(No Model.)

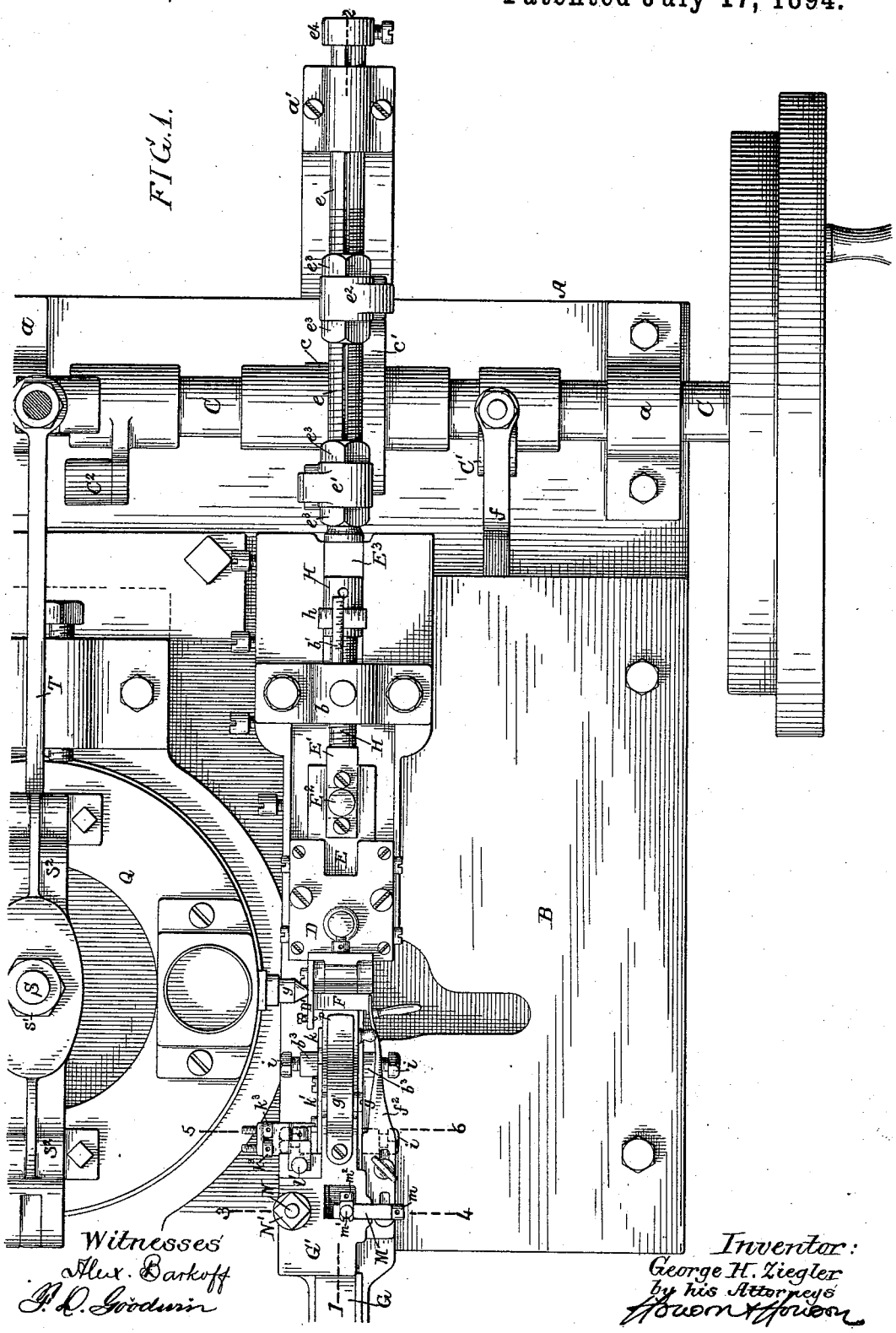
5 Sheets—Sheet 1.

G. H. ZIEGLER.

TYPE CASTING MACHINE.

No. 523,255. Patented July 17, 1894.

FIG. 1.



Witnesses
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(No Model.) 5 Sheets—Sheet 2.

G. H. ZIEGLER.

TYPE CASTING MACHINE.

No. 523,255. Patented July 17, 1894.

FIG. 1.

