I. SHÖNBERG.

TYPE CASTING MACHINE.

APPLICATION FILED JAN. 7, 1909.

920,195.

Patented May 4, 1909.

4 SHEETS—SHEET 1.

Fig. 2.

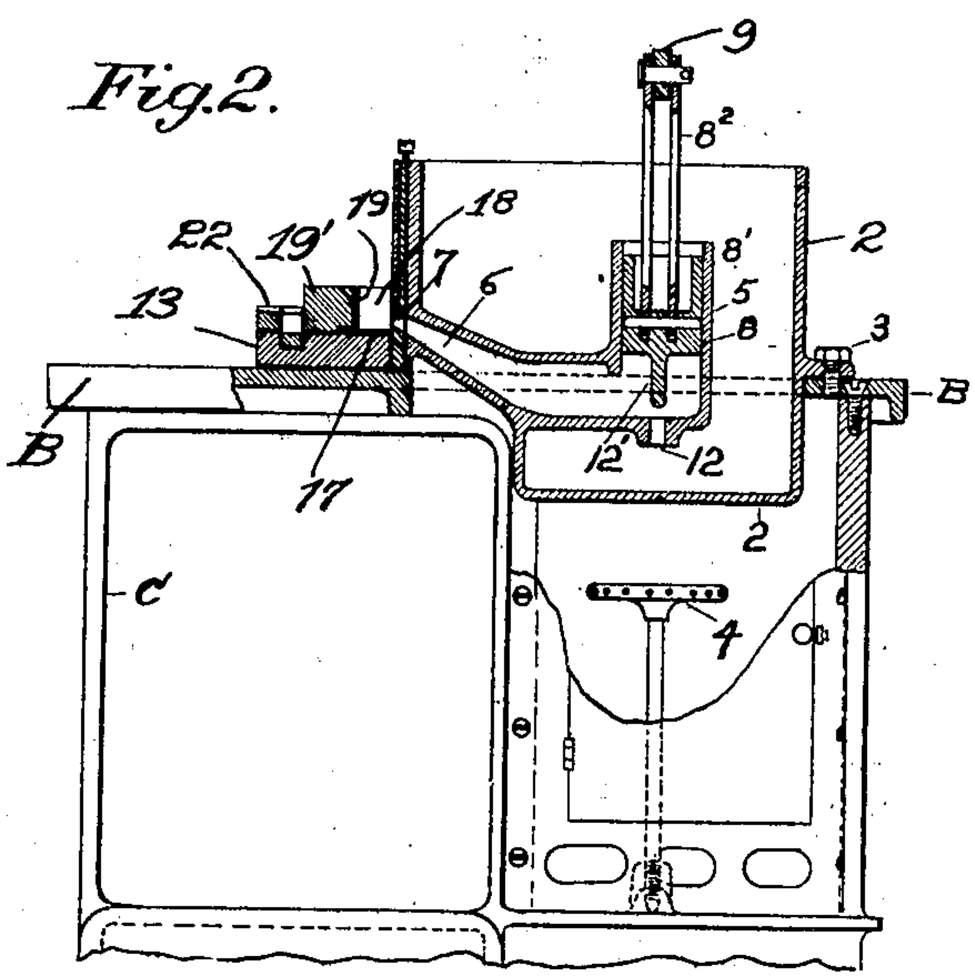
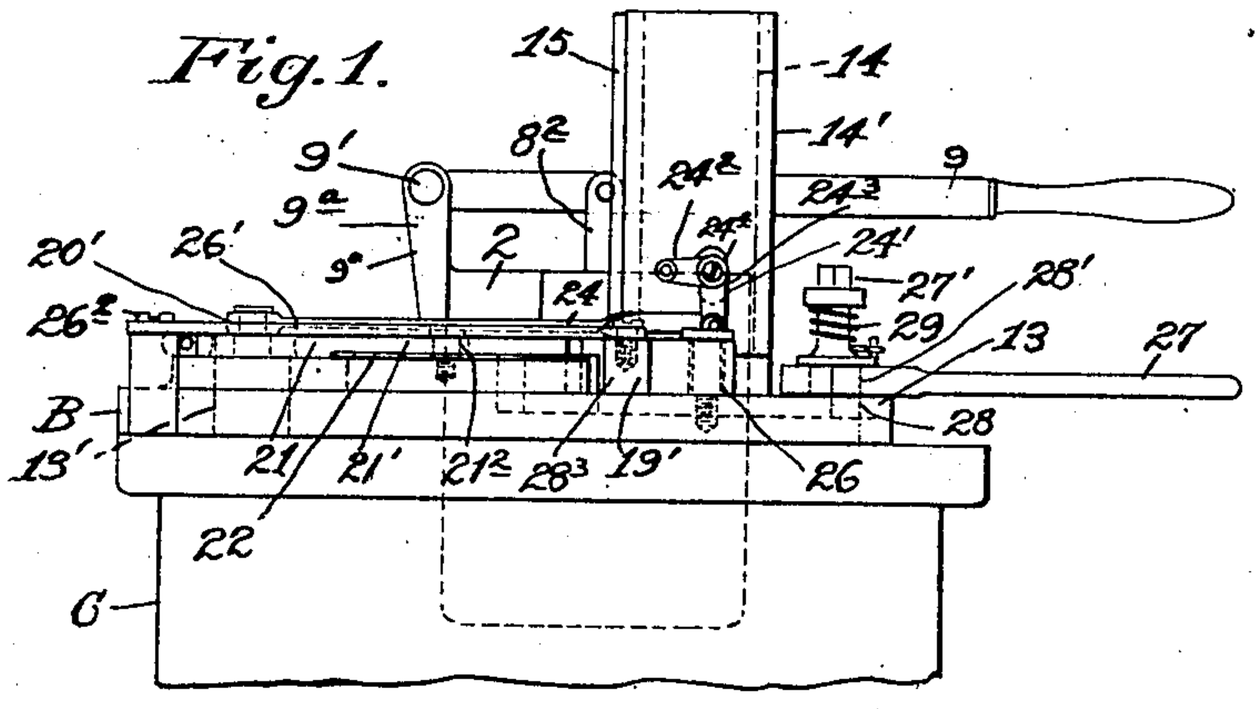


