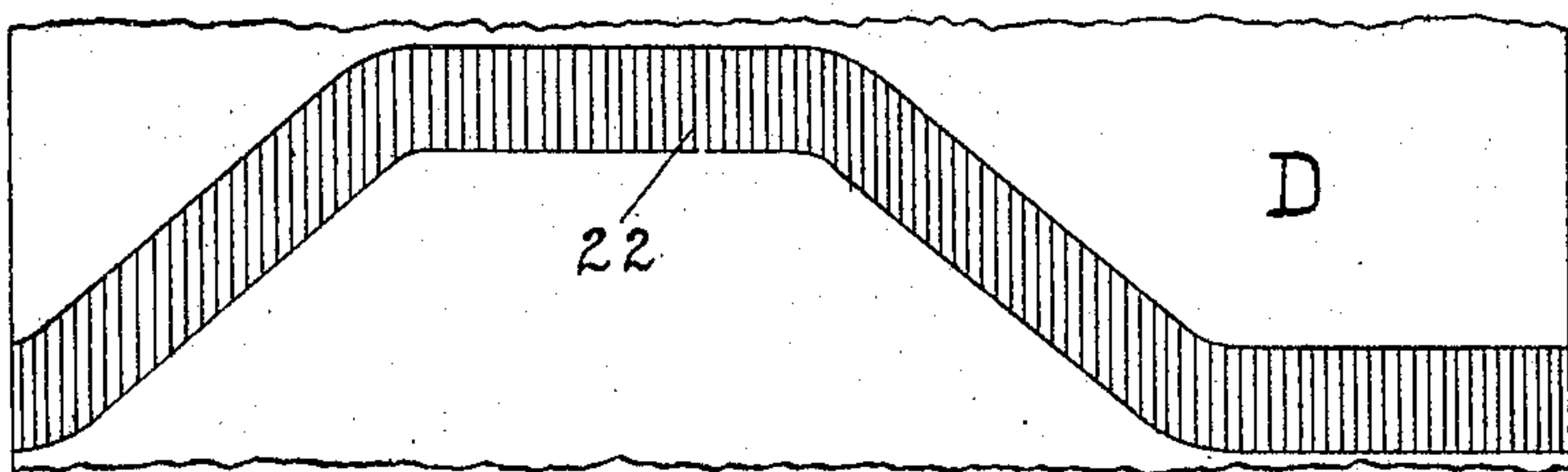


Fig. 6.



WITNESSES.

H. R. Kennedy.
A. R. Bond.

INVENTOR.

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5 SHEETS—SHEET 4.