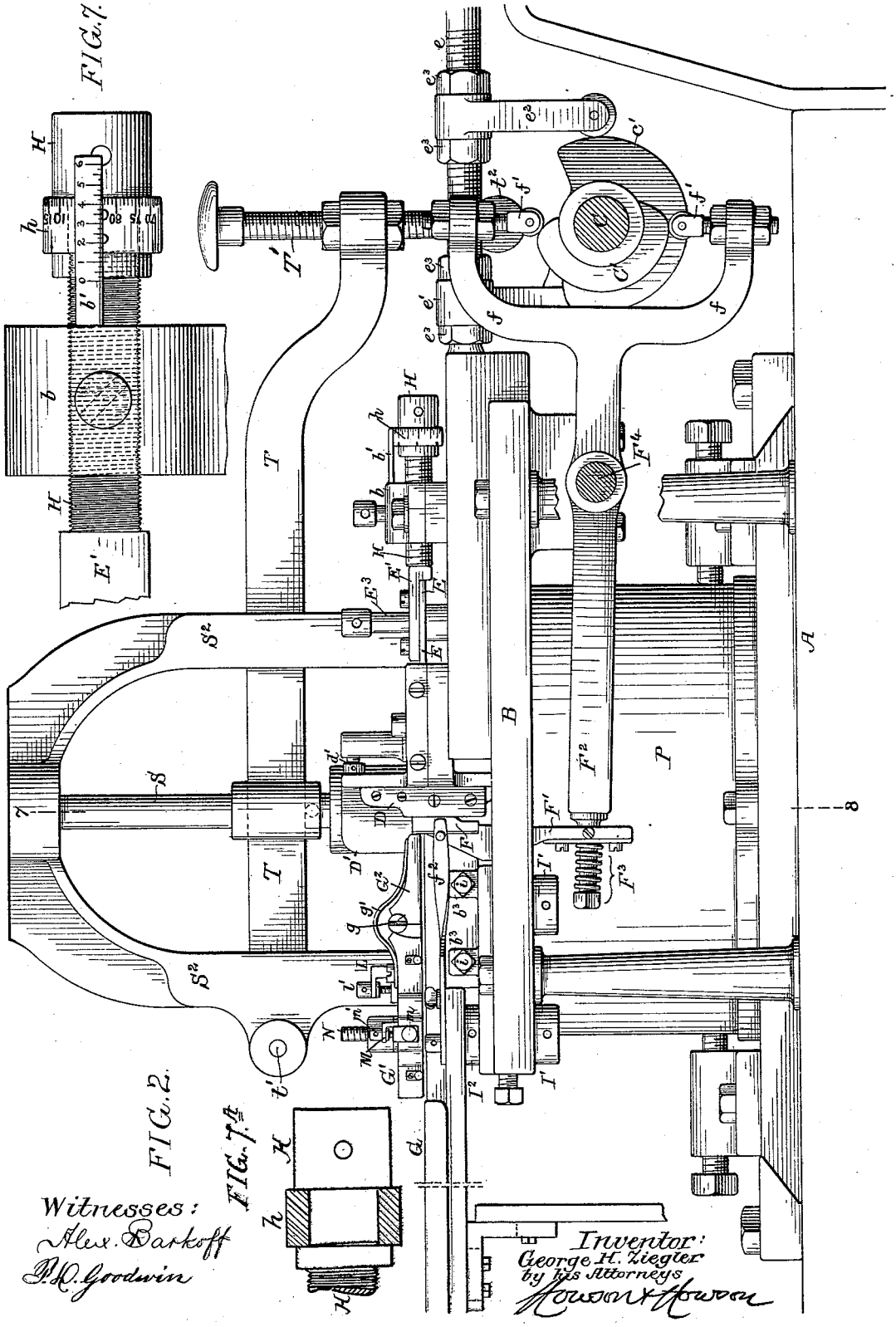

FIG. 2.

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(No Model.)

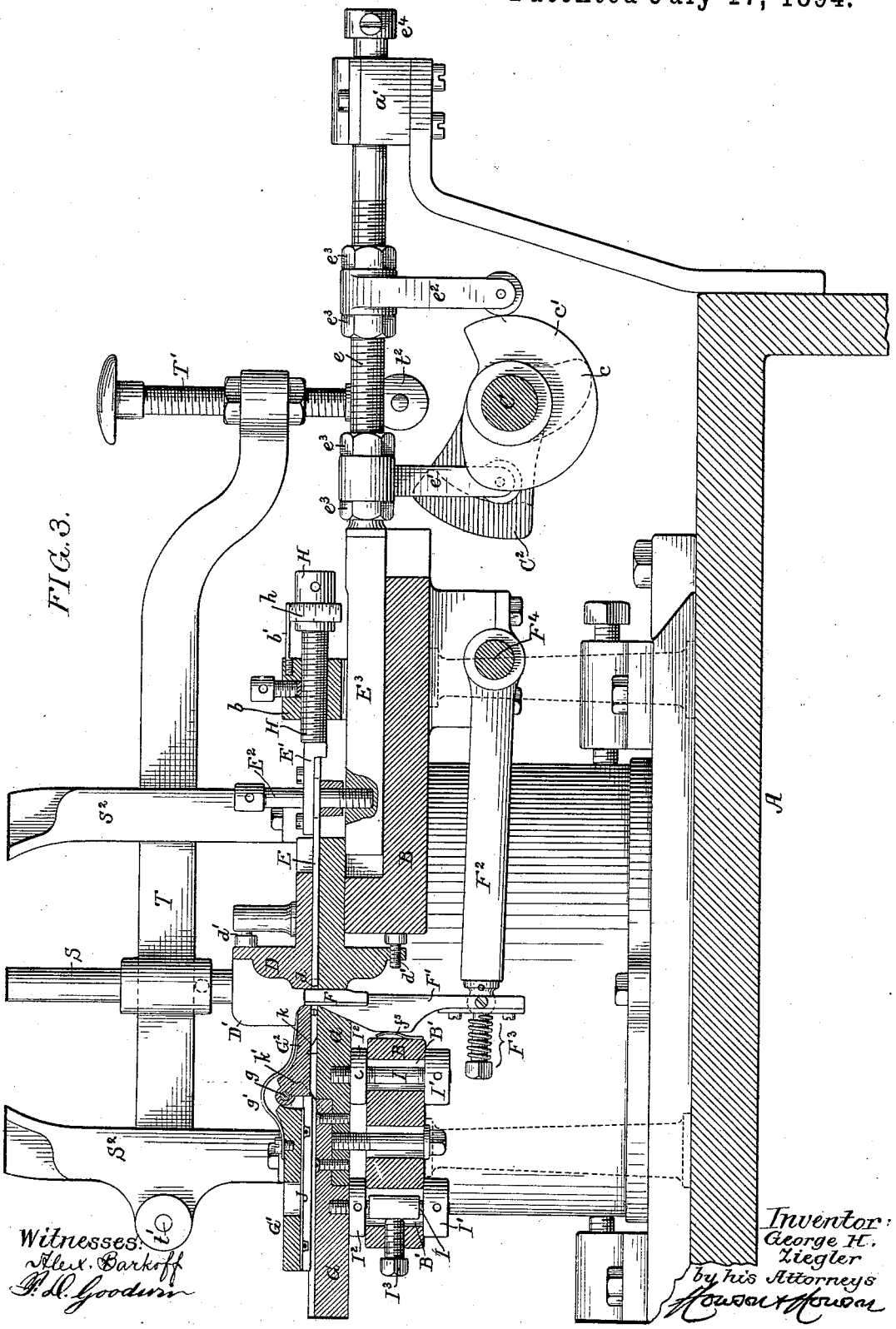
5 Sheets—Sheet 3.