Fig. 1.



Witnesses:
R. W. Pittman
Geo. Cordts.

Inventor,
Isaac Shönberg,
By his Attorney,
Pierson L. Wells

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4 SHEETS—SHEET 2.

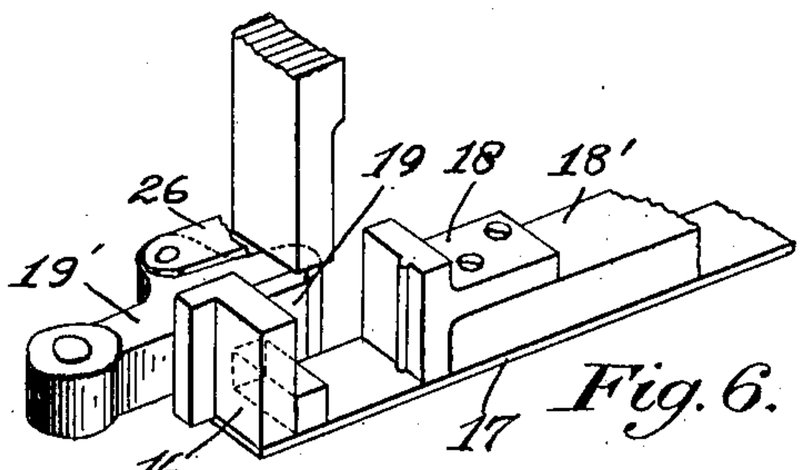

Fig. 6.