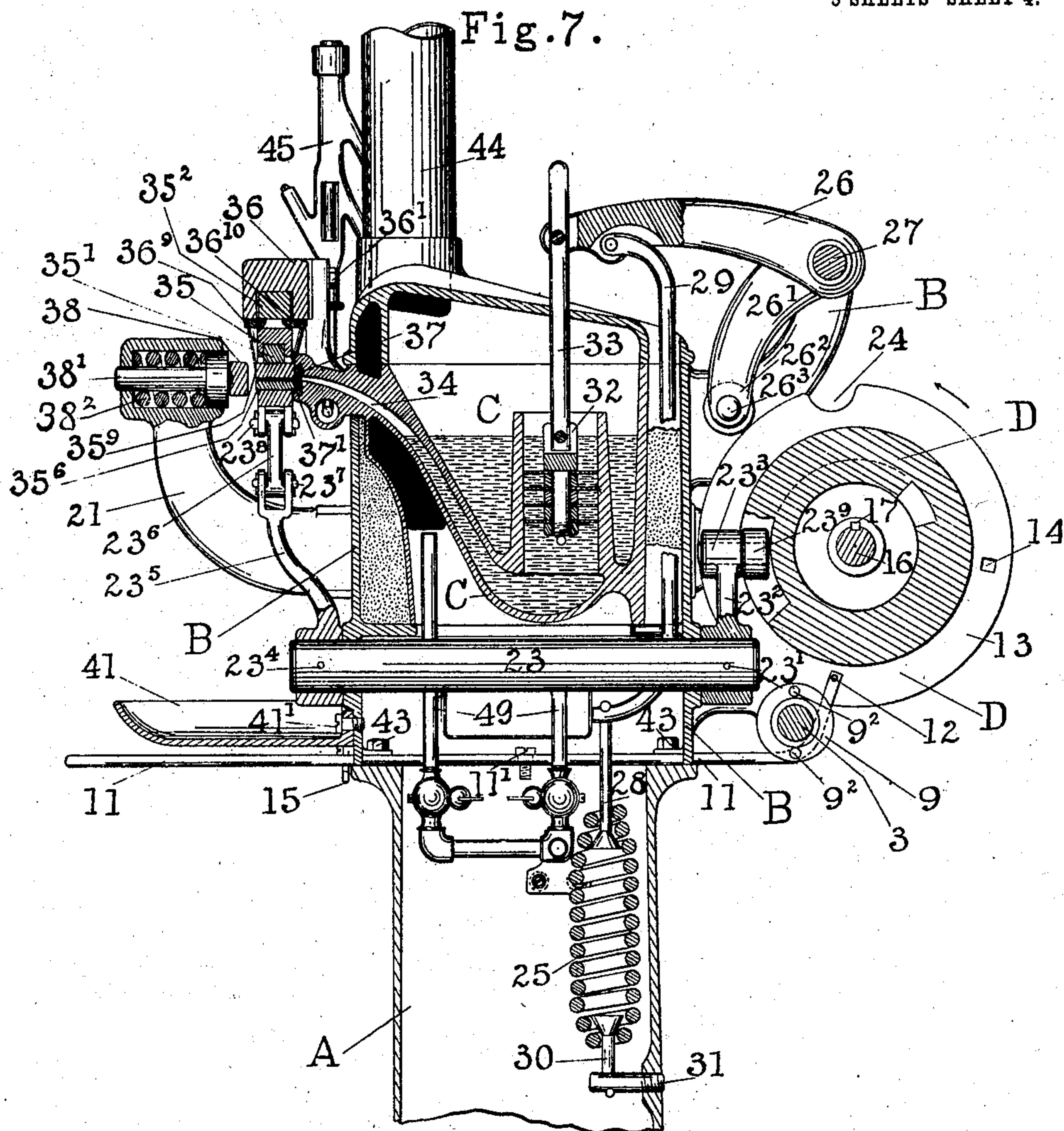


Fig. 8.

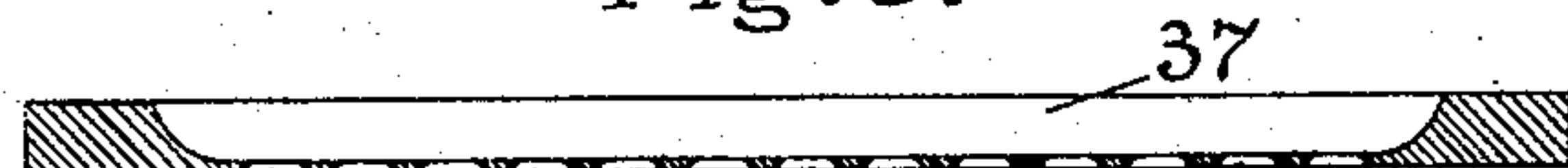


Fig. 9.

