No. 629,751. Patented July 25, 1899.

C. R. MURRAY.

MACHINE FOR CASTING TYPE.

(Application filed Feb. 24, 1898.)

(No Model.) 2 Sheets—Sheet 1.

Fig. 1.

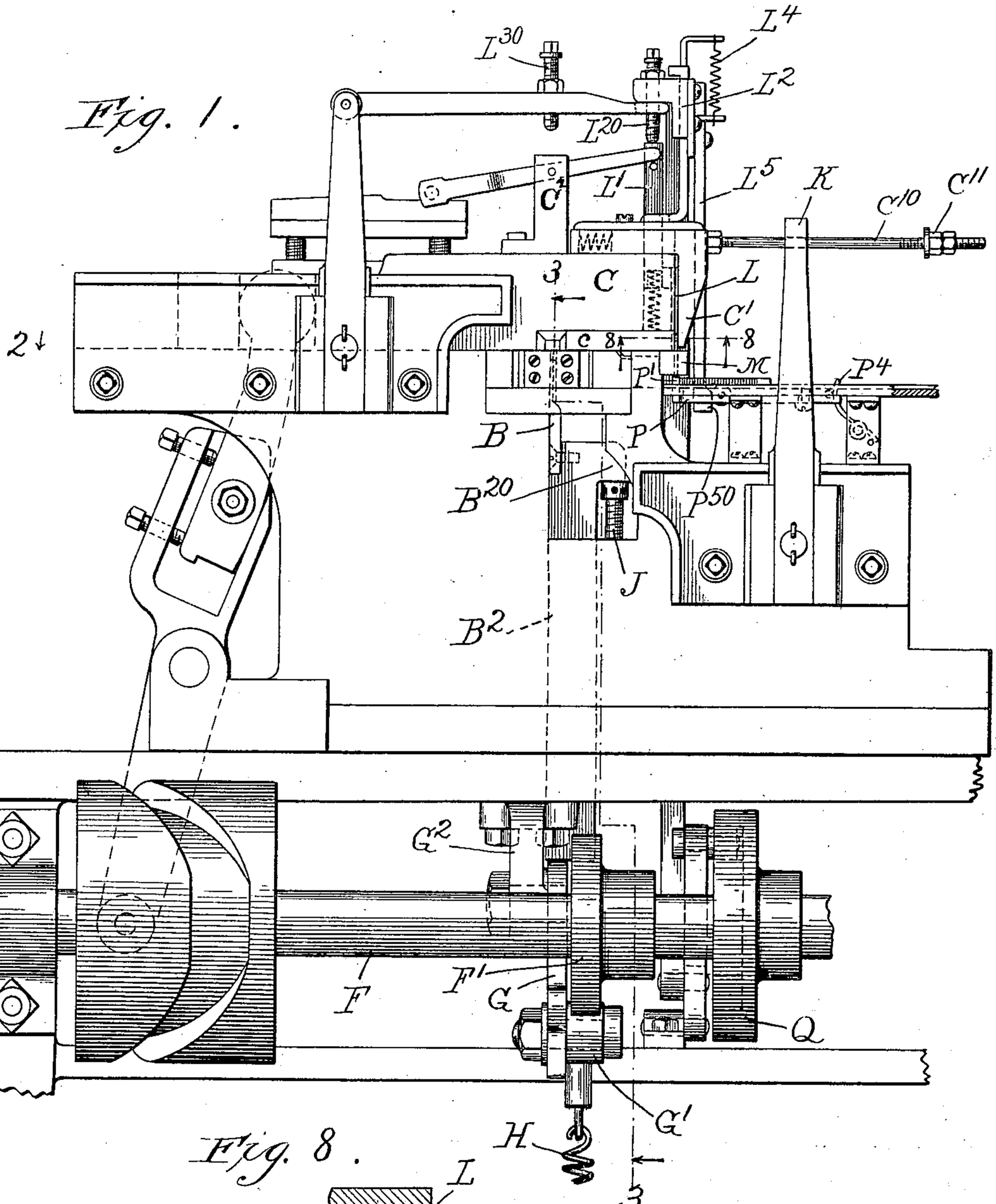
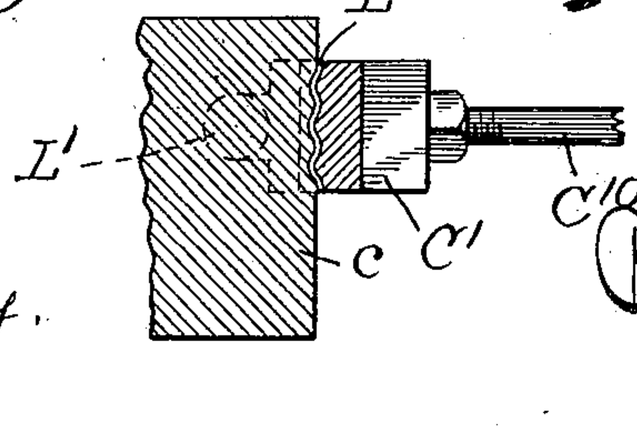