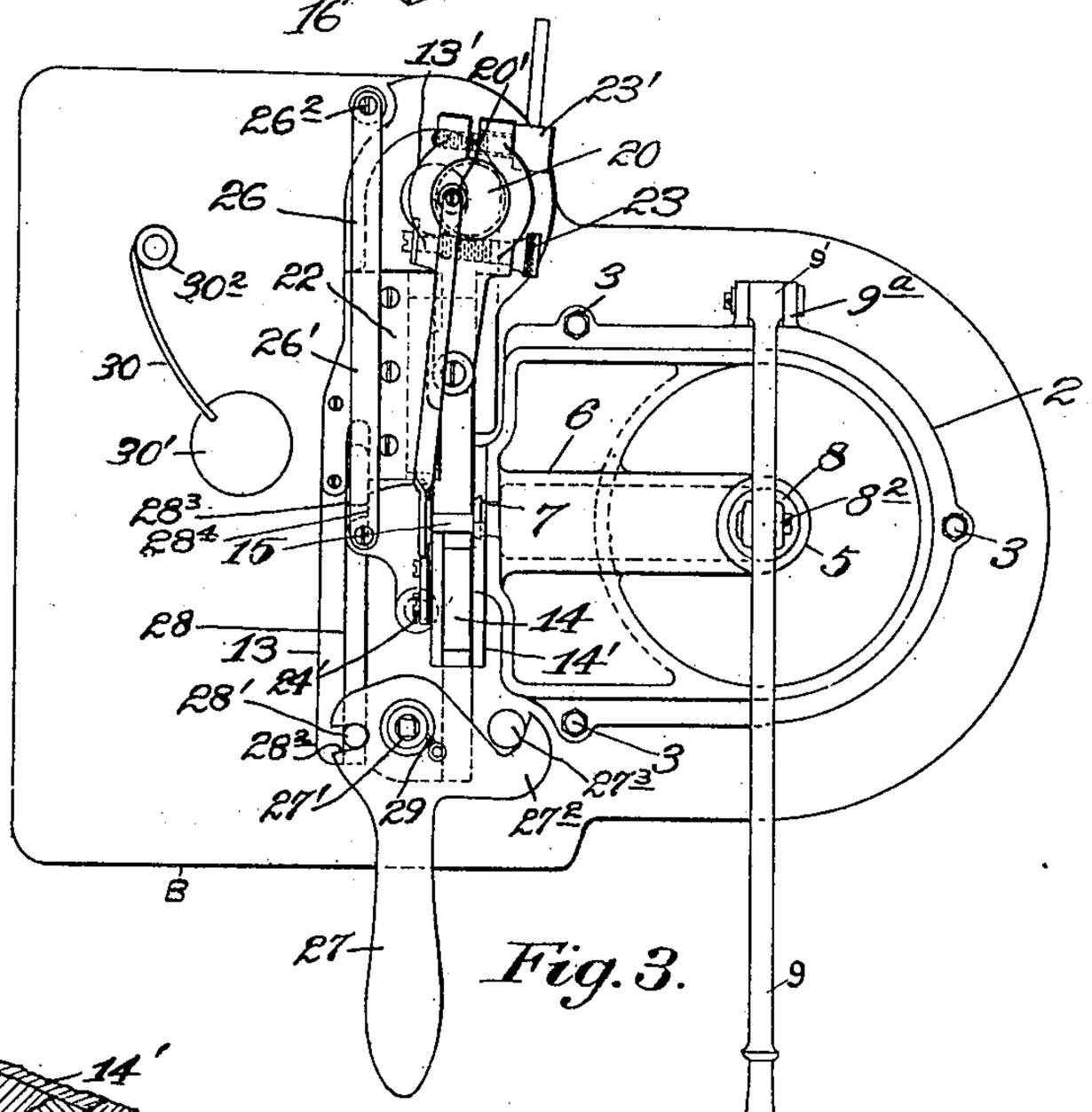

Fig. 3.