G. H. ZIEGLER.

TYPE CASTING MACHINE.

No. 523,255. Patented July 17, 1894.

FIG. 3.



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(No Model.) 5 Sheets—Sheet 4.

G. H. ZIEGLER.

TYPE CASTING MACHINE.

No. 523,255. Patented July 17, 1894.

FIG. 6.

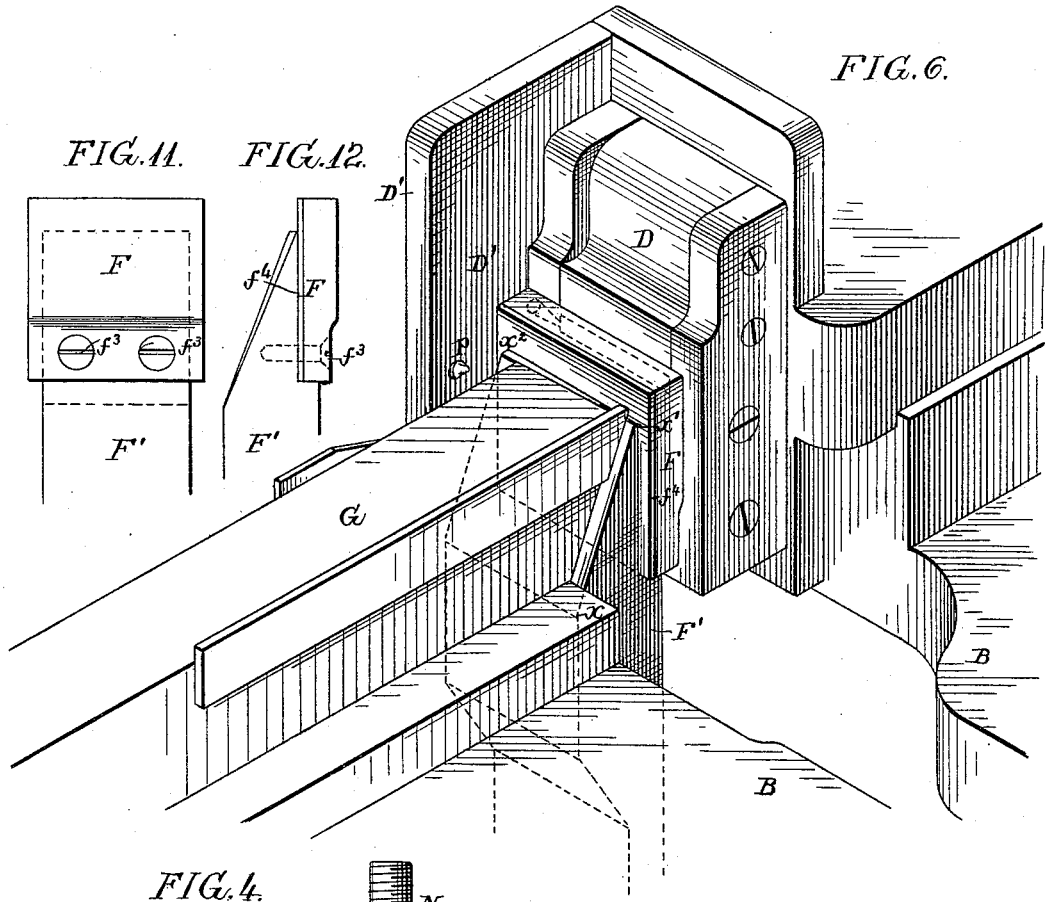


FIG. 11.