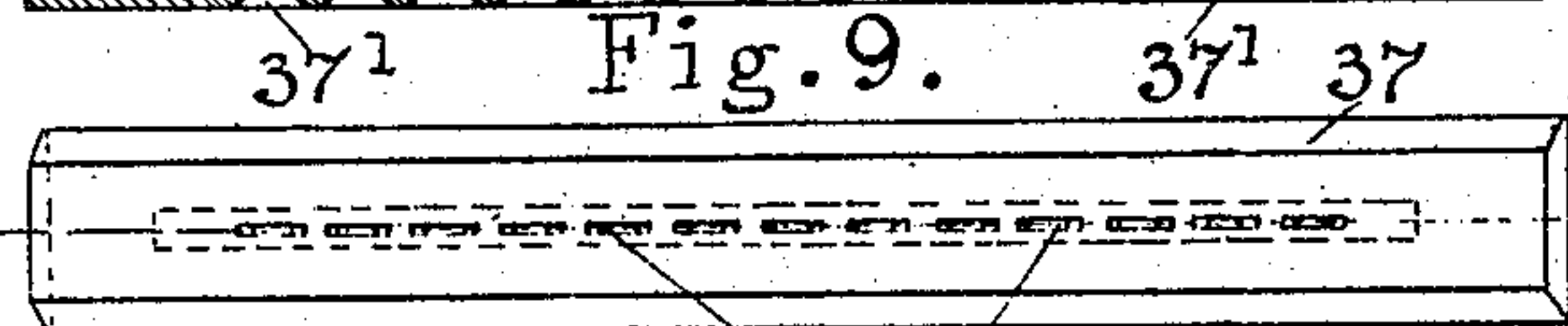
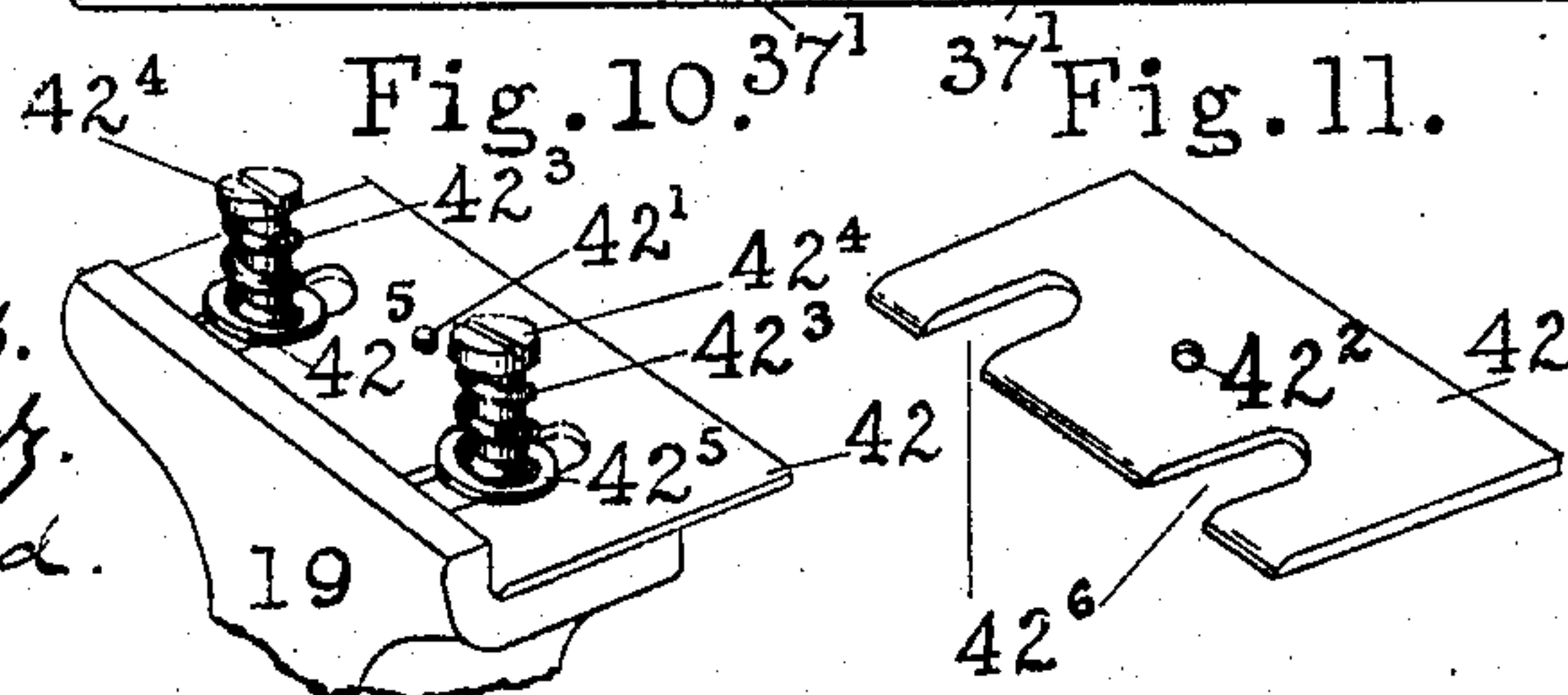


Fig. 10.

Fig. 11.