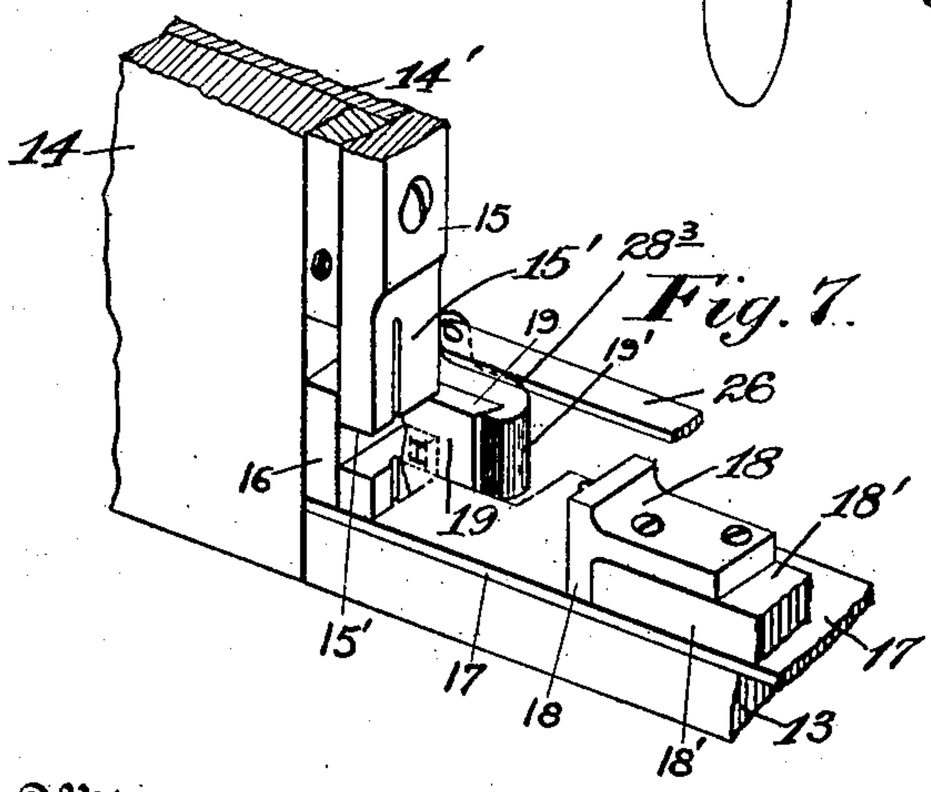

Fig. 7.

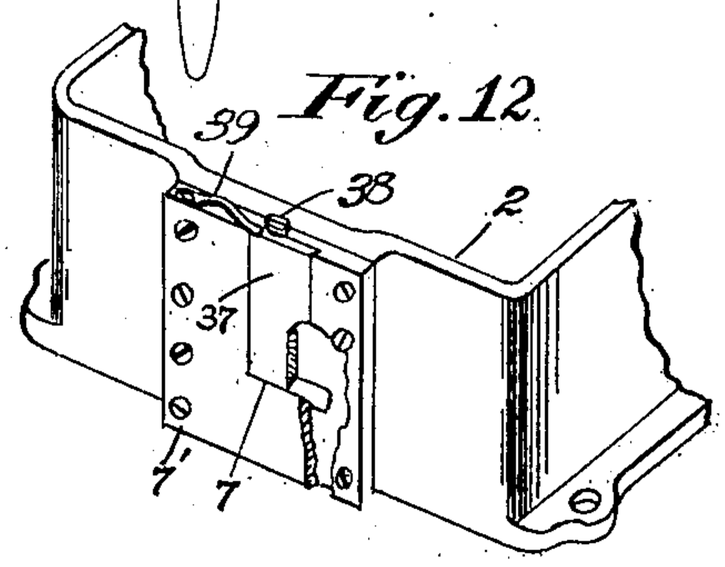

Fig. 12.

Witnesses:

R. W. Pittman

Geo. Coombs

Inventor,

Isaac Shönberg,

Wyks Attorney,

Pierson & Mills

I. SHÖNBERG.

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4 SHEETS—SHEET 3.

Fig. 8.