Fig. 8.



Witnesses:
Edward T. Wray.
Harry White.

Inventor:
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his Attys

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Fig. 2.

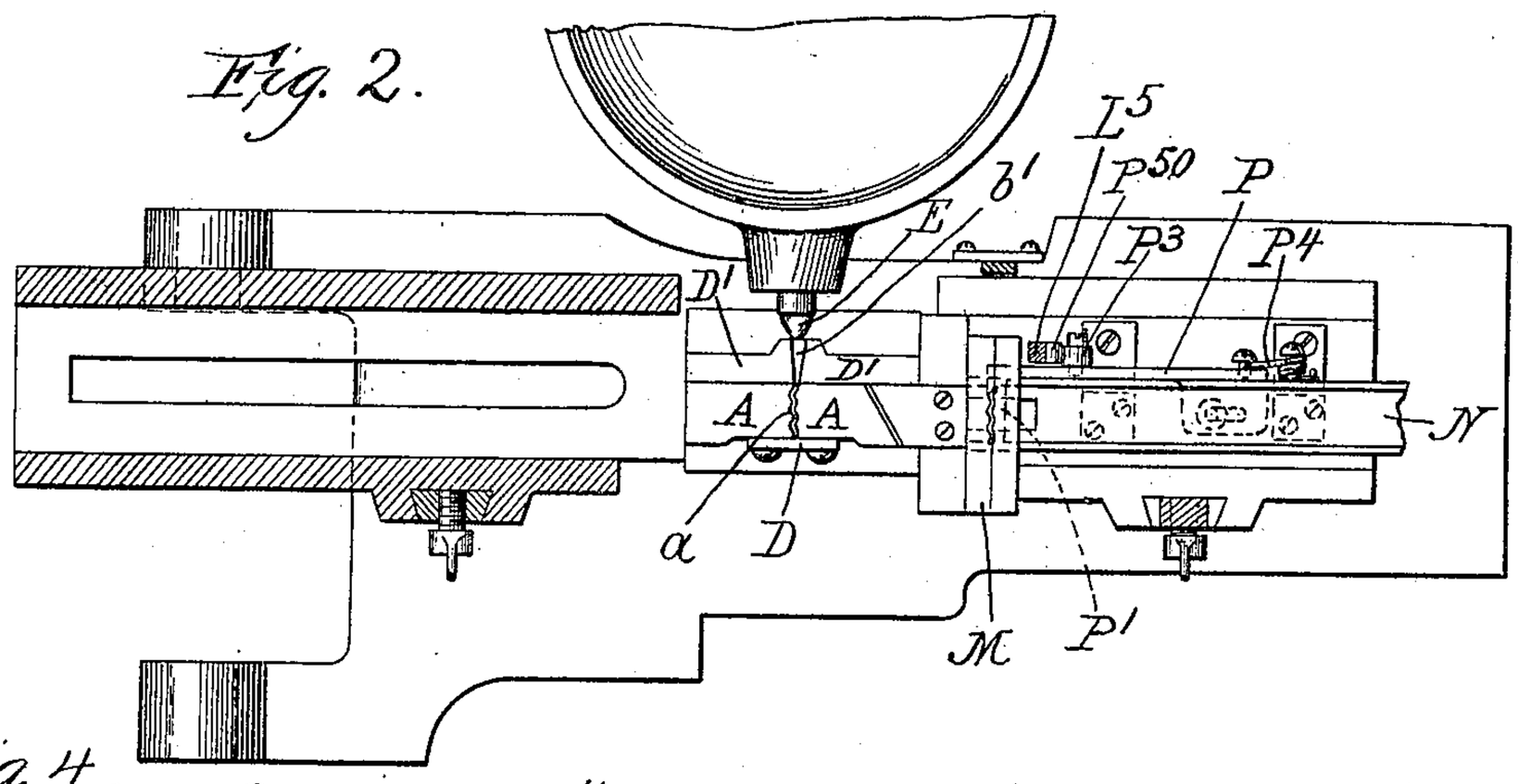


Fig. 4.

