No. 702,941. Patented June 24, 1902.

G. A. GOODSON.

SQUIRT PREVENTER FOR TYPE CASTING MACHINES.

(Application filed Apr. 22, 1901.)

(No Model.) 4 Sheets—Sheet 1.

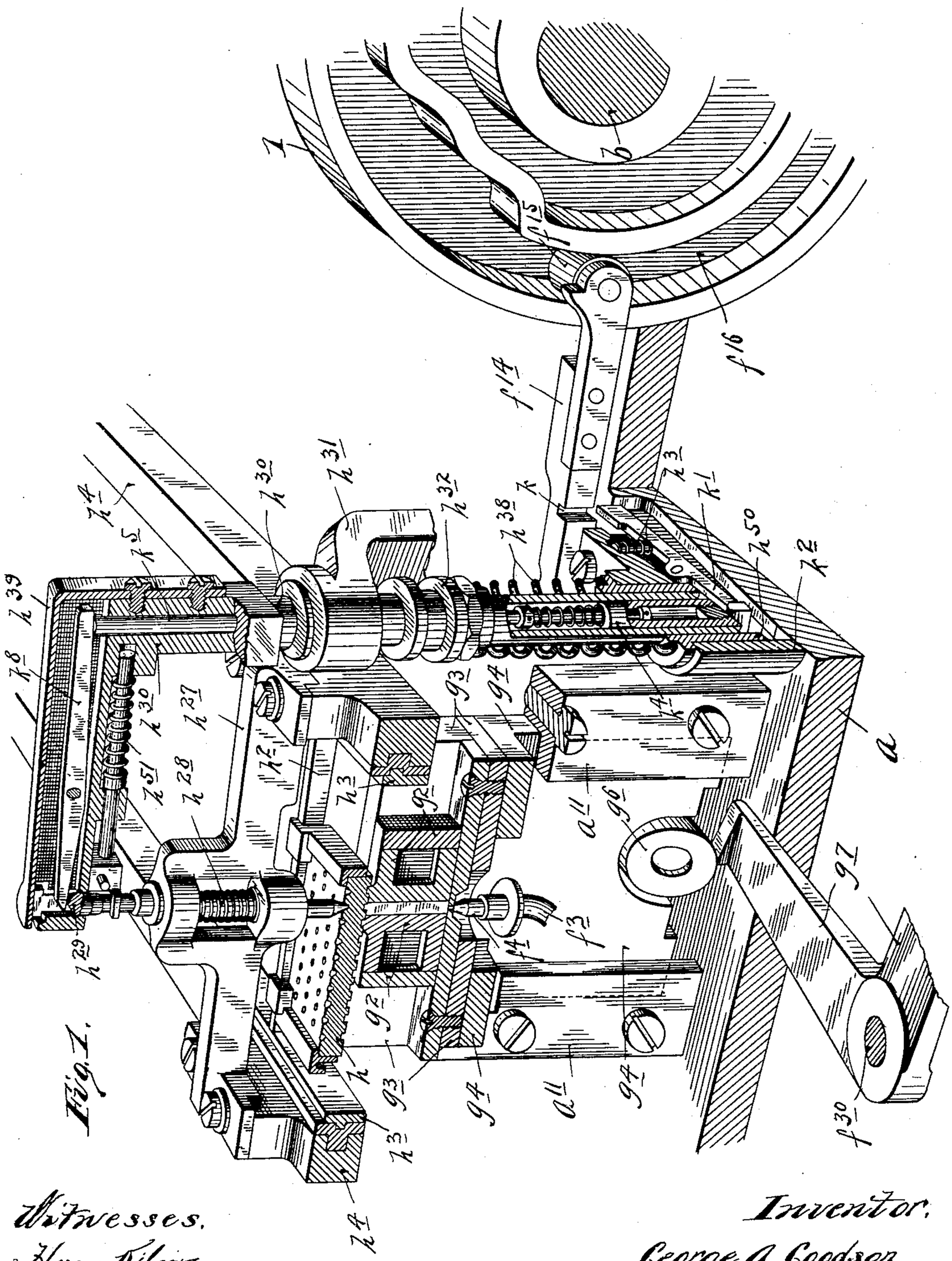

Fig. 1.

Witnesses.
Harry Kilgore.
C. F. Turner.

Inventor.
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(No Model.) 4 Sheets—Sheet 2.