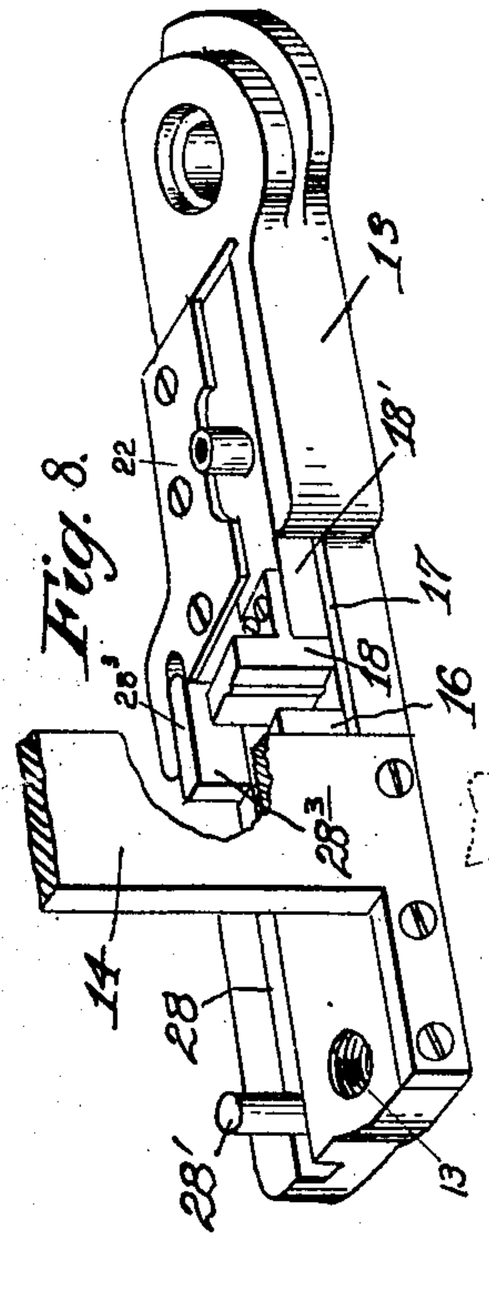

Fig. 5.

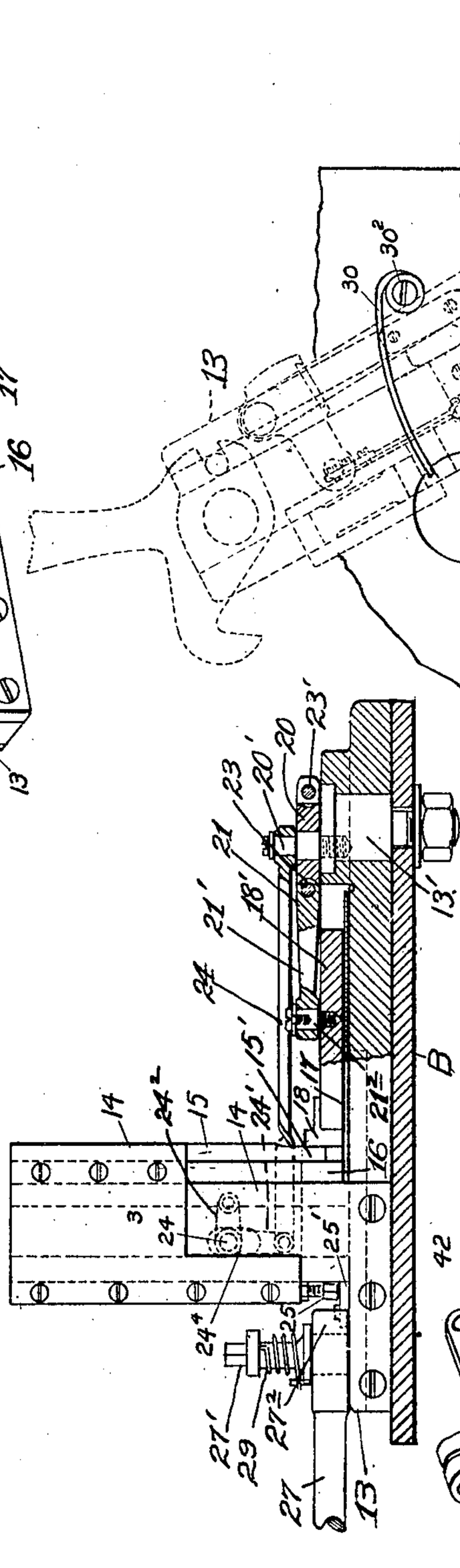

Fig. 4.