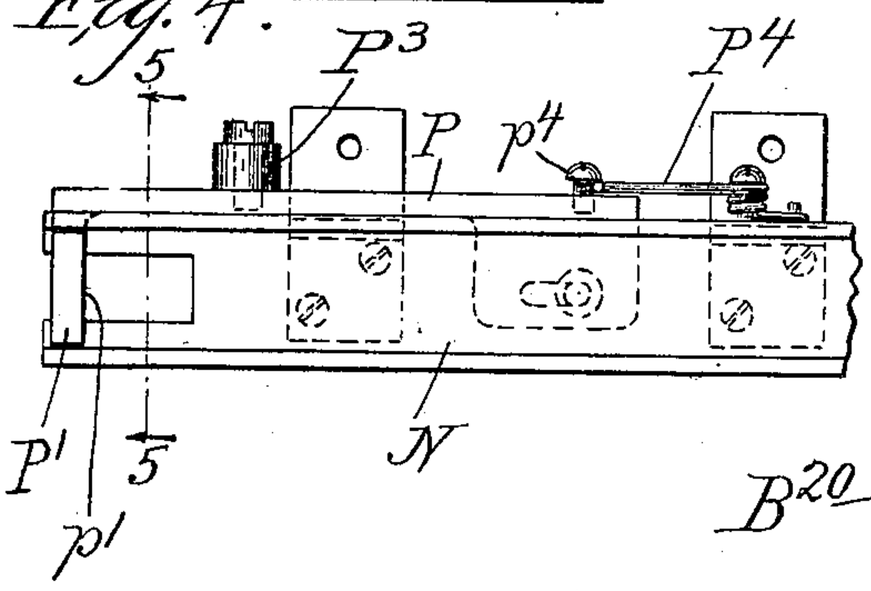
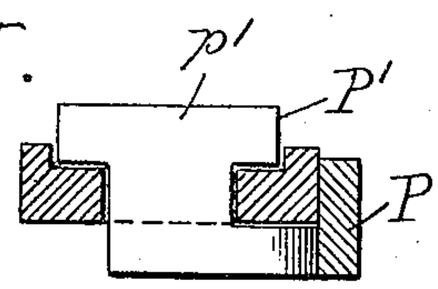


Fig. 5.



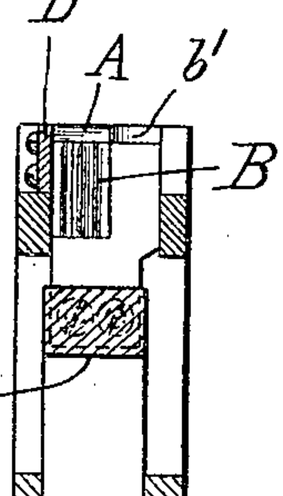


Fig. 6.

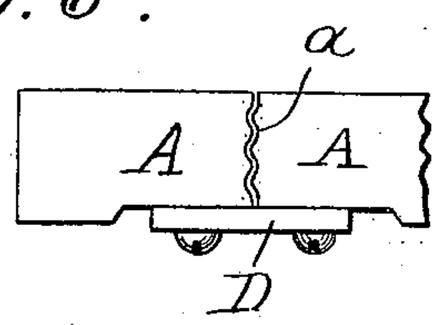


Fig. 3.