FIG. 12.

FIG. 4.

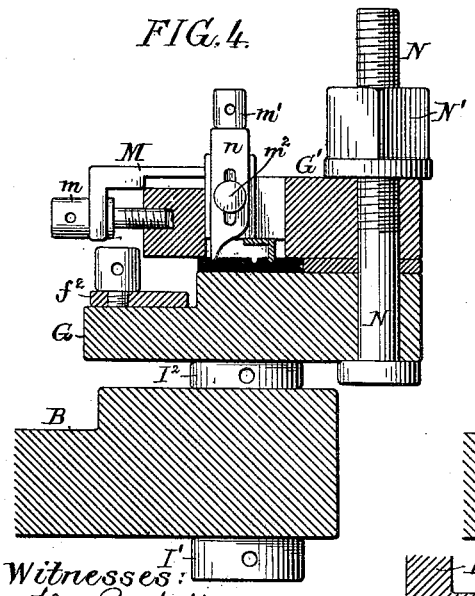


FIG. 5.

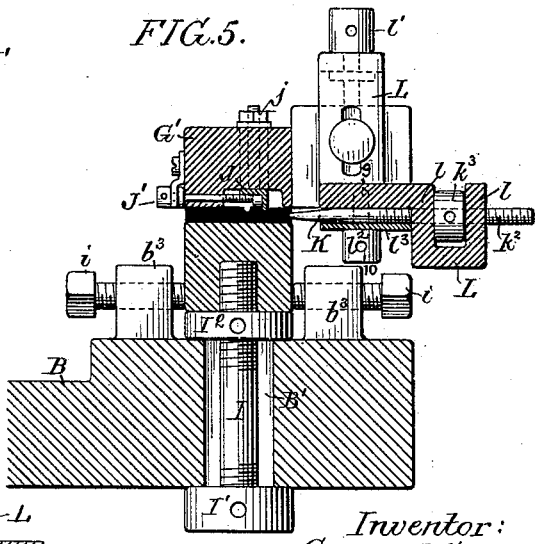
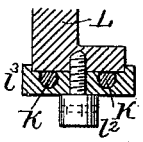


FIG. 5a



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(No Model.) 5 Sheets—Sheet 5.

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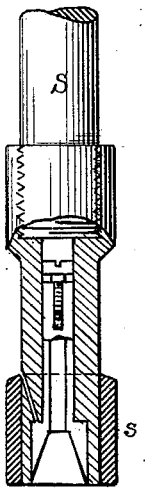
TYPE CASTING MACHINE.

No. 523,255. Patented July 17, 1894.

FIG. 9.



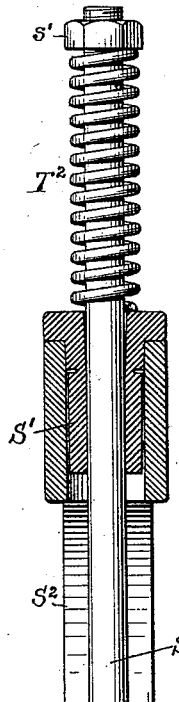


FIG. 10.

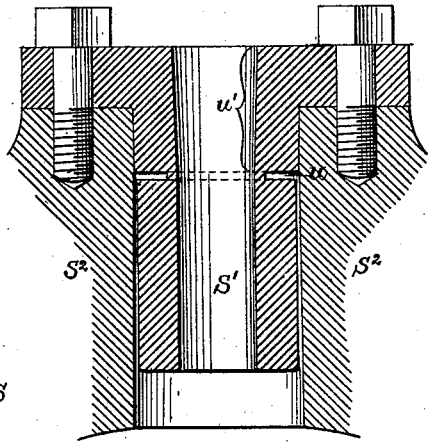
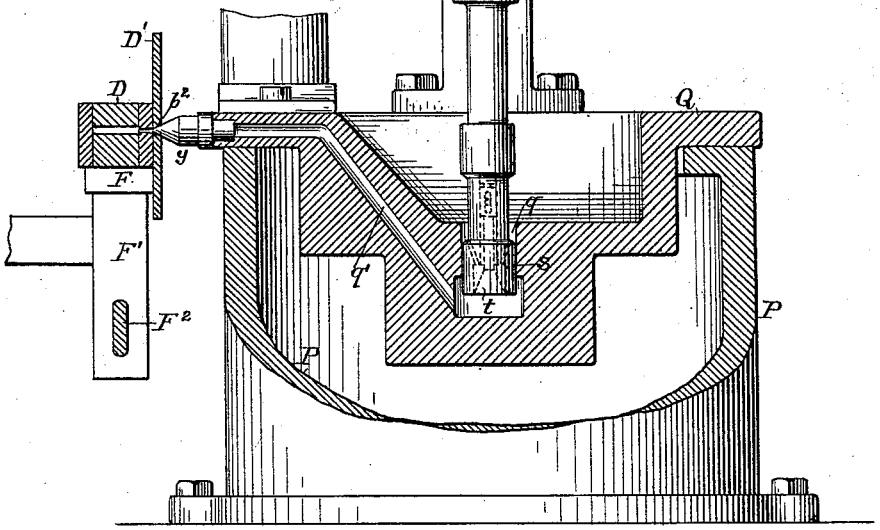


FIG. 8.