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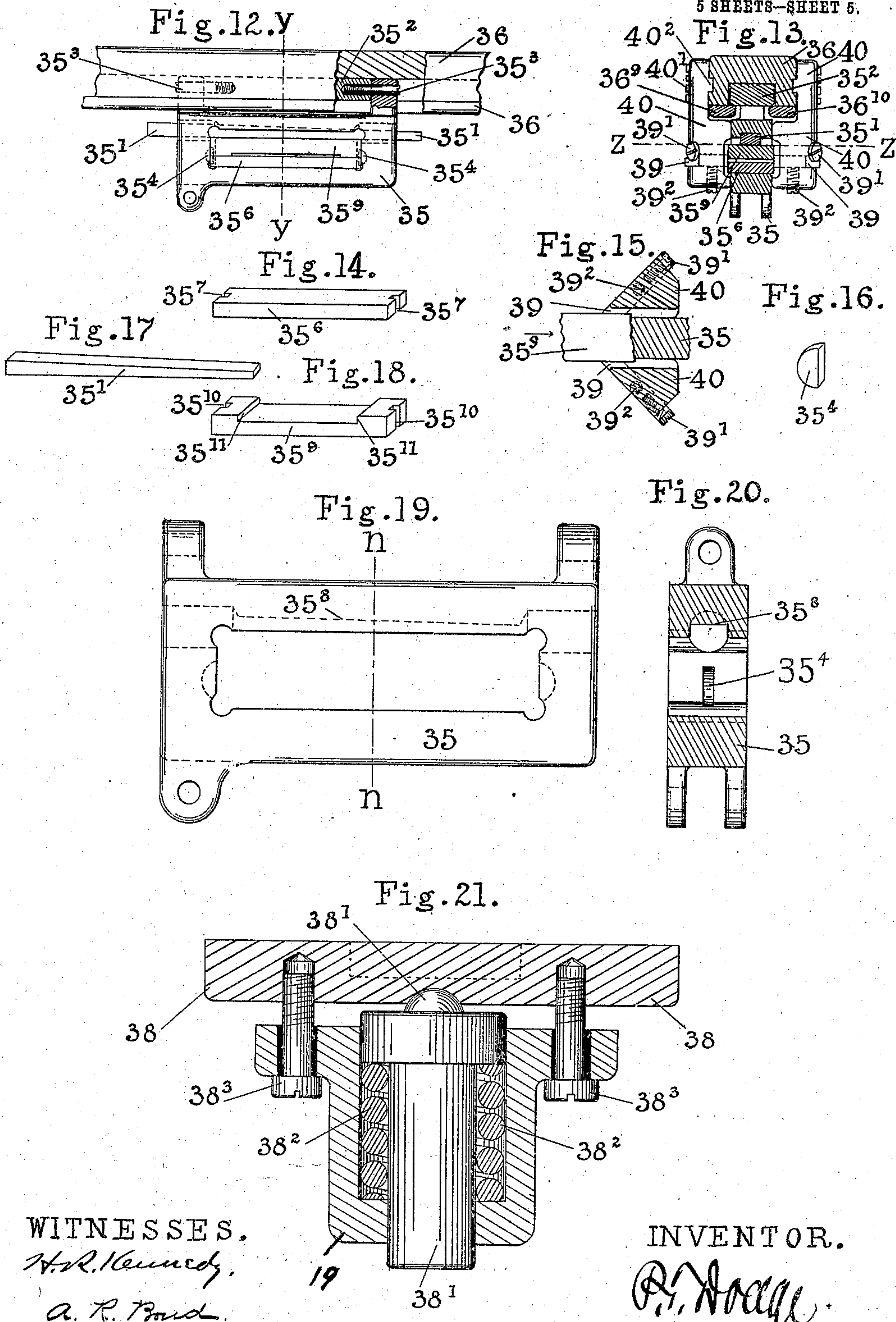
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INVENTOR.

P. T. Dodge

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5 SHEETS—SHEET 5.



WITNESSES.
H. R. Kennedy.
A. R. Bond.

INVENTOR.
P. T. Dodge.

UNITED STATES PATENT OFFICE.

PHILIP T. DODGE, OF BROOKLYN, NEW YORK, ASSIGNOR TO THE MERGENTHALER LINOTYPE COMPANY, A CORPORATION OF NEW YORK.

SLUG-CASTING MACHINE.

No. 806,529.

Specification of Letters Patent.

Patented Dec. 5, 1905.

Application filed March 3, 1904. Serial No. 196,258.

To all whom it may concern:

Be it known that I, PHILIP T. DODGE, of Brooklyn, county of Kings, and State of New York, have invented a new and useful Improvement in Slug-Casting Machines, of which the following is a specification.

The object of my invention is to provide a simple automatic machine for casting printers' leads, blank slugs, quads, borders, &c., to be used in type or linotype forms.