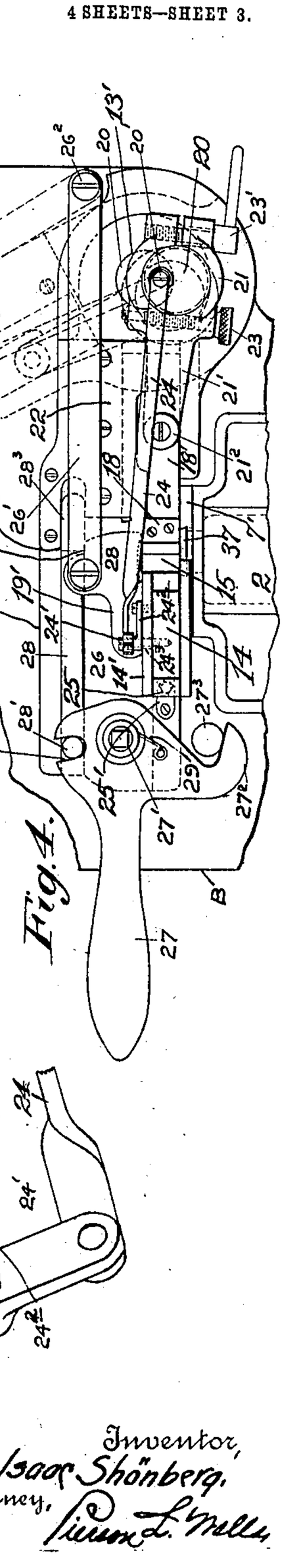

Fig. 11

Witnesses:

P. W. Pittman

Geo. Cordts

Inventor,

Isaac Shönberg.

By his Attorney,

Simon L. Mills

I. SHÖNBERG.

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4 SHEETS—SHEET 4.

Fig. 10.