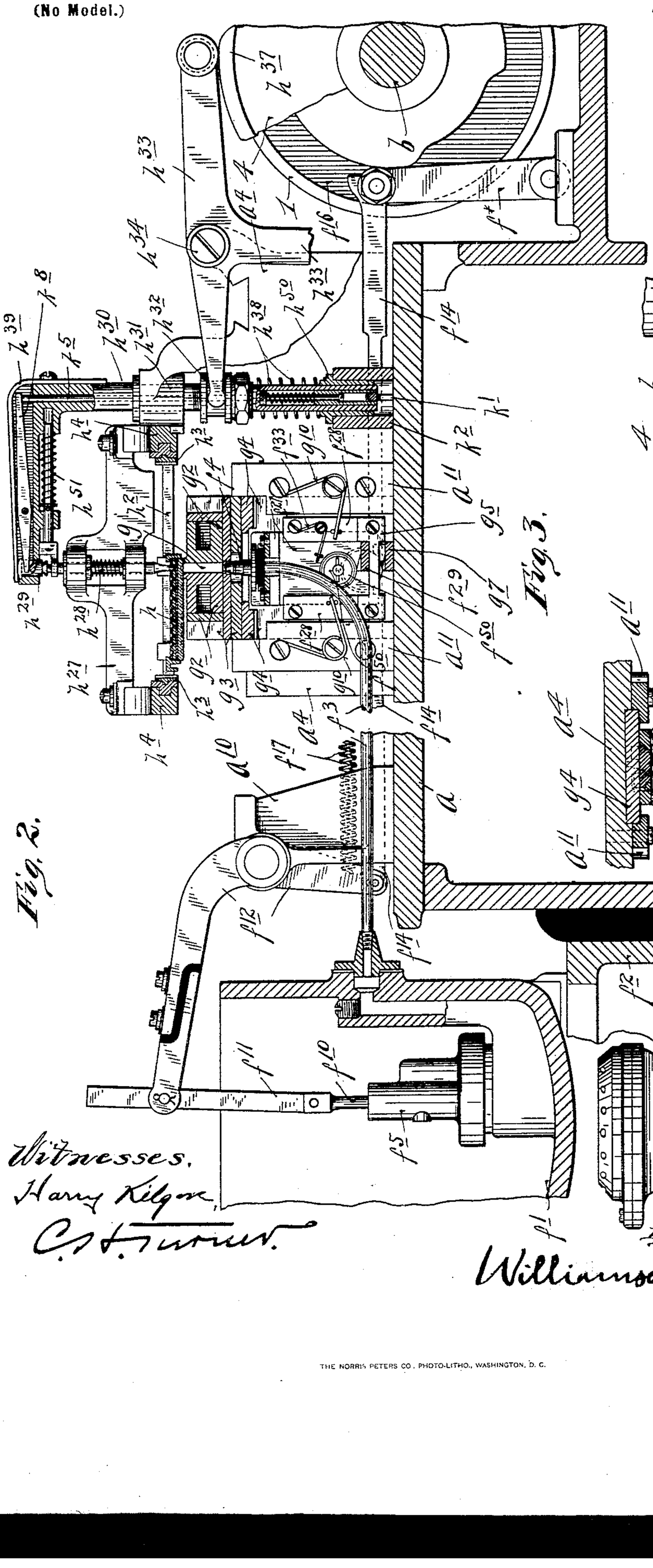

Fig. 2.

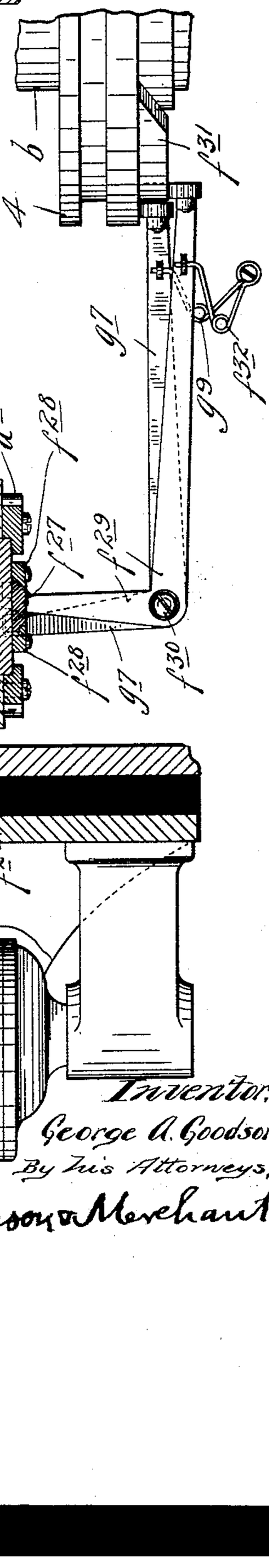

Fig. 3.

Witnesses,
Harry Kilgore,
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(No Model.) 4 Sheets—Sheet 3.

Fig. 4.

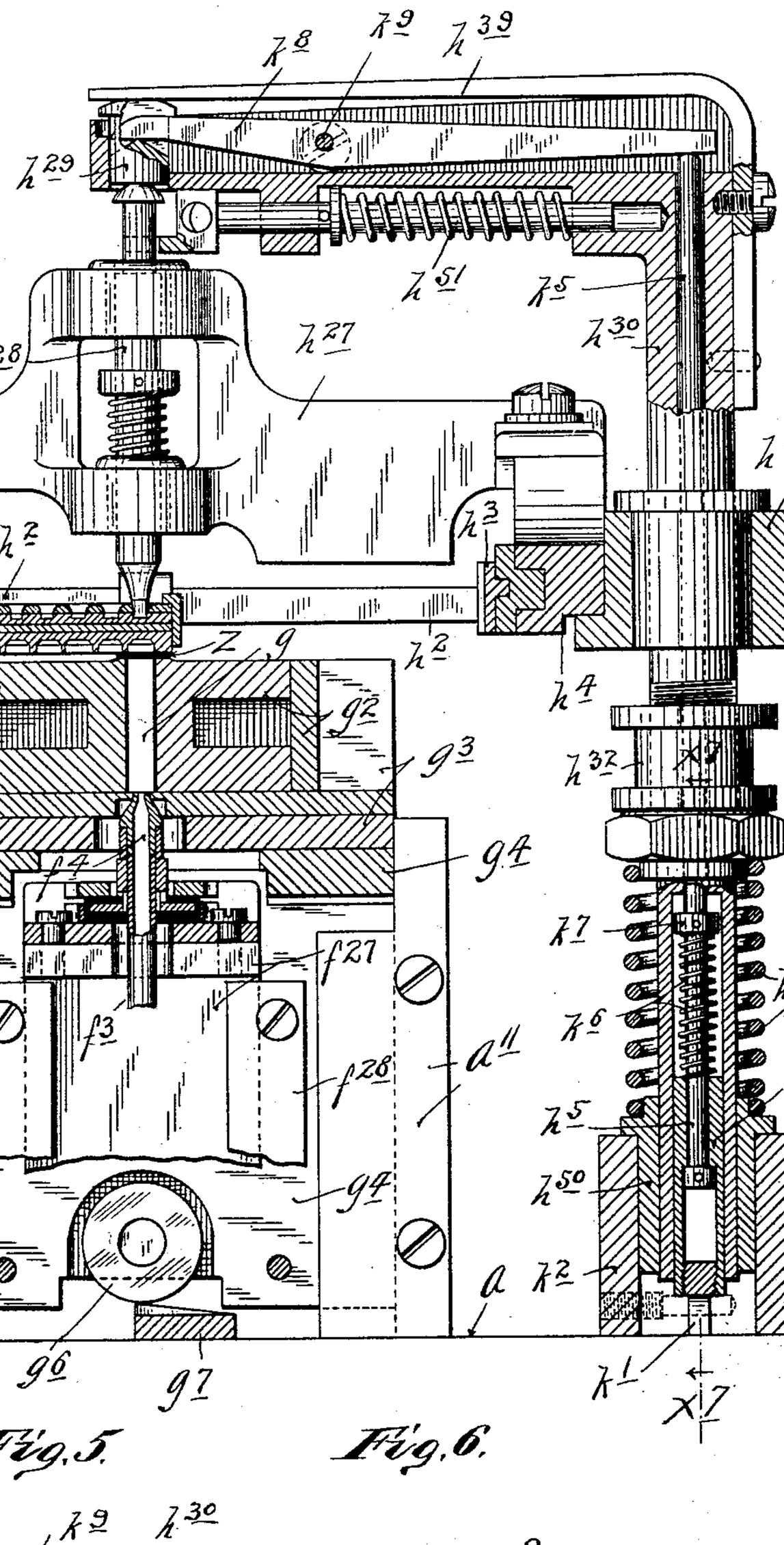
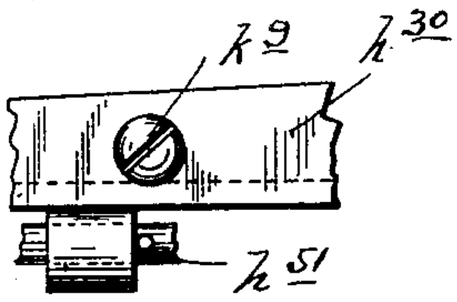
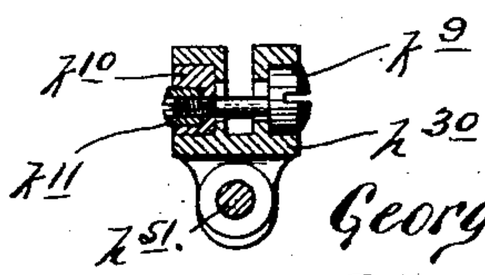