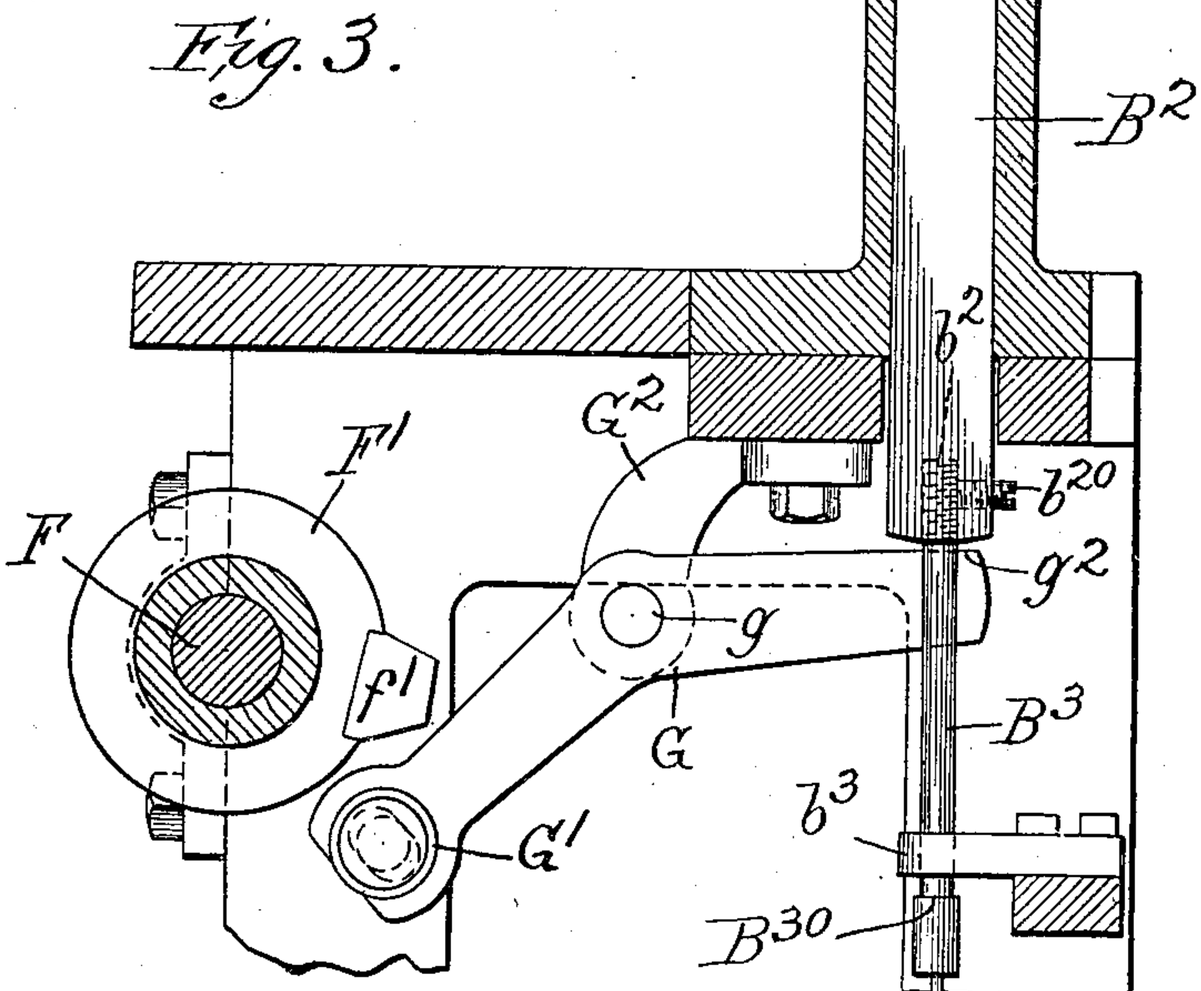
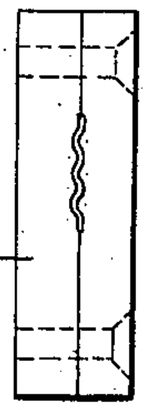


Fig. 7.



Witnesses:
Edward T. Wray.
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Inventor:
Charles R. Murray
by Burton & Burton
his attys

UNITED STATES PATENT OFFICE.

CHARLES R. MURRAY, OF CHICAGO, ILLINOIS, ASSIGNOR TO THE BARNHART BROTHERS & SPINDLER, OF SAME PLACE.

MACHINE FOR CASTING TYPE.

SPECIFICATION forming part of Letters Patent No. 629,751, dated July 25, 1899.