Referring to the drawings, Figure 1 is a front elevation of my machine. Fig. 1^a is a top or plan view of the galley or slug-receiver. Fig. 2 is a side elevation of the same looking from the right side with the galley or receiver broken away. Fig. 3 is a rear view, partly in section, of a portion of the machine, showing more particularly the driving devices. Figs. 4, 5, and 6 show, respectively, the development or layout of the principal cams. Fig. 7 is a vertical section through the operative part of the machine from front to rear on the line 7 7, Fig. 1, with the mold-carriage at the casting-point. Figs. 8 and 9, respectively, are a horizontal section and a face view of the mouthpiece of the metal-pot. Fig. 10 is a perspective view of the ejector-blade and its support. Fig. 11 is a view of the blade detached. Fig. 12 is a front view of the mold and its support. Fig. 13 is a vertical cross-section on the line *yy* of the preceding figure. Fig. 14 is a perspective view of the lower member of the mold. Fig. 15 is a plan view, partly in section, illustrating the action of the trimming-knives. Figs. 16, 17, and 18 are perspective views of parts of the mold, the last-named figure illustrating the top member of the mold in an inverted position. Fig. 19 is a face view of the carrier-slide in which the mold proper is mounted. Fig. 20 is a cross-section on the line *nn* of the preceding figure. Fig. 21 is a horizontal section of the front plate or jaw for closing the face of the mold.

Referring to the drawings, A represents a column on which the hollow box-like frame B is secured. These parts may be of any form and construction desired, provided only they are adapted to give proper support to the working parts hereinafter described.

C represents the melting-pot, secured rigidly in position on the frame B and provided with a delivery throat or mouth 34, through which the molten metal is ejected by means of a vertical

plunger 32, working in a well formed in the pot, the operation being similar to that of the pots used in ordinary linotype-machines. The mouth of the pot is widened horizontally and provided with a mouthpiece 37. (Shown in detail in Figs. 8 and 9.) This mouthpiece is slotted in the back and provided in the front with a series of narrow slits or openings, through which the metal escapes into the mold. The pump-plunger is urged downward to effect the delivery of the metal by a rod 29, connected, through a rod 28, with the upper end of a spiral spring 25, the lower end of which is connected, through a rod 30, to a stud 31 in the column. The elevation of the plunger is effected by means of a lever 26, jointed thereto and turning on a horizontal pivot 27, mounted on the main frame. This lever 26 has a second arm 26', carrying at its end a roller 26³, riding on the periphery of a notched flange or cam 13 on one end of the large drum D, carried by a horizontal shaft 16, mounted in the main frame. The form of the notched cam is shown in Figs. 5 and 7, its notch 24 admitting the roller on the lever and permitting the pump-plunger to fall once during each revolution of the cam and for an instant only.

The mold in which the blank slug or other object is to be cast is constructed with an internal cavity of the form of the required article and is mounted so as to be presented first in front of the mouth of the pot and thereafter in front of an ejector, by which the contained slug or casting will be ejected into a galley or receiver. In the form shown the mold consists, as shown in Figs. 12, 13, 14, 18, &c., of an outside frame or carrier 35, having an opening through it from front to back of suitable size to receive the two mold members 35⁶ and 35⁹. The lower member presents a flat upper surface, as shown in Figs. 12 and 14; but the upper member, resting upon the lower, is recessed in the under side, as shown in Figs. 12 and 18, so as to leave between the two parts when they are brought together a slot or cavity of the exact size and form of the required slug or other object, this slot being normally open at the front and rear. The two parts of the mold are provided in their ends with vertical notches 35⁷ and 35¹⁰, which are guided on vertical keys 35⁴, seated in the ends of the carrying-frame. This arrangement keeps the two parts of the

mold in exact alinement, but permits them to be separated vertically to permit the easy ejection of the slug and also permits them to be readily removed from the frame when a mold with a cavity of different form is to be employed.

Through the carrier-frame 35 above the mold is extended a horizontal wedge 35'. When moved to the right, this wedge locks the two parts of the mold firmly together and holds them rigidly in position within the frame. When moved in the reverse direction, it relieves the pressure on the upper part or cap of the mold and on the contained slug, so that the latter may be easily expelled, as hereinafter explained. The movement of the wedge 35' is automatically effected by the stops 36² and 36⁴, which contact with opposite ends of the wedge as the mold completes its movements to and fro. The stop 36² consists simply of an adjustable screw seated in one end of the frame and secured by a lock-nut 36³, so that it may arrest the wedge at any point, while the mold continues its advance. The stop 36⁴ consists of a plunger seated in the frame, urged forward by a spiral spring 36⁵, its advance being limited by nut 36⁶ on the outer end. This stop acts with yielding pressure on the wedge as the mold advances to the casting position, the wedge being thus crowded snugly home, so that the mold is closed with certainty.