Fig. 5.



Witnesses,
Harry Kilgore.
C. A. Turner.

Fig. 6.



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(No Model.) 4 Sheets—Sheet 4.

Fig. 7.

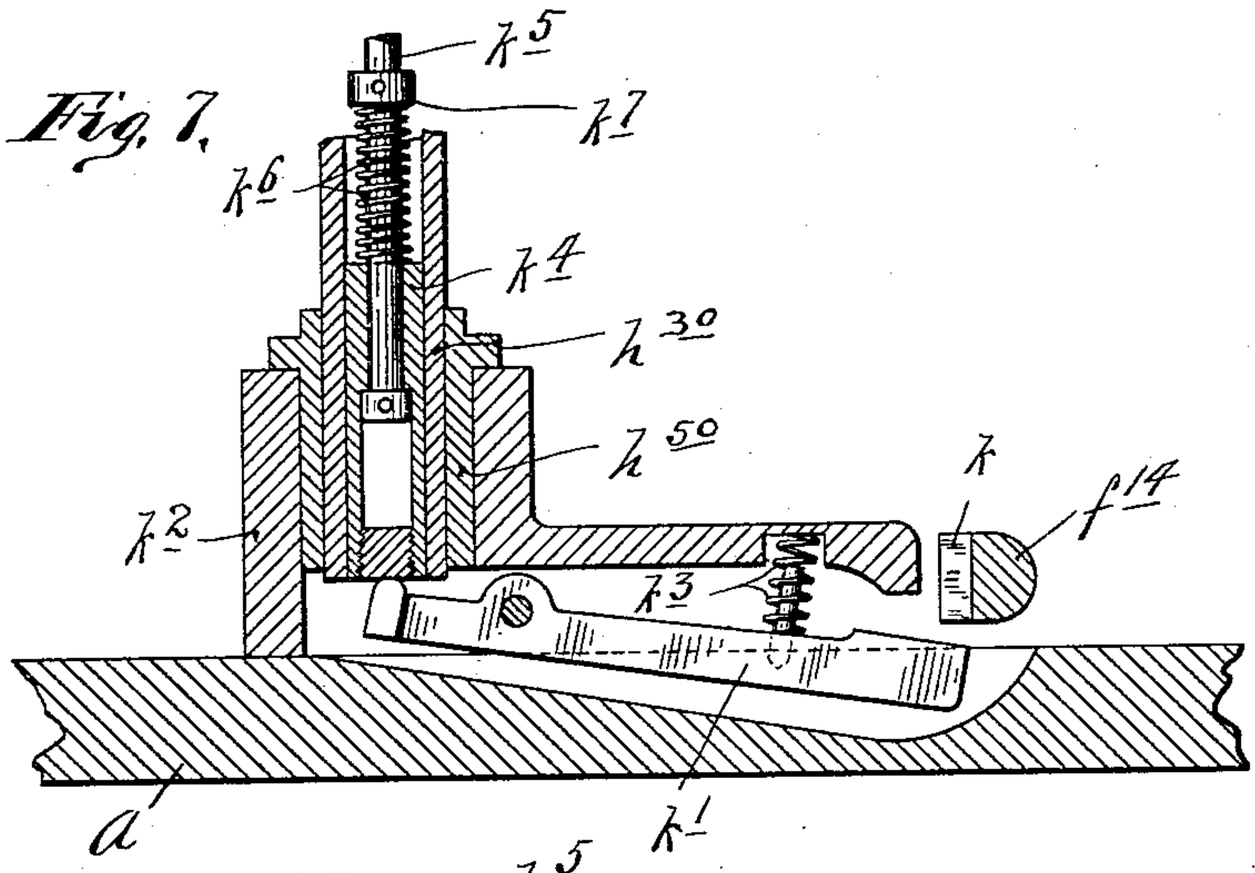


Fig. 8

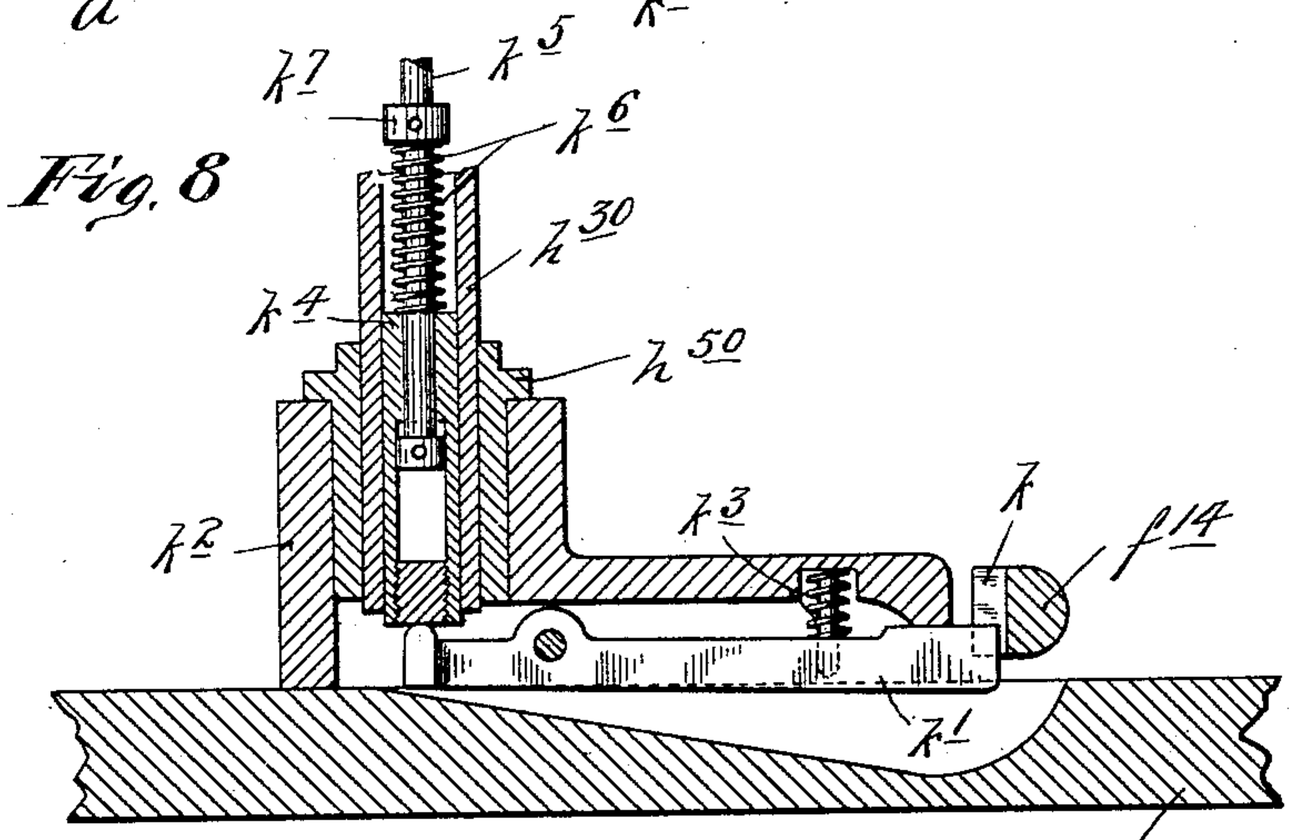