Application filed February 24, 1898. Serial No. 671,438. (No model.)

To all whom it may concern:

Be it known that I, CHARLES R. MURRAY, a citizen of the United States, residing at Chicago, county of Cook, and State of Illinois, have invented certain new and useful Improvements in Machines for Casting Type, of which the following is a specification, reference being had to the accompanying drawings, forming a part thereof.

This invention is an improvement upon mechanism for casting type of the class commonly called "perfecting-machines," and I have shown this machine of the general character which is shown in United States Patent No. 359,779 to L. and A. Foucher, dated March 22, 1887.

The drawings illustrate and the specification will describe the machine at large only in so far as necessary to indicate the specific features embodying the improvements which constitute my invention.

In the drawings, Figure 1 is a front elevation of the machine, showing, however, only so much of the mechanism as necessary for my present purpose. Fig. 2 is a sectional detail plan at the plane of the line 2 2 on Fig. 1, which is the plane of the upper surface or face of the mold. Fig. 3 is a detail section at the plane of the line 3 3 on Fig. 1, showing specific mechanism for operating and controlling the movement of the follower which discharges the cast from the mold. Fig. 4 is an enlarged detail plan of a portion of the parts which are shown in Fig. 2. Fig. 5 is a section at line 5 5 on Fig. 4. Fig. 6 is a detail plan of the mold-cheeks, showing the type-body space between them on a larger scale than that of Fig. 1. Fig. 7 is a detail plan of the parts forming the throat into which the serpentine type-body is received after finishing. Fig. 8 is a detail section at the line 8 8 on Fig. 1.

In general machines of this class comprise a mold whose cavity is formed between two cheek pieces or blocks A A, between which a follower B fits closely and forms by means of its end a third side of the mold-cavity, such follower being adapted to be reciprocated between the cheeks A to carry its said end from a point at a distance back of the mold-face at the plane of the line 2 2 equal to one transverse dimension of the type-body to said plane, so that having first served the purpose of bounding the type-cavity at one side while the type was being cast therein it next serves the purpose of ejecting the cast from that cavity by lifting it, so that it projects wholly above the plane 2 2. The fourth lateral side of the mold-cavity is formed in these machines by a plate, (shown at *c*), which is carried by and has its lower face flush with the lower surface of the sliding carriage C. It will be understood that the ends of the type-cavity are closed by the matrix, or in the case of spaces by the plain block D at the head and by the jet-pieces D′ D′ at the foot, the metal being ejected from the nipple E of the melting-pot through the jet-cavity *b′* into the body-cavity *a*. (See Fig. 2.)

The general operation of these machines is that by suitable mechanism (partly shown in the drawings, but which it is not necessary to describe in this connection) the carriage C is reciprocated from a position at which the plate *c* closes the top of a mold-cavity to a position at which a gripper formed by means of the jaw C′ at the end of the carriage is open over the mold-cavity and adapted to receive the cast, which at that stage is discharged upward from the mold by a suitable upward thrust movement given to the follower B, whereupon the carriage advances again to the right, carrying the cast in the gripper to a position shown in Fig. 1, at which it may be delivered from the gripper-jaw downward through a throat into a receptacle wherein the casts are accumulated in order. The halt of the carriage at the position at which the cast is formed affords opportunity for the cast already carried by the gripper to be delivered therefrom, one cast being thus formed while the preceding one is being delivered. Suitable devices are provided in machines of this class by which the type is dressed and the jet broken off by the movement of the carriage which carries the cast from the mold into the throat, from which it is delivered to the receptacle; but with these specific devices the present invention is not concerned.

One feature of improvement which forms a part of my present invention is an expedient

for preventing an overthrust of the follower B, which in a rapid action of the machine as these machines have commonly been constructed before my invention is liable by reason of the spring of the metal and the momentum of the parts in rapid motion to be protruded slightly above the plane 2 2, which causes it to be encountered by the corner c' of the lower plate of the carriage C, resulting in injury to the protruding corner of the follower, which destroys the efficiency of the machine, requiring frequent dressing of the follower B in order to produce perfect type. This difficulty I overcome by devices which will now be described.