Witnesses:
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F. H. Goodwin

Inventor:
George H. Ziegler
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UNITED STATES PATENT OFFICE.

GEORGE H. ZIEGLER, OF PHILADELPHIA, PENNSYLVANIA, ASSIGNOR TO THE MACKELLAR, SMITHS & JORDAN COMPANY, OF SAME PLACE.

TYPE-CASTING MACHINE.

SPECIFICATION forming part of Letters Patent No. 523,255, dated July 17, 1894.

Application filed June 25, 1892. Serial No. 437,946. (No model.)

To all whom it may concern:

Be it known that I, GEORGE H. ZIEGLER, a citizen of the United States, and a resident of Philadelphia, Pennsylvania, have invented certain Improvements in Type-Casting Machines, of which the following is a specification.

The object of my invention is to construct a machine for casting type which will be positive in its action, rapid in its movement, and readily adjustable, and simple in construction. This object I attain in the following manner, reference being had to the accompanying drawings, in which—

Figure 1 is a plan view of sufficient of a type casting machine to illustrate my invention. Fig. 2, is a face view. Fig. 3, is a section on the line 1—2, Fig. 1. Fig. 4, is a section on the line 3—4, Fig. 1. Fig. 5, is a section on the line 5—6, Fig. 1. Fig. 5^a, is a sectional view on the line 9—10, Fig. 5. Fig. 6, is a perspective view of the mold portion of the machine drawn to an enlarged scale. Fig. 7, is an enlarged view of the type body gage. Fig. 7^a is an enlarged sectional view of the gage screw head. Fig. 8, is a sectional view of the pump on the line 7—8, Fig. 2. Fig. 9, is a detached view illustrating the lower portion of the pump plunger. Fig. 10, is an enlarged view of the pump rod guide; and Figs. 11 and 12, are detail views of the side slide.

The present machine is arranged to cast what are termed quads and spaces, the outer end of the mold being closed, but if type is to be cast the outer end of the mold is opened, and a matrix suitably carried is mounted in such relation to the mold that it will properly cast the type.

The main object of my invention is to make the machine positive in its action, dispensing with a number of springs usually employed on machines of this character.

A is the base of the machine upon which is mounted the table B, rigidly secured. Mounted in suitable bearings *a* on the base A, is a shaft C, driven either by power or by hand. This shaft is the main driving shaft of the machine, and on it are mounted the several cams for giving the proper movement to the different parts.

Mounted on the table B is the mold D in which the type is cast. This mold is slotted throughout its length forming a guide-way *d* for the body piece E. This body piece forms one side of the mold and is also the ejector for the type after they are cast.

F is a sliding block, and when raised forms one side of the mold, and when lowered, forms a plane for the passage of the type from the mold, to the platform G. This platform is vertically adjustable so that it can be arranged in line with the mold and its body piece.

The mold is formed as shown in Fig. 3, and has two set screws thereon *d'*, one at the upper portion of the mold, and the other at the lower portion of the mold. The set screws are so arranged as to adjust to a slight degree the mouth of the mold, so that the type will always be sharp. The body piece E has a reciprocating motion in the mold, derived from the two cams *c c'*.

Attached to the rear end of the body piece is a striker plate E', having a screw E^2, which enters a reciprocating bar E^3, confining the body piece fixedly to the bar. The bar has a screw threaded portion *e*, and on this portion are two arms *e'*, e^2, adjustable longitudinally on the bar by means of the adjustable nuts e^3. By adjusting these nuts the arms can be placed in any position upon the bar. The arm *e'* is acted upon by the cam *c* on the shaft C, while the arm e^2 is acted upon by the cam *c'*. The cam *c* is a quick acting cam, and acts to eject the type from the mold, forcing the body piece forward. The cam *c'*, however, while a quick acting cam on its first stroke is about a three-quarter face cam, and tends to hold the body piece in the mold at the proper place to cast the type, thus, by this arrangement, springs are not relied upon to bring the body piece back, as in machines of this construction the body piece often sticks when it is projected, and consequently the sliding side bar F, will shear the body piece, thus destroying it, and often injuring other parts of the machine, owing to the severe strain to which the parts are subjected.

In order to alter the size of the mold to cast type of different thicknesses, the arm e^2 is moved toward or from the arm *e'*, making the throw of the body piece greater or less. On

these arms I prefer to mount friction rollers, but these rollers may be dispensed with in some instances.

In order to prevent the body piece from being thrown out too far from the mold, I mount at the rear of the bar E^3, a stop e^4 adjustable on the bar, which strikes against the bearing a' preventing the body piece from moving farther than necessary. Thus it will be seen that the action of the body piece is positive.