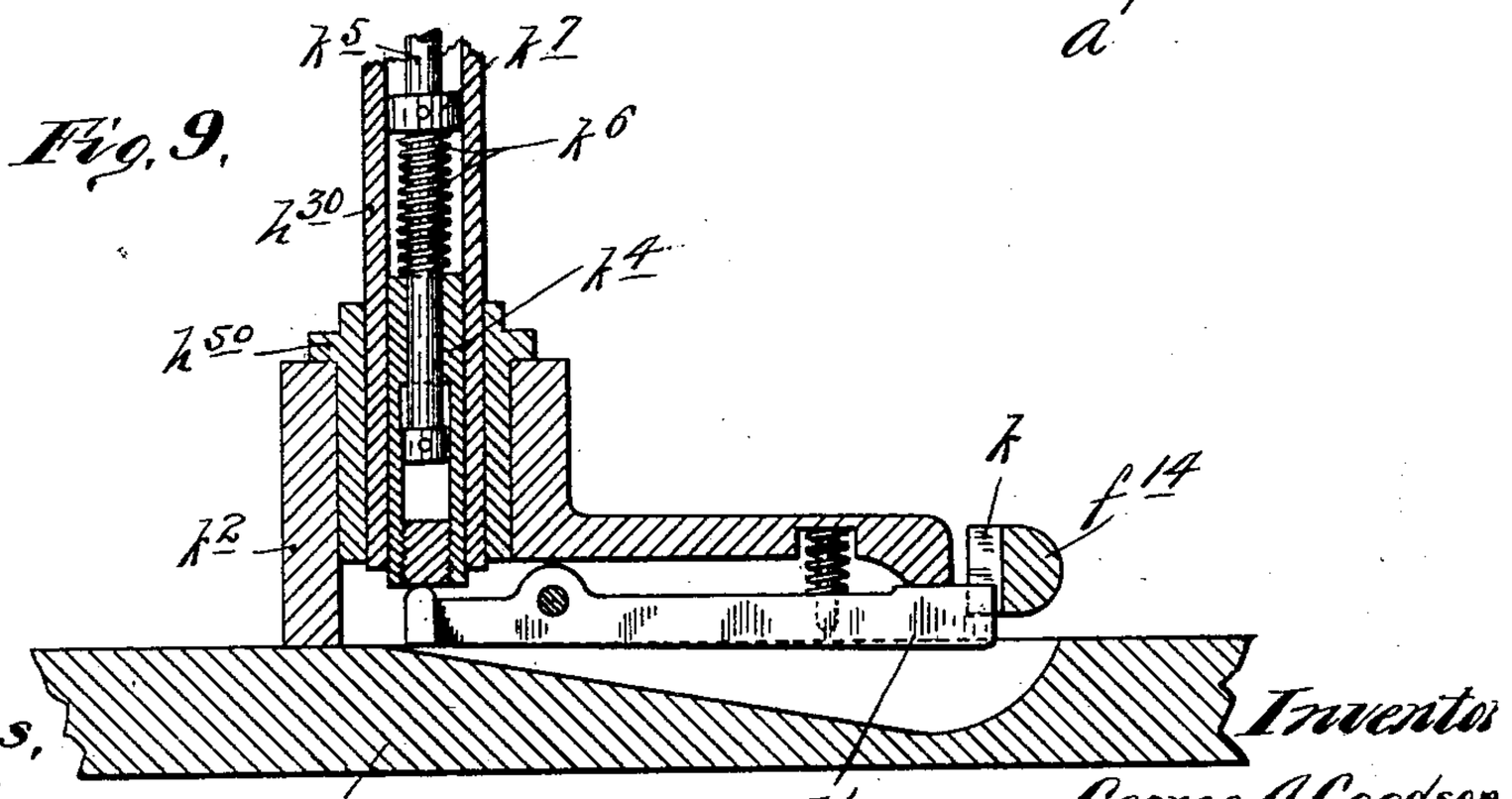


Fig. 9.



Witnesses,
Harry Kilgore,
C. A. Turner.

Inventor
George A. Goodson
By his Attorneys.
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UNITED STATES PATENT OFFICE.

GEORGE ARTHUR GOODSON, OF NEW YORK, N. Y.