F is the main driving-shaft of the machine, from which the various parts derive movement through cams and lever-operating devices thereon, and the cam F′ is provided on said shaft for the purpose of operating the plunger B, the abutment f' on the cam being arranged to act upon an abutment consisting of a stud or roll G′, which is adjustably mounted at one end of the lever G, fulcrumed at g on bracket G^2, the other end of said lever G being arranged to operate at g^2 against the lower end of the plunger-rod B^2, which carries the follower B rigidly at its upper end. The plunger-rod B^2 has a stem B^3, to whose lower end a retracting-spring H is attached, tending to hold the plunger-rod at the lowest limit permitted by a micrometer stop-screw J, set in the frame and adjustable to vary the position of its stop-head, which limits the downward movement of the plunger-rod by the lodgment of the abutment or shoulder B^{20} upon it, as seen in Fig. 1. The lower limit of movement of the follower is thus definitely determined by the adjustment of the micrometer stop-screw, and the spring H brings it to this limit. The upward thrust of the rod, however, caused by the riding of the roll G′ over the abutment f' of the cam is liable to vary with the speed of the machine, especially if the construction is such as to involve a long lever having the function of the lever G, because the stress put upon the lever by the resistance to the upward movement of the plunger will slightly spring the lever, and if the machine is adjusted so as to bring the follower to the right position at starting when the parts are cold it will be found after the machine has become warm and the action is somewhat easier that the spring of the lever being less the follower is thrust too high. Also in rapid action the momentum of the parts tends to the same result. This difficulty I overcome by making the lever mechanism by which the thrust movement is given to the follower short and compact, as shown in the drawings, and especially by providing the rod B^3 with a shoulder at B^{30} under the guide-bearing b^3, which makes a positive stop for the upward movement, and attaching the rod B^3 to the plunger-rod B^2 by screwing the former into the end of the latter, as seen at b^2, so that the distance of the shoulder B^{30} from the upper end of the follower B can be made exactly as desired. I provide also a set-screw b^{20}, which is to hold the rod B^3 securely after adjustment at the thread b^2.

The principal feature of my present invention, however, relates to adaptation of machines of this class to the casting of type-bodies which are longitudinally serpentine or otherwise non-rectilinear in the plane of one of the transverse dimensions of the body. Such forms are useful chiefly for the purpose of spaces; but I do not limit my invention to the casting of spaces of this form, because the same form of body for certain special purposes might be given to type having printing-faces. I have, however, shown the mold-cavity closed at the head by a block D, as for casting spaces, and it will be understood that a matrix with the usual mechanism for operating it would be substituted for such block if the invention were to be applied to printing-type having serpentine bodies.

In the ordinary use of machines of this class the type as they are delivered from the gripper are passed through a throat which makes a turn of ninety degrees, so that the type are assembled in line in a channel in which said throat merges with their surfaces in contact, which form the upper and lower sides as cast in the mold. In order that the type assembled in this manner in the channel shall be in the proper position—that is, with the bodywise dimension up and down or transverse with respect to the line of the channel—it is evident that the horizontal dimension or distance between the cheeks A A must be made the bodywise dimension of the mold, and the vertical dimension or depth of retreat of the follower B must be the runningwise dimension.

In order to adapt this machine to the casting of serpentine bodies in which the serpentine inflections are in the runningwise direction, this arrangement of dimensions must be reversed, and the bodywise dimension of the cast is made in the direction of thrust of the follower B, while the runningwise dimension is the width or thickness of the follower—that is, the distance between the cheeks A A. The opposed faces of these cheeks are therefore made conformed to the serpentine form of the cast to be produced, so that the space between them is longitudinally serpentine in horizontal plane, and the follower B is made serpentine in cross-section, so that it fits accurately between the serpentine-faced cheeks A A. Similarly the plate c, which forms the lower face of the carrier C, has the outer end conformed to the serpentine outline of the cast, and the jaw C′ has its face opposed to said end of the face-block similarly serpentine. The usual expedient for opening the jaw is employed, consisting of the stem C^{10}, attached to the jaw and provided with a stop-nut C^{11}, which checks the movement of the jaw when the stop-nut reaches the post K in the retreat of the carrier and causes the jaw to open for

the last increment of such retreating movement, a spring (not shown) being provided to resist such opening movement and closing the jaw as soon as the carrier starts forward toward the post K. The cast having the serpentine form described is thus thrust upward by the follower between jaws which grasp it at its opposite serpentine surfaces and carry it to the point of delivery.