The striker plate E′ is drawn against the micrometer screw H, adapted to threads in a suitable bearing b on the table B. This screw I prefer to cut twenty-four threads to the inch, and mounted upon the head of the screw is a graduated collar h, having at one side graduations indicating "points." As this machine is constructed in the present instance to cast type under the point system, the opposite side of the dial is graduated in one-half thousandths. In the present instance, the one-half thousandths are on the back of the dial and the points are in the forward portion of the dial. Projecting from the bearing b is an indicator b' which is also graduated into twenty-four equal parts, each division indicating three points. Thus on one revolution of the micrometer gage H, it will adjust the body piece three points.

The front graduations of the dial h are divided into three equal parts, each indicating one point in type measurement or thirteen and ten-twelfths one-thousandths of an inch, and one revolution of the dial indicates three whole points or forty-one and six-twelfths one-thousandths of an inch. The indications of the one-half thousandths are on the back of the dial, and one revolution of the dial indicates eighty-three half thousandths which includes allowance for shrinkage in type cast.

If, for instance, I wish to cast type of the "pica" measurement, which is one hundred and sixty-six one-thousandths or twelve points, I first close the mold by bringing the body piece against the slide plate, by turning the micrometer screw forward. The dial is thus turned upon the screw to zero, and all the zero marks are then in line. The projecting indicator is graduated, and marked in pica measurement with shrinkage allowed, 0 to 1 being one pica, or twelve points, each mark representing three points, so that to adjust the mold to mold pica type, the screw is turned back four revolutions, or until the zero mark on the dial is at 1 on the indicator, being twelve points. This will give the full size of the mold to cast pica type, allowing for shrinkage.

The indicator in the present instance, is one inch long, and as the screw has twenty-four threads to the inch, I divide the indicator into six parts, or six picas, or, as this pica type after shrinkage will measure only nine hundred and ninety-six one-thousandths of an inch, four one-thousandths is allowed for shrinkage, which is the exact shrinkage of this pica type, consequently, the screw having twenty-four threads to the inch, can be divided equally to give measurement equal to six pica type, allowing for shrinkage. Thus it will be readily seen that the machine can be set for type having point measurement, and it can also be readily adjusted for the shrinkage, so that type cast on the machine will always bear the same relation to each other.

While I place this micrometer gage at the point indicated, it may be placed at other points, and may be placed on machines other than that shown in the accompanying drawings, as it is applicable to all machines using the point system.

Having now described the mechanism for moving and mechanism for adjusting the body piece, I will describe the construction and operation of the side slide F. This side slide F as before remarked, is raised and lowered, closing and opening one side of the mold, and is connected to a bar F′, attached to one arm of a lever F^2, by a yielding connection F^3. This lever is pivoted to a stud F^4, and the lever has a yoke f carrying, in the present instance, adjustable screw rods f', having friction rollers which bear upon a cam C′ on the driving shaft C. This cam is so cut as to raise and lower the side slide at the proper time. The back of the bar F′ is cut on a double taper, or a double wedge, as clearly shown in Fig. 6, so that when it is raised up against the platform G, it will not only force the side slide against the mold, but also force it against the apron D′. The tapered portion between the points x and x' is so shaped to force it against the mold, while the tapered portion x', x^2 is tapered to force it against the apron D′, thus forming a tight joint at the corner of the mold and apron, the apron being perforated at b^2, (Fig. 8) in order to allow for the passage of the molten type metal from the nipple y, so that when the pump operates to force the molten metal through the nipple into the mold, the metal does not have a chance to escape at the junction of the mold and side slide, or at the point where the side slide bears upon the apron. As this movement against the mold and apron is positive, any foreign matter which may gain access between the parts, will be driven out or crushed as the slide bar is raised. A spring f^2 is provided to keep the side slide against the apron D′, when it is not under the control of the tapered portion of the platform, or, in other words, when the side slide is lowered, the spring tends to keep the slide against the apron, but when it is raised, the tapered portion of the bar F′ is forced against the tapered portion of the platform, and the side slide is forced against the apron. A spring f^5 between the table B and the back of the bar F′, tends to force the side plate against the mold, when not under the control of the wedge, so as to prevent foreign matter getting between the mold and the slide plate.

As shown in Figs. 11 and 12, I secure the

side slide to the bar F′, by screws f^3, so that it can be taken off and re-surfaced, or a new slide substituted therefor, and I place back of the slide, between it and the bar, a plate f^4, preferably of brass, or similar soft material, which not only acts as a filling plate, but also is soft enough to prevent breakage of the parts if a type should fall between it and the platform, the type indenting the plate, rather than breaking parts of the machine.

The connections F^3 between the bar F′ and the lever F^2, is a yielding ball and socket joint common in type machines of this character.