SQUIRT-PREVENTER FOR TYPE-CASTING MACHINES.

SPECIFICATION forming part of Letters Patent No. 702,941, dated June 24, 1902.

Application filed April 22, 1901. Serial No. 56,871. (No model.)

To all whom it may concern:

Be it known that I, GEORGE ARTHUR GOODSON, a citizen of Great Britain, residing at New York, in the county of New York and State of New York, have invented certain new and useful Improvements in Squirt-Preventers for Type-Casting Machines; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to type-casting machines, and has for its object to provide certain improvements therein with a view of securing increased efficiency.

In type-casting machines the matrix and the body-mold are movable relative to each other, and when tightly clamped together in casting position the molten metal is forced into the mold-cell under pressure, which is usually done by a suitable pump. The matrix and the mold must be centered with great accuracy in casting position and must be tightly clamped together with a perfect joint between the matrix and the mold, or otherwise satisfactory results cannot be secured. If the matrix and the mold do not make a perfect joint with each other, then when the pump is actuated to effect the cast the molten metal will be forced out at the open joint between the matrix and the mold with what the typefounders call a "squirt" or a "slobber." When such a squirt or slobber occurs, the type of course will be imperfect and worthless, and the type-metal thus thrown out between the matrix and the mold must be cleared away from both before further successful casting of perfect type can be done. This is of course a serious limitation or objection to type-casting machines. When the squirt or slobber occurs, the machine must of course be stopped to clear away the debris, and oft-times loss is incurred not only in point of time as to the continuous action of the machine, but also as to type already made and set in a partial line, for example.

My invention has for its object to overcome this defect or limitation, and to this end I provide a lock for the pump which under the coöperative control of the matrix and the mold will become operative to lock the pump in an idle position, and thereby prevent any cast whenever the matrix and the mold fail to make a perfect joint when clamped together in casting position. Normally the lock is inoperative or idle and so continues as long as the matrix and mold make a perfect joint when clamped together in casting position; but if any obstruction—such as a broken type, chip of type-metal, or grain of sand—should happen to get interposed between the faces of the matrix-walls and the mold then it will be impossible for the clamping devices to bring the matrix and the mold into their normal or properly-jointed casting position, and the pump-lock will then become operative to prevent any cast.

The invention was especially designed for use on what is known to the trade as "the Goodson type casting and setting machine," which machine is disclosed in my various prior United States patents. Said machine is disclosed most nearly in its commercial form in my prior patent, No. 609,098, of date August 16, 1898, and my invention herein disclosed, which I call "squirt-preventer," is disclosed as applied to the machine as disclosed in my said Patent No. 609,098.

The invention is illustrated in the accompanying drawings, wherein like notations refer to like parts throughout the several views.

In said drawings, Figure 1 is a perspective view showing some of the parts of my type casting and setting machine with my present invention embodied therein. Fig. 2 is a longitudinal vertical section through the machine in a plane cutting the matrix-block, the mold, and the melting-pot. Fig. 3 is a detail, partly in horizontal section and partly in plan, illustrating the devices which act from below to elevate the mold carriage or slide and the nipple carriage or slide and to coöperate with the devices which act from above to clamp the matrix and the mold tightly together in casting position. Fig. 4 is a view in vertical longitudinal section in the same plane as Fig. 2 and showing some of the same parts, but on a larger scale and in a different position. Figs. 5 and 6 are details in elevation and cross-section, respectively, illustrating the adjustable fulcrum-pin for the top lever of the squirt-preventer. Fig. 7 is a detail in vertical section, taken crosswise of the machine on the line x^7 x^7 of

Fig. 4, showing the pump-locking lever and some of the coöperating parts in their normal position. Fig. 8 is a similar view, but showing the same parts as they appear when in pump-locking position. Fig. 9 is a view similar to Figs. 7 and 8, but with the parts as they would appear when an excessive motion had been imparted to some of the parts of the squirt-preventer by an obstruction of unusual size coming between the matrix and the mold.

Before specifying in detail the parts of my squirt-preventer as herein disclosed it is necessary to briefly note some of the operative parts of the old structure of the machine to which it is applied.

Parts of machine as disclosed in Patent No. 609,098, of August 16, 1898.—These old parts are marked with the same reference-notations as in said prior patent. The main frame a, of box-like form, has on its main bed-plate a central casting a^4, on which most of the operative parts requiring notice herein have their bearings. In addition the bed-plate a has a bracket a' to serve as a bearing for pump-lever f^{12}, as will later appear. The constantly-running driving-shaft b is provided with suitable cams, and of these it is sufficient for present purposes to consider two—to wit, the cams numbered 1 and 4 in said prior patent, and these only are shown in the drawings.

The type-metal is kept in a molten condition in a suitable melting-pot f', supported from a burner-bracket f^2, which is insulated from the main frame of the machine, as shown in Fig. 2. This melting-pot is located remotely from the mold, and the molten metal is conducted from the melting-pot to the mold through a metallic tube f^3, which terminates in a nipple f^4, adapted when in casting position to register with the lower end of the mouth or cell of the mold. This conducting-tube f^3 in practice is connected into an electric circuit (not shown) for the purpose of controlling the temperature of the molten metal and delivering the same to the mold in exactly the right condition.

In the melting-pot f' is located a suitable pump, the cylinder of which is marked f^5 and the piston f^{10}. The piston f^{10} is connected by a pivoted plunger f^{11} to the horizontal arm of a bell-crank lever f^{12}, which is pivoted to the bracket a^{10}, hitherto noted. The said horizontal arm of said lever f^{12} is made in two sections suitably insulated from each other, as shown in Fig. 2. An actuating-rod f^{14} is connected at its left end to the lower end of the bell-crank lever f^{12}, and at its opposite or right end it is provided with a roller f^{15}, which works in a profile cam-channel f^{16}, formed in the front face of the cam-heel 1. The right-hand or cam end of the rod f^{14} is shown as held up, Fig. 2, by a pivoted lever f^*. The pump-lever f^{12} is also subject to the action of a strong spring f^{17}, acting opposite to the cam. The cam and the connections described raise the pump-piston f^{10} into its uppermost position and set the strong spring f^{17} under tension to throw the piston f^{10} into its lowermost position whenever so permitted by the cam, thus giving the proper pump action to effect the cast.