The mold-carrying frame 35 is provided with top ears and is suspended by screws 35³, passing horizontally through these ears into the ends of a plate 35², mounted to slide horizontally in a grooved guide 36, affixed to the front of the main frame B in such position that when the slide is moved to the left the mold will be suspended directly in front of the pot-mouth and when moved to the right the mold will be presented in front of the horizontal ejector-blade 42², attached to a carrying-arm 19, as shown in Figs. 1, 10, and 11.

The mold-carrying frame 35 is connected by an operating-link 23⁶ to an arm 23⁵, fastened to the front end of a horizontal rock-shaft 23, which is seated in bearings in the frame B and extended through the same to the rear, where it is provided with an arm 23², carrying a roller 23⁹, which travels in a cam-groove 22, formed in the surface of the before-mentioned drum D, as shown in Fig. 7, the groove being of the form shown in Figs. 3 and 6, so that the mold is held at rest in each of its positions to permit the casting and ejecting operations, respectively.

During the casting action it is necessary that the mold shall be held firmly and tightly against the pot-mouth and also that it shall be closed at the front. For this purpose I mount on the left side of the frame B a horizontal slide 21, having an upturned forward

end in which there is mounted a spiral spring 38², giving support to a horizontal pressure-bolt 38', the forward end of which is rounded to support the rocking jaw or anvil 38, adapted to fit against and close the face of the mold. This jaw or anvil 38 is adapted to rock to a limited extent on the spherical end of the pressure-bolt, being retained in position, however, by bolts 38³ passing through slots in the slide 21, as shown in Fig. 21.

The jaw or anvil, actuated as described, serves both as a means of closing the face of the mold and as a pressure device for forcing the mold back tightly against the mouth of the pot.

The rear end of the slide 21 is provided with a roller, seated in the cam-groove 20 in the end of the drum D. (See Fig. 5.) The groove is of such form that the slide is caused to move rearward until the jaw or anvil 38 bears tightly against the face of the mold and causes the mold in turn to bear tightly against the mouth of the pot.

The slide 35², from which the mold is suspended, is permitted a slight forward-and-backward movement by the enlargement of the slot in which it travels. This construction, coupled with the suspension of the mold-frame on pivots, permits the mold to adjust itself readily to the position of the pot-mouth, so that if the latter should be slightly out of position there will be no danger of leakage at the joint.

In the drawings I have shown the anvil or jaw 38 as having a flat face to fit the front of the mold; but it will be understood that the face of the jaw may be modified at will to suit the shape and size of the particular mold which may be for the time being in use. It is also to be understood that this jaw may be recessed in the face, as indicated in dotted lines in Fig. 21, to admit the matrix-slides or a composed line of matrices for forming border characters, dashes, letters, or other designs on the face of the slug cast in the mold. When the matrices are thus used in the jaw or pressure device, they form, in effect, a part of the same and close or assist in closing the front of the mold. For this reason the expression "pressure device" as hereinafter employed refers to the part 38 either with or without the inserted matrices.

It will be observed that the ejector for delivering the slug advances from the front and drives the slug out of the back of the mold; whence it falls into a receiving-galley 46. (Clearly shown in Fig. 1.) This galley has an inclined bottom, an inclined guiding-surface 46' at a higher level, and an upright or substantially upright end wall, so that the ejected slugs falling therein over the guiding-surface 46' are stacked in an orderly manner.

It will be observed that the metal is deliv-

ered into the mold from the rear side and the slug ejected from the same side. This I believe to be a new feature in slug-casting machines. Owing to the fact that the mold is opened and the pressure of the slug relieved prior to ejection, the ejector may act against the forward or printing edge of the slug without danger of mutilating the characters thereon.

10 The ejector-blade is attached to the forward upturned end of a horizontal slide 19, mounted on the right side of the main frame and carrying at the rear end a roller 19³, seated in a groove 18 in the end of the drum D, 15 the form of the groove being such that the ejector is moved momentarily rearward while the mold is at rest before it and then returned and held in its original and normal position.