M is the die or throat-block into which the cast is delivered. The die opening or throat has the serpentine form of the cast, which is brought directly over the opening by the carrier at the outer limit of its movement. While halted in this position and the next cast is being made in the mold, a follower or plunger L, which in transverse section has preferably the serpentine form of the cast and in any event is adapted to enter the serpentine throat or die-opening, being located between the jaws of the gripper—that is, between the jaw C′ and the end of the carriage—is thrust down through the upper jaw and drives the cast out of the gripper into the throat, in which it forces it down to the bottom. Said throat at the bottom ends in a horizontal channel N, into which projects a lip or finger P′ of a reciprocating feed-bar P. Suitable mechanism provided to reciprocate the feed-bar P is timed so that said feed-bar shall be at the inward limit of its movement, with the face p' of the finger P′ flush with or inward from the inner side of the throat or die-opening, at the time that the plunger or driver L is forced downward into said throat, and it will be seen that the cast will thus be lodged in front of the finger by such downward thrust of the driver. While the driver is retreating upward and at any convenient stage in the movement before it makes the next downward thrust, the feed-bar P is withdrawn outward and the finger P′ advances the cast lodged in front of it out from under the throat and leaves it in the channel N against the row of type which have preceded it. Each successive cast is thus brought out horizontally from the bottom of the throat with its serpentine faces vertical, or, speaking more generally, is brought out from the throat in the direction of the parallel and not of the serpentine faces of the cast, whereby the successive casts are lodged with their serpentine faces abutting or nested in the channel. The plunger L is designed to be operated in the usual manner of similar plungers in machines of this class, and I have not shown in detail the particular method of actuating it; but it will be understood that the reciprocating head L^2, carrying the adjusting-screw L^{20}, which strikes upon the upper end of the head L′ of the plunger and directly actuates the latter, is itself actuated by suitable connecting devices, which derive their motion by a cam Q on the shaft F. The depth of thrust or drive of the plunger will be regulated by setting the screw L^{20} properly with respect to the screw L^{30}, which latter screw operates upon the head of the stem C^2 of the carriage C to hold the top plate *c* of the mold tightly in place while the cast is being formed, at which instant the plunger must be at the bottom of its stroke. The spring L^4 retracts the plunger when the head L^2 rises, and any range of movement can be given to the plunger by proper adjustment of the parts, as well understood. To give to the feed-bar P the desired reciprocating movement which I have described, I extend the arm L^5 from the plunger-head L^2 down past the race or channel N, and from the side of the reciprocating feed-bar P, I project an abutment, as a stud or roll P^3, which is held bearing against the outer edge of the arm L^5 by any spring device adapted to hold the feed-bar P at the inward limit of its movement—as, for example, a coiled spring P^4, operating against the pin p^4. The edge of the arm L^5, against which the roll P^3 bears, is in effect a cam-track, which has an abutment or upraise at P^{50} by which as the arm is drawn upward the roll P^3, bearing against it, and thereby the carrier P are forced outward, thus giving the necessary movement to withdraw the cast which has been last lodged in front of the finger P′ by the downward thrust of the plunger L, and when the driver next descends the abutment P^3, running up the upraise P^{50}, permits the carrier to move inward obedient to its spring in time to receive the next cast. This feed device may be widely varied. Essentially it is a carrier or feeder which has a shoulder which is moved from a position back of the path of the cast in the throat to a position forward of such path and returns to the first position during the interval between the deposits of the successive casts in the throat.

I claim—

In a type-casting machine of the class described, in combination with the frame and the follower B, the thrust-rod B^2, which carries the follower mounted and adapted to be reciprocated in the frame; a cam F′ and a lever G actuated by the cam and adapted to actuate the follower thrust-rod in the discharging movement of the follower; a spring which retracts the follower thrust-rod; the stem B^3 screwed in said rod and having the shoulder B^{30} and a fixed stop b^3, which is encountered by the shoulder to arrest the thrusting movement of the thrust-rod.

Signed at Chicago, Illinois, this 19th day of February, 1898.

CHAS. R. MURRAY.

In presence of—
CHAS. S. BURTON,
JEAN ELLIOTT.