The nipple f^4 is carried by a slide or carriage f^{27}, mounted for vertical movement between guides f^{28}, fixed to an angular bracket or carriage g^4, which in turn is mounted for vertical movement between guides a^{11}, fixed to a vertical web of the central casting a^4, as best shown in Figs. 2, 3, and 4. The nipple-slide f^{27} is provided near its lower end with a roller f^{50} for coöperation with the inner end of a bell-crank cam-lever f^{29}. The cam-lever f^{29} is pivoted to the bed of the machine, as shown at f^{30}, and the outer or long arm of the same extends to the cam-wheel 4 and is subject to a profile cam-surface f^{31} thereon and a coöperating spring f^{32}, working opposite to the cam, as shown in Fig. 3. The nipple-slide f^{27} is subject to a spring f^{33} for throwing the same downward whenever so permitted by the cam-lever f^{29}. The tube f^3 has sufficient spring to permit the limited up-and-down motion of the nipple 4 under the action of the slide f^{27}.

The type-body mold is made up of several parts, of which the parts marked g^2 and g^3 are shown in the drawings. Of said parts g^2 and g^3 the pair of members g^2 are laterally movable on the part g^3, which is of angular form, for shifting from casting to ejecting positions by means not herein shown. When in casting position, the parts g^2 and g^3 coöperate with the mold-plunger (not shown) to afford the mold-cell g. (See Figs. 2 and 4.) The angular member g^3 of the mold is fixed to horizontal portions of the vertically-movable slide or carriage g^4, hitherto noted as mounted for vertical movement between the guides a^{11} and a vertical web of the casting a^4. At its lower end the mold-carriage g^4 is provided with a roller g^6, which is subject to the action of the inner or cam end of a bell-crank lever g^7, pivoted to the bed-plate by the same pivot-pin f^{30} as the cam-lever f^{29}, which operates the nipple-carriage f^{27}, as shown in Fig. 3. The outer or long arm of the cam-lever g^7 extends to the cam-wheel 4 and is subject to a profile cam-surface thereon (not shown) and is also subject to a coöperating spring g^9 to keep the lever against the face of the cam. The mold-carriage g^4 is subject to a pair of springs g^{10}, tending to throw the same downward into its lowermost position whenever so permitted by the cam-lever g^7. As the angular member g^3 of the mold is fixed to the horizontal arms of the carriage g^4, the mold will of course be moved up and down with said carriage under the coöperation of the cam-lever g^7 and the springs g^{10}. Inasmuch as the nipple-slide f^{27}, hitherto noted, must move independently on the mold-carriage g^4 under the coöperation of its cam-lever f^{29} and spring f^{33}, the lever

f^{29} must have a limited rocking motion at its inner or cam end, which is secured by allowing a little lost motion at its joint with the pivot-pin f^{30}. The inner end of the cam-lever f^{29} works over a cross-piece g^5, carried by the mold-carriage g^4, and hence always occupies a proper position for coöperation with the roller f^{50} of the nipple slide or carriage f^{27} in all positions of the mold-carriage g^4.

The up-and-down motions of the mold secured by the devices just hereinbefore described are to enable the mold to coöperate with the matrix-block h at an upper level when in casting position and to coöperate with the galley-floor (not shown) at a lower level when in type-ejecting position. There is also a lateral shifting motion of the parts g^2 and the mold-plunger (not shown) embraced between the same on the angular member g^3 to shift the mold from casting to ejecting positions; but it is not necessary for the purposes of this case to consider the said lateral motions.

The devices hereinbefore described for effecting the upward movement of the mold constitute portions of the clamping devices which operate from below on the mold and coöperate with devices which operate from above on the matrix-block h to clamp the matrix and the mold in casting position. The matrix-block h has matrices on its face arranged in rows in two directions and has on its back corresponding centering-surfaces justified in two directions for permitting any desired matrix to be selected and brought to casting position by a two-way movement of the block. For permitting these two-way movements the matrix-block h is directly mounted on a small carriage h', which in turn is loosely mounted for transverse movement on guide-bars h^2, connected at their ends to the side rails h^3, and which parts h^2 and h^3 constitute portions of the larger or main carriage, which is mounted for a forward and backward movement in suitable guideways formed in a pivoted support h^4. Otherwise stated, the main carriage h^2 and h^3 and the small carriage h' for the matrix-block h move at right angles to each other. The movements of these carriages are effected by positive devices in one direction to bring the matrix-block to an initial or normal starting-point and set under tension suitable springs for moving the said carriages in the opposite direction and permitting the same to be variably intercepted by suitable stops in each of the two directions to select the proper matrix and bring the same to casting position. The stops for thus variably intercepting the matrix-block are operated by armature-levers and magnets under the automatic control of a punctured representative strip. The devices for thus selecting and centering the selected matrix in casting position are not herein shown, but are fully disclosed in my prior patents, hereinbefore identified. The said primary devices, however, bring the selected matrix to the casting-point only with approximate accuracy. The final positioning or centering of the selected matrix is effected with the required precision by a centering-pin h^{28}, the lower end of which is of conical form and coöperates with the centering-holes of the matrix-block, which are of reversely-conical form, to effect the final centering of the selected matrix. The said centering-pin h^{28} is spring-seated in a suitable frame or yoke h^{27}, fixed to the main-carriage support h^4. At its upper end the centering-pin h^{28} is subject to a loose head 29, which is carried in the horizontal arm of a vertically-movable plunger h^{30}, which is mounted for vertical and pivotal movements in suitable guides, one of which (marked h^{31}) forms a part of or is fixed to the central casting a^4. At its lower end the plunger h^{30} is provided with another guide h^{50}, which is in the form of a shouldered bushing loosely seated in a casting k^2, which is hollow and serves as a housing for the pump-lock lever k', as clearly shown in Figs. 7 to 9, inclusive. The vertical stem of the plunger h^{30} is provided with a grooved nut or collar h^{32}, which is embraced by the forked forward end of a three-arm cam-lever h^{33}. The cam-lever h^{33} is pivoted to the fixed structure a^4 at h^{34}, as shown in Fig. 2. The cam-arms of the lever h^{33} stand approximately at right angles to each other and are provided with suitable cam-rollers, which are subject in succession to the action of a peripheral cam-surface h^{37} on the cam-wheel 4. The stem of the plunger h^{30} is encircled by a stiff spring h^{28}, reacting between the collar h^{32} or a lock-nut cooperating therewith and the lower end guide h^{50} for said plunger. Under the action of the cam-surface h^{37} on the cam-wheel 4, operating in succession on the two arms of the cam-lever h^{33}, the plunger h^{30} is first forced downward against the spring h^{38}, thereby depressing the spring-seated centering-pin h^{28}, and thus causing said pin to center the matrix-block in casting position and then to tightly clamp the same to the type-body mold in coöperation with the clamping devices operating from below, as hitherto described, on the vertically-movable mold-carriage g^4. Later the same cam-surface h^{37}, acting on the roller of the lower or vertical arm of the cam-lever h^{33}, will rock the lever in the opposite direction, and thereby force the plunger h^{30} into its uppermost position. The spring h^{38} will assist in this action and also serves to keep the roller of the horizontal arm of the cam-lever h^{33} in contact with the cam-wheel 4. The plunger h^{30} is provided with a stiff flat spring h^{39}, which overreaches the loose head h^{29} and had in its original function to serve as a safety device to prevent breakage under the clamping action of the plunger h^{30} on the centering-pin h^{28}. Said spring h^{29} is strong enough to resist the required clamping strain, but will yield, if necessary, to prevent breakage of the parts under the action of the cam. Said spring h^{39} is also made to