In order to permit the ready application of 20 blades differing in size and form to correspond with the various molds, I provide the blade in the rear edge with two slots, so that it may be slipped onto a supporting-surface on the end of the slide beneath the washers 25 42⁵, which are pressed downward by springs 42³, encircling the screws 42⁴, which are seated rigidly in the end of the slide. The rear edge of the ejector abuts against the lip or shoulder, by which it is held from yielding 30 under the pressure to which it is subjected in delivering the slug. It is prevented from drawing forward accidentally by means of a stud 42⁷, fixed on the slide and projecting upward through an opening 42² in the blade. 35 The blade is removed by lifting its rear edge until it is disengaged from the stud and then drawing it out from under the washers.

In some cases it is desirable to have the slugs shaved or finished on the edges in order 40 to insure uniformity in the width or height. For this purpose I propose to employ, as shown in Figs. 13 and 15, two trimming-knives 39, mounted in a fixed support 40, with their inner and operative ends arranged to 45 ride against opposite faces of the mold as it is moved endwise. The knives are preferably seated to slide endwise in the support 40 and supported by adjusting-screws 39¹, acting against their rear ends. In this way the 50 knives may be advanced to bear closely against the faces of the mold, which serve as guides to regulate the depth of cut, so that the edges of the slugs are trimmed flush with the faces of the mold.

55 It will be observed that the pump, the mold-carrying slide, and the pressure device or anvil all receive motion from the cams integral with the drum D. The drum receives motion through a spur-gear 6, formed on its end and 60 engaging the pinion 5¹ on one end of a sleeve 5, which loosely surrounds a horizontal constantly-rotated shaft 3, seated in bearings in

the frame B, this shaft being provided at one end with a driving-pulley 1 or with any other suitable driving means. The shaft 3 carries 65 also a second sleeve 9, connected thereto by a spline 9³, so that it may move endwise. The two sleeves are held normally apart by an intermediate spring 8 and are provided in their inner ends with studs 7 and 9², so that when 70 the sleeve 9 is urged endwise toward the sleeve 5 the pins or studs of the two will interlock and form a clutch or connection through which motion will be imparted to the pinion 5¹, and thence to the drum and its cams. 75

Under ordinary conditions it is desirable that the machine shall complete its cycle of operations by one rotation of the drum and then come automatically to a rest. It is for this reason that the spring is interposed be- 80 tween the sleeves.

In order to throw the driving parts into engagement, a lever 11 is extended from the front of the frame rearward past a supporting-pivot 11¹, bearing against the extremity of the slid- 85 ing sleeve 9 to move it endwise. The end of this lever is provided with a stud 12, seated normally in a hole 14 in the inner face of a cam 13, as shown in Fig. 3. When the lever is actuated to couple the driving members, the 90 stud is withdrawn from the cavity and rides on the side face of the cam, so as to hold the clutch-pins in engagement until the drum has completed one revolution and the machine has cast and ejected a slug, when the stud again 95 falls into the cavity and the parts are automatically unclutched. A hook or latch 15, pivoted to the main frame, serves as a means of locking the clutch-lever L, so that the machine may continue its operation indefinitely 100 instead of tripping out of action, as above described.

The machine will be provided with gas-burners 49 to effect the heating of the pot, with a mercurial regulator 45 of ordinary form for 105 regulating the flow of gas and controlling the temperature within the pot, and with a chimney 44 to carry away the products of combustion. These parts form no part of my invention. 110

I commonly provide in the front of the frame a tray 41, in which to carry extra matrices and other articles commonly used in connection with the machine. This forms no part of my invention. 115

Having described my invention, what I claim is—

1. In a machine for casting slugs, a fixed melting-pot and means for delivering molten metal therefrom, in combination with a coöperating mold, means for reciprocating the mold laterally, and means for closing the face of the mold and forcing the same against the pot when in operative relation thereto. 120