I will now describe the mechanism by which the platform G is raised and lowered, reference being had particularly to Fig. 3 of the drawings. I so mount the mold D that it is fixed as regards vertical movement, and I provide means for raising and lowering the platform G, so as to align with the mold D. Tapped into the body of the platform are screw studs I, which pass through slots B′ in the table B, and have clamp nuts I′ I^2, situated below and above the table. By turning these nuts upon the screws the platform can be raised or lowered, as required. The platform can also be moved longitudinally by the set screw I^3, which bears against the squared portion of one of the studs I, so as to take up for wear upon the beveled portion of the platform and slide bar. The platform can also be adjusted transversely by set screws i, (Figs. 1 and 5,) these set screws passing through lugs b^3, on the table B, so as to adjust it in line with the mold transversely, as well as vertically. Above the platform is a stationary plate G′, and a pivoted plate G^2. This plate G^2 is pivoted at g and is provided with a spring g', to keep it down in position, so as to provide a proper guide way for the type, as they leave the mold, but if an accident happens, and the type commences to pile, the spring will allow the plate G^2 to be raised and yield to prevent breakage of the machine, as it will be understood, that type are sacrificed rather than to allow parts of the machine to break, as the destroyed type can be readily re-melted and utilized.

As shown in Figs. 3 and 5, the nick guide J can be adjusted transversely, so as to align with the nick cast in the type without dismembering parts of the machine. The nick guide is made L-shaped in cross section, as shown in Fig. 5, and is secured to the plate G′ by screws j, which pass through slots in the plate G′, and is adjusted transversely by set screws J′, which pass through the side of the plate G′, and are tapped into a nick guide J, so that on turning these set screws J′, the nick guide can be moved transversely, so as to be in line with the nick cast in the type, thus the type can be properly guided while passing from the machine. While the type is thus guided, the groove in its base can be cut, and an additional nick can be cut, if required.

The jet is broken from the type by the two inclined plates $k\,k'$, leaving in most instances, a rough central portion where the nick is broken from the type, and in order to have the type rest firmly and squarely upon a foundation, this rough portion is cut away, and a groove formed, allowing the type to set squarely upon its base. This groove is cut, in the present instance, by knives K^3, having screw threaded shanks k^2, on which are nuts k^3 mounted between two arms $l\,l$, of a bracket L. Thus, by turning the nut k^3, the knife can be projected more or less into the path of the type to cut a deeper or shallow groove, and the knife can be adjusted vertically by means of the set screw l' carried by the bracket L, and screwed into the plate G′. The knives K are flat on one side, and the clamp screw l^2 passes through a clamp plate l^3, and fastens the knives to the bracket when once adjusted.

The knife for cutting the additional nick in the type, is carried by a slide M, adjustable transversely by means of a screw m, tapped into the side of the plate G′.

The knife n has a point of the proper shape to cut the required nick, or it may have two points, according to the number of nicks required. The knife is adjustable vertically upon the slide M, by a set screw m', a clamp screw m^2 passing through a slot in the knife, holding the knife in position after adjustment. The slide and knife are adapted to a slot in the plate G′, as clearly shown in Figs. 1 and 4.

The plate G′ is firmly clamped to the platform G by a screw bolt N, and a nut N′, shown in Figs. 1 and 4. By removing the nut, the plate and its parts can be readily detached from the platform.

A primary cut is made in the jet immediately on its leaving the mold, by a knife p, having a screw threaded shank, and tapped into the apron D′, as clearly shown in Figs. 1 and 6.

I will now describe the mechanism for pumping the molten type metal into the mold.

P is the frame, in which is the flame chamber, and above which is supported the pot Q, containing the molten type metal; the burner is directly under the pot, and is preferably an oil or gas flame, but in some instances, a coal or wood fire may be burned, but a gas or oil jet is preferable.

q is a central opening, to which is adapted the plunger s, of the pump rod S, and leading from this opening q, which is preferably enlarged at its lower end, is a passage q' leading to the nipple y, and through this passage is pumped the molten type metal. The pump rod is guided in this opening q, and in a bearing S′, resting in an opening in a yoke S^2, as shown clearly in Figs. 2 and 8. In the lower portion of the pump rod is a valve t of the ordinary construction, which opens as the pump rod is lifted, allowing the molten metal to pass into the chamber q, below the pump plunger, and when the plunger is forced down again, this molten metal is forced through the

passage q' through the nipple y into the mold D.

Passing through the pump rod S, is the operating lever T, pivoted at t' to the one side of the yoke, and guided in the opposite side, and is preferably bent, and provided at its outer end with a vertically adjustable screw-rod T', having a roller t^2 at its lower end. This roller t^2 is struck by a cam C^2 on the cam shaft C, and as this cam is so shaped as to act on the upper portion of the roller, it consequently will draw down the lever T, and force the pump rod down, projecting the molten metal into the mold. A spring T^2 mounted between the upper portion of the bearing S', and a nut s', on the pump rod S, returns the pump rod to its raised position. I have found that if a plain bearing is used, for the upper portion of the rod, great care has to be exercised to heat the pot q evenly. If one side is heated more than the other, the heat tends to expand the one side, and tilt the yoke out of line, consequently, the bearing will bind tightly on the pump rod, and jamb it to such an extent as to practically stop the operation of the machine. This I have found to be the case in a number of machines built in the ordinary manner, and is a great annoyance to the operator. I overcome this objection, by first cutting the narrow annular groove u in the bearing, as indicated in Fig. 10, and taper the upper portion u' of the bearing leaving the balance of the bearing a snug fit for the rod; this I found by practical tests obviates locking of the parts. If the yoke should be extended on one side more than on the other, it will simply close the portion of the annular groove u, at that side, allowing the rod to move freely within the bearing.