serve an additional function in respect to the top lever of my present invention, or the squirt preventer herein disclosed, as will later appear. The horizontal arm of the plunger h^{30} carries a spring-seated keeper h^{51}, which is bifurcated at its outer end and embraces the centering-pin 28 below the head of the pin when the parts are in working position. This keeper h^{51} has as its primary function to prevent the centering-pin h^{28} from turning in its bearings and to hold the plunger h^{30} from any swiveling or pivotal motion when the parts are in working position. Incidentally the said keeper h^{51} will also serve to lift the centering-pin h^{28} with a positive action in case the same should get stuck in its lowermost position or its retracting-spring should become broken. Said keeper h^{51} is adapted to be taken hold of by hand and shoved back against its spring, so as to clear the centering-pin h^{28}, and thus permit the plunger to be swung laterally with a pivotal motion into such position as to clear the underlying pivotal support h^4, on which the matrix-carriages are mounted.

With the exception of the roller f^{50} on the nipple carriage or slide, the lower or loose guide h^{50} for the plunger h^{30}, and the spring-seated keeper h^{51} all the parts hereinbefore specified are identical with the corresponding parts bearing the same reference-notations in my said prior patent, No. 609,098.

The squirt-preventer.—I will now describe my present improvement or so-called "squirt-preventer." The parts thereof are marked with the reference-letter k and its powers. Especial attention is called to Figs. 1 and 4 to 9, inclusive.

The pump-actuating rod f^{14} is provided with a notch k, as best shown in Figs. 1, 7, and 8, for coöperation with a latch-lever k'. The latch-lever k' is pivoted to the casting k^2, hitherto noted, and which is of proper construction to serve as a casing for said lever k' and to seat the loose or lower end guide h^{50} for the plunger h^{30}. The latch-lever k' is subject to a spring k^3, which tends to hold the said lever k' in its lowermost or normal position, as shown in Fig. 7. The short end of the lever k' underlies a loose block k^4, carried on the lower end of a headed rod k^5, both of which parts are seated within the plunger h^{30}, the vertical stem portion of which is in this instance formed hollow for that purpose. The loose block k^4 is recessed to permit movement thereof on the head of the rod k^4, and the lower end of the block k^4 is plugged, as shown in Figs. 7, 8, and 9. The loose block k^4 is subject to a spring k^6, encircling the rod k^5 and reacting between the top of the block k^4 and a collar k^7, which may be set in any desired position on the rod k^5. The upper end of the rod k^5 underlies a lever k^8, which is suitably seated within the horizontal portion of the plunger h^{30}, as best shown in Fig. 4. This top lever k^8 is pivoted to the horizontal or arm portion of the plunger h^{30} by a screw-stud k^9, the shank portion of which is eccentric to its head and extends through an eccentrically-located passage in a roller k^{10} and is subject to a lock-nut k^{11}, by which construction the pivot-pin or fulcrum k^9 may be set in any desired adjustment in respect to the bearings for the same afforded by the seats for the eccentrics k^9 and k^{10} in the horizontal arm of the plunger h^{30}. The throw of the lever k may therefore be nicely adjusted as required for the necessary precision to secure the proper action on the latch-lever k'.

The loose head h^{29}, seated in the horizontal or arm portion of the plunger h^{30}, as hitherto described, is in this instance carried by the inner or short arm of the top lever k^8 of the squirt-preventer. For this purpose the loose head h^{29} is recessed or slotted to receive the end of said lever k^8. The said parts (marked with the reference-letters k to k^{11}, inclusive) constitute the elements of the squirt-preventer and are related to each other as shown and described. The action thereof can be readily understood.

The stiff safety-spring h^{39}, fixed to the plunger h^{30}, with its free end overreaching the loose head h^{29}, as hitherto described, constitutes an upper end stop to the movement of said head h^{29} and is sufficiently stiff, as hitherto noted, to withstand the normal clamping strain which is applied to the plunger h^{30} and through the same to the head h^{29}, the centering-pin h^{28}, the matrix-block, and the mold from above, and as long as the matrix-block and the mold make a perfect joint when in casting position the parts will come into positions shown in Figs. 1, 2, and 7 and the latch-lever k' will remain in its normal or inoperative position, as shown in Fig. 7. The weight of the long end of the latch-lever k' and the spring k^3 keeps the loose head k^4 in its uppermost position and puts the spring k^6 under sufficient tension to cause the same to hold the rod k^5 in an uppermost position in direct contact with the top lever k^8 of the squirt-preventer. Suppose now that some obstruction, such as a piece of type-metal z, should intervene between the matrix and the mold, as shown in Fig. 4, and thereby prevent the matrix and the mold from making a proper joint in casting position. Then it will necessarily follow that under the coöperation of the clamping devices acting on the mold and through the centering-pin h^{28} on the matrix-block some element thereof will be obliged to yield in order to permit the cams to complete their normal throws. The centering-pin h^{28} is subject to this yielding action or is the member which will move upward, or, more accurately stated, will fail to move downward to its normal clamping position. Hence the loose head h^{29} will move upward against the tension from the stiff flat spring h^{39} as the plunger h^{30} goes downward to its limit, and the upward movement of said loose head h^{29} will carry with it the short end of the top lever k^8, thereby forcing down the

rod k^5 and through the spring k^6 also forcing down the loose block k^4 against the short end of the bottom or latch lever k', thereby throwing the parts into the position shown in Fig. 8. Otherwise stated, under the action just described the long end of the lower latch-lever k' will be thrown upward into the notch k of the pump-rod f^{14}, thereby preventing any action of the pump. When the clamping devices are released under the further movements of the cams, it is of course obvious that the parts of the squirt-preventer will resume their normal or idle positions, as shown in Figs. 1, 2, and 7.