2. In a slug-casting machine, the combination of a fixed pot provided with means for delivering molten metal therefrom, a fixed transverse slide, a mold connected with said slide to move longitudinally and also to move to and from the pot, means for reciprocating the mold laterally, means for closing the face of the mold, and means for forcing the mold against the pot when in operative position.
3. In a slug-casting machine, a fixed pot and means for delivering molten metal therefrom, in combination with a slotted mold mounted to reciprocate laterally from the casting to the ejecting position and also to move toward and from the face of the pot, a pressure device acting to force the mold against the pot when in the casting position and also to close its open side, and an ejector to deliver the slug from the mold.
4. In a slug-casting machine, a fixed pot and means for delivering molten metal therefrom, a pressure mechanism opposing the pot, a slotted mold mounted to reciprocate from a position between the pot and the pressure device to an ejecting position and also to move face-wise to and from the pot, an ejector to expel the slug from the receiving side of the mold, and mechanism for imparting to said parts the movements stated.
5. In a slug-casting machine, a fixed pot with means for delivering molten metal therefrom, a slotted mold mounted to reciprocate across the mouth of the pot, a pressure device acting to carry the mold against the pot and to effect the closing of the mold, an ejector to expel the slug, a shaft mounted in the rear of the pot, cams carried by said shaft, and connections thence to the mold, the pressure device and the ejector respectively.
6. In a slug-casting machine, the pot with means for delivering metal therefrom, in combination with the slotted mold mounted to slide horizontally across the face of the pot and also to move to and from the pot, a pressure device adapted to close the mold, a horizontal slide carrying the pressure device, and a cam mechanism in rear of the pot to operate the slide.
7. In a slug-casting machine, a melting-pot provided with means for delivering metal therefrom, in combination with the reciprocating guided mold, the pressure device and its actuating-slide, the ejector and its actuating-slide, and the shaft provided with cams and connections for operating the mold, the pressure device and the ejector, respectively.
8. In a slug-casting machine and in combination with the mold, a pressure mechanism comprising a slide 19, and means for positively operating the same, a spring-supported bolt 38' carried by the slide, and an anvil 38, carried by the bolt.
9. In a slug-casting machine, the combination of the pot, the fixed horizontal guide 36, a slide or traveler mounted therein, means for reciprocating the traveler in the guide, a mold loosely mounted in the traveler to move to and from the pot, and means for forcing the mold toward the pot while in operative relation thereto.
10. In a slug-casting machine, the combination with the fixed pot and an opposing pressure device, of an intermediate reciprocating mold, an actuating-cam, 22, and an intermediate rock-shaft having two arms, one connected with the cam and the other with the mold.
11. In combination, a pot, a slotted mold open at both front and rear, means for presenting the rear side of the mold to the pot to receive metal therefrom and thereafter removing the mold with the contained slug, and an ejector located and arranged to enter the mold from the front, after the mold has been moved from the pot.
12. In a slug-casting machine, in combination with a fixed pot and an opposing pressure device, an ejector, a mold, and means for moving the mold to and fro from a position between the pot and pressure device, to a position in rear of the ejector.
13. In a slug-casting machine, the reciprocating mold-frame, the mold members therein, the longitudinal wedge to confine said members, and means for automatically moving the wedge to and fro whereby the mold members may be confined and released without changing their relations edgewise.
14. The mold-frame movable to and from the casting position, in combination with mold members therein, the confining wedge, and adjustable means for automatically moving the wedge.
15. In a slug-casting machine, a separable traveling mold, means for rigidly confining the mold members, and a yielding device to actuate the confining means.
16. In a slug-casting machine, the reciprocating mold-frame with the mold members and the mold-confining wedge therein, in combination with fixed devices located in the path of the mold to move the wedge to and fro.
17. In a slug-casting machine, a slotted mold open on both sides, in combination with two opposing trimming-knives arranged to act on opposite sides of the mold, whereby the two edges of the contained slug are trimmed and the slug reduced to a uniform height.
18. In a slug-casting machine, the combination of the ejector-blade, slotted and perforated, the carrying-arm having the shoulder and stud, and a spring-pressure device to hold the blade in place.
19. In a slug-casting machine, the combination of a fixed pot, a longitudinally-reciprocating mold movable to and from the face of

the pot, a movable mold-clamp, a pump, an ejector, driving devices therefor, and automatic stop devices to arrest the parts when the cycle of actions is completed.

- 5 20. The pot, the longitudinally-reciprocating mold, the pressure device acting to urge the mold against the pot, the ejector and the pump-plunger, in combination with the cams having a common axis and connections from

the cams to the mold, the pressure device, the 10 ejector, and the plunger, respectively.

In testimony whereof I hereunto set my hand, this 2d day of March, 1904, in the presence of two attesting witnesses.

PHILIP T. DODGE.

Witnesses:

K. L. BRENNAN,

A. J. STEIDEL.