I make the plunger portion s of the rod S, in the form of a sleeve, so that it can be readily detached from the rod, and a new sleeve mounted thereon, when the first sleeve becomes worn, without the necessity of abandoning the rod S, and its valve. These pump rods have often to be repaired on account of their exposure to the heat necessary to keep the molten metal in the proper condition.

I claim as my invention—

1. The combination in a type casting machine, of the mold, the body piece adapted to reciprocate therein, a wedge shaped side slide for closing the mold, two cams for moving the body piece positively in each direction and a cam for positively moving the side slide in both directions and holding it against the mold during the casting, substantially as described.

2. The combination in a type casting machine, of the mold, the reciprocated body piece, a reciprocating bar attached to the body piece, arms projecting from said bar, two cams, one acting upon each arm to reciprocate the bar and body piece, said arms being adjustable on the bar to increase or diminish the throw of the body piece, substantially as described.

3. The combination of the mold, the body piece, the reciprocating bar attached to said body piece, said bar having a screw threaded portion, arms depending from said bar, with nuts on each side of each arm and adapted to the threaded portion of the bar, and cams for reciprocating the bar through the medium of the arms, substantially as described.

4. The combination of the table, the mold, the horizontally reciprocated body piece, the reciprocated bar rigidly connected thereto and adapted to slide on the table and in an outer bearing, arms longitudinally adjustable on said bar, cams acting on said arms to reciprocate the bar, with an adjustable positive stop on the end of the bar beyond the outer bearing to limit the forward movement of the body piece, substantially as described.

5. The combination of the mold, body piece, the striker plate attached to the body piece, an adjustable stop for limiting the rearward movement of the body piece, a reciprocating bar, with a screw passing through the striker plate and into the bar, thus rigidly securing the body piece to the bar, substantially as described.

6. The combination of the mold, the apron, a sliding side block adapted to close one side of the mold, and a platform beyond the mold beveled both vertically and laterally, so that when the block is moved up to its seat it will be forced against the mold and against the apron, substantially as described.

7. The combination of the mold, the apron, the platform, a vertically reciprocated bar having a sliding side block adapted to close one side of the mold, said bar being beveled both vertically and laterally, the platform being correspondingly beveled, with a side spring and a back spring tending to keep the block against the mold and against the apron when it is not in its raised position, substantially as described.

8. The combination in a type casting machine, of the mold, the body piece, a platform, in line with the mold, onto which the type is projected by the body piece, with means for vertically adjusting said platform, substantially as described.

9. The combination of the mold, the body piece, mechanism for reciprocating said body piece, a sliding side block, mechanism for vertically reciprocating said block, a platform beyond the block and in line with the mold, with mechanism for raising, lowering and locking the platform, substantially as described.

10. The combination of the mold, reciprocating body piece, the platform, sliding side block, with a plate of yielding material mounted at the back of the block, substantially as and for the purpose set forth.

11. The combination of the mold, reciprocating body piece, the sliding side block, the platform, and means for vertically and transversely adjusting the platform in respect to the mold, substantially as specified.

12. The combination of the mold, body

piece, the side block, the platform, screw studs I I, projecting from said platform, and nuts on said studs, mounted above and below the supporting table, substantially as described.

13. The combination of the mold, the body piece, the side block, a platform adjustable vertically, transversely and longitudinally in respect to the mold, and means for locking the platform in its adjusted position, substantially as described.

14. The combination of the platform for receiving the type from the mold, a plate situated above the platform, a bracket L, adjustable vertically on said plate, a knife K carried by the bracket and adapted to cut a groove in the base of the type, said knife having a screw threaded shank k^2, and an adjusting nut k^3 for moving the knife toward or from the type, substantially as specified.

15. The combination in a type casting machine, of the mold, the platform, a bracket, the grooving knives situated at one side of the platform and adapted to cut the groove in the bottom of the type, each knife having a screw shank, a nut for each shank, each nut confined in the bracket, a clamp plate under the knives, and a set screw for confining the plate and the knives to the bracket, substantially as described.

16. The combination in a type casting machine, of the mold, the platform, the plate above the platform, a bracket on the plate, two knives flat on each side, each knife having a screw shank, a nut for each shank, said nut being confined by the bracket, a clamp plate and a set screw for clamping the knives to the bracket with the flat side up, substantially as described.

17. The combination of the melting pot for the type metal, the pump rod, a valve therein, a detachable collar on the lower portion of the rod forming a pump plunger, and a passage from the melting pot, substantially as specified.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

GEORGE H. ZIEGLER.

Witnesses:
HARRY SMITH,
HENRY HOWSON.