The purpose of the loose block k^4 and the intermediate spring k^6 on the rod k^5 is to provide a yielding part in the squirt-preventer, which will permit an excess motion on the rod k^5 without breaking any of the parts of the squirt-preventer. For example, suppose some obstruction should intervene between the matrix-block and the mold of unusually large size. In that event the parts could assume the position shown in Fig. 9, or, otherwise stated, the rod k^5 of the squirt-preventer could continue to move downward after the latch-lever k had been moved as far as possible. This yielding part in the squirt-preventer could otherwise be located so long as the same function was preserved.

From the foregoing statements it will be seen that the squirt-preventer is an extremely-simple attachment, but that it is well adapted to serve the purpose intended. By actual and extensive use I have demonstrated the efficiency of the device. The device must of course be properly adjusted; but this adjustment is not so fine as to preclude reliable action. It is only the quads or spacing-type which are hair-spaced, and the smallest printing-type has a face of two units. This two units of face is the smallest adjustment, or, in other words, the smallest-sized obstruction requiring notice by the squirt-preventer. The latch-lever k' will therefore never be thrown up so as to engage with the notch k of the pump-rod f^{14} unless an obstruction equal to or greater than the dimension of a two-unit type comes between the matrix and the mold. It follows that the squirt-preventer does not interfere with the casting action whenever the matrix-block and the mold make a perfect joint, but will always come into play to lock the pump and prevent a cast when such a perfect joint is not secured.

It will be understood that the construction of the squirt-preventer may be widely varied in form without departing from the spirit of my invention.

It should, perhaps, be noted that in my prior patents pump-locks were disclosed for certain purposes specified therein. None thereof, however, served the purpose of the squirt-preventer herein disclosed, and none were capable of use for this function. One of the locks disclosed in my said prior patents operated after every cast to lock the pump with its piston in its uppermost position under tension from its actuating-spring f^{17} and was subject to an electric trip having its magnet in the common return branch of the electric connections, which coöperated to set the matrix-block and the mold-plunger, and hence the pump could not operate until after the matrix-block and the mold had been so properly set. This old lock, although not herein shown, is still used on the machine for the same purpose as disclosed in my prior patents. In some of my prior patents—as, for example, the Patent No. 609,098, of August 16, 1898—I also disclosed a safety-lock for cooperation with the pivoted support h^4, (which carries the matrix-carriages,) which safety-lock was so constructed and disposed that when the pivoted support h^4 was in its lowermost or operative position said lock would be held in an idle position; but when said support h^4 was turned upward on its pivotal bearings and backward over the side of the machine, so as to expose the face of the mold, the spring of the lock would instantly throw the same into an operative position and cause a hook to engage over the end of the pump-actuating rod f^{14} adjacent to the cam-wheel, and thereby render it impossible for any pump action to take place until after the support h^4 had been again lowered into its operative position. From these statements it will be seen that the pump-locks disclosed in my prior patents served functions entirely different than the lock for the pump herein disclosed and which I call the "squirt-preventer." In other words, both of said old locks disclosed in my prior patents are still used, and the squirt-preventing lock herein disclosed is also added to serve its own special purpose. All three of the locks coöperate in the working machine to prevent any casting action whatever except when the parts are in proper working positions for permitting and securing a perfect cast. The addition of the squirt-preventer herein disclosed adds greatly to the efficiency of the machine.

Of course it will be understood that the molten metal might be forced into the mold in any suitable way. A pump is the means in almost universal use for that purpose; but any suitable injecting devices might be employed so far as the purposes of the present invention are concerned. If the melting-pot was at a sufficient height, the molten metal might be forced into the mold under the action of gravity under the control of a suitable regulating-valve, to which the squirt-preventer herein disclosed could then be applied.

What I claim, and desire to secure by Letters Patent of the United States, is as follows:

1. In a type-casting machine, the combination with a mold, a matrix and metal-injecting devices, of a lock for the metal-injecting devices under the coöperative control of the matrix and the mold and operative to prevent any cast, in case the matrix and the mold

fail to make a perfect joint, when in casting position, because of the intervention of foreign material between the face of the mold and the face of the matrix, substantially as described.

2. In a type-casting machine, the combination with a mold, a matrix and a pump, of clamping devices for clamping together the matrix and the mold in casting position, and a pump-lock subject to said clamping devices and operative to lock the pump and prevent any cast, in case the matrix and the mold fail to make a perfect joint, when in casting position, because of the intervention of any foreign material between the face of the matrix and the face of the mold, substantially as described.

3. The combination with a matrix, a mold and a pump, of a pump-lock and clamping devices, for clamping together the matrix and the mold in casting position, which clamping devices include a yielding part which, when the matrix and mold fail to make a perfect joint, in casting position because of the intervention of any foreign material between the matrix and the mold, will render said pump-lock operative to lock the pump in idle position, and thereby prevent any cast, substantially as described.

4. In a type-casting machine, the combination with a matrix, a mold, a pump, and clamping devices for clamping together the matrix and the mold in casting position, of a squirt-preventer including a pump-lock and intermediate devices under the control of the said clamping devices, and operative to hold the lock in idle position, as long as the matrix and mold make a perfect joint, but to throw said lock into locking position, whenever said perfect joint is prevented by an intervening obstruction, between the matrix and the mold, substantially as described.

5. In the type casting and setting machine substantially as described, the combination with the matrix, the mold, the melting-pot and the pump, of the vertically-movable mold-carriage, the cam-actuated devices for forcing the mold-carriage upward into casting position, the matrix-block, the centering-pin h^{28}, the loose head h^{29} and the cam-actuated plunger h^{30}, for clamping the matrix against the face of the mold, when in casting position, the pump-actuating rod provided with a notch or other engaging surface thereon, and the squirt-preventer, including the elements marked k' to k^8, inclusive, for coöperation, substantially as described.

In testimony whereof I affix my signature in presence of two witnesses.

GEORGE ARTHUR GOODSON.

Witnesses:
CHAS. E. HUNTER,
M. J. LOTT.