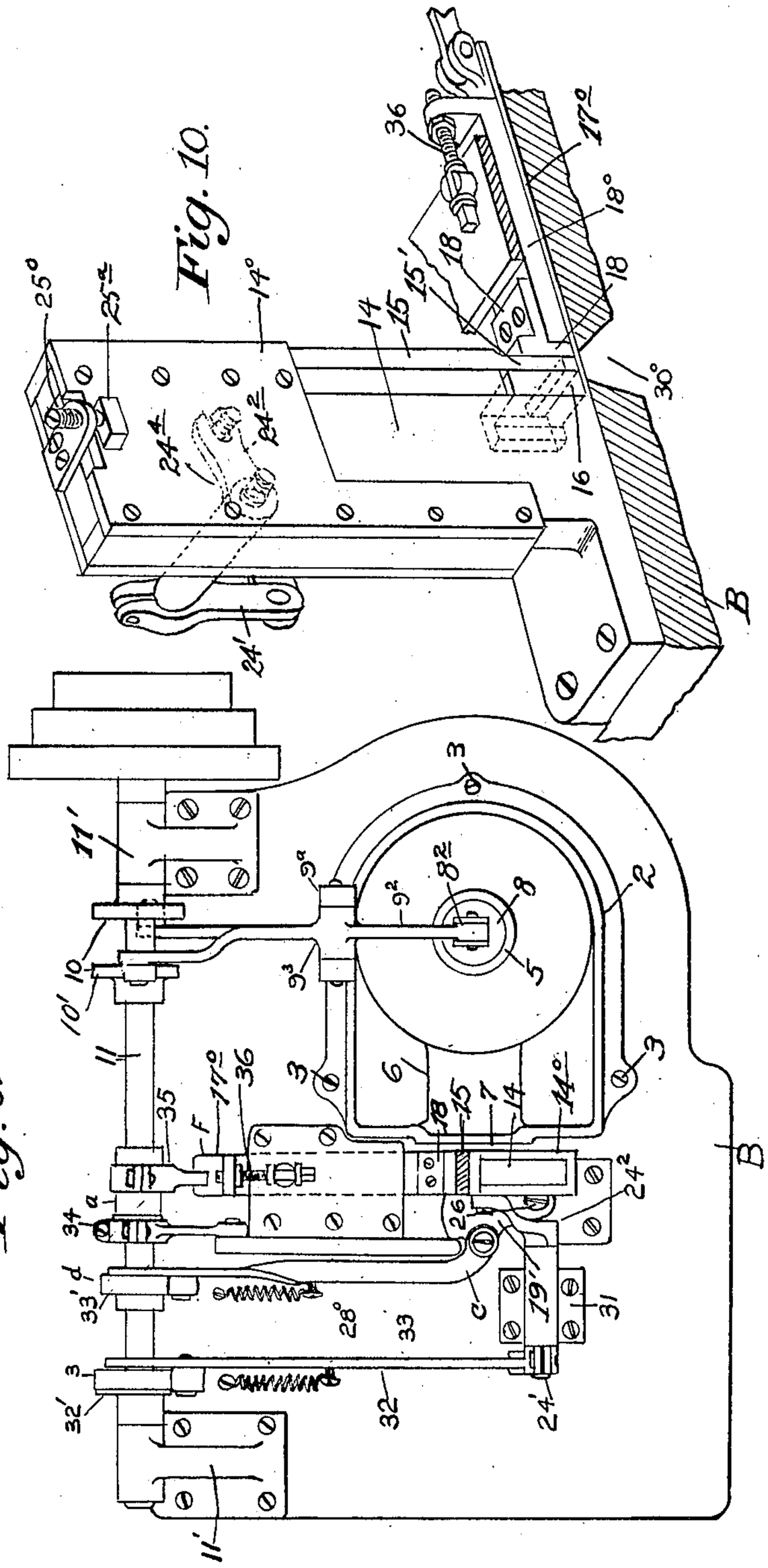

Fig. 9.

Witnesses:
R. W. Pittman
Geo. Corcoto.

Inventor,
Isaac Shönberg.
By his Attorney,
Richard L. Mills

UNITED STATES PATENT OFFICE.

ISAAC SHÖNBERG, OF NEW YORK, N. Y.

TYPE-CASTING MACHINE.

No. 920,195. Specification of Letters Patent. Patented May 4, 1909.

Application filed January 7, 1909. Serial No. 471,073.

To all whom it may concern:

Be it known that I, ISAAC SHÖNBERG, of the borough of Brooklyn, city and State of New York, have invented a certain new and useful Improvement in Type-Casting Machines, of which the following is a specification.

This invention relates particularly to the mold mechanism of type casting machinery and is directed to a construction and mounting for the sections of a separable type mold enabling the opening and closing of the mold to be readily effected and the adjustment of the size of and form of the mold cavity for the production of various styles of type to be easily and quickly made. This novel mold forms a constituent part of a casting machine which possesses various features of invention other than those embodied in the mold, particularly with reference to the means indicated for isolating the molten metal subjected to the pressure of the plunger from the molten metal supply, the adaptability of the machine to either hand or power operation, etc.

The accompanying drawings illustrate a type casting machine embodying the features of this invention, and in these drawings Figure 1 is a side elevation of the top portion of such machine. Fig. 2 is a front elevation part being in section and part being removed. Fig. 3 is a plan view of the machine. Fig. 4 is a plan view, upon a somewhat enlarged scale of the swinging mold-carrying arm and associated parts used in the hand operated machine, the full lines showing the relative condition of parts in the closed position of the mold, and in dotted outline such condition in the open position of the mold. Fig. 5 is a longitudinal section through such arm, parts being in elevation. Figs. 6 and 7 are perspective details of the open mold looking from different points of view toward the matrix side of the mold. Fig. 8 is a perspective detail of the swinging-mold carrying arm showing certain guides, guide-ways, etc., thereon. Fig. 9 is a plan view of the machine constructed for power operation. Fig. 10 is a perspective detail of the mold mechanism, etc., of Fig. 9. Fig. 11 is a detail of the adjustable angle arm for operating one of the mold parts. Fig. 12 is a detail of the melting pot looking at the orifice plate thereof.

Similar characters of reference designate corresponding parts in all figures.

The illustrated support for the operative parts of the machine comprises a platen or table B on a supporting pedestal C. Into an opening of the table, a melting pot 2 is set, the pot being secured in position by proper fastening devices 3 and heated by some suitable source of heat 4.

A cylinder 5 in the melting pot communicates by a nozzle 6 with a nozzle orifice 7 in an orifice plate 7′. In cylinder 5, a piston 8 works, a cross pin 8′ of the piston being connected by a suitable connecting rod 8^2 with a rock lever, which in the hand operated machine of Figs. 1 to 8, inclusive, and Fig. 12 consists of a hand lever 9 fulcrumed at one end 9′ to a fixture 9^a on the side of the melting pot; in the power machine of Figs. 9 and 10, rock lever 9^2 is fulcrumed intermediate its ends, see 9^3, to the melting pot and is rocked to and fro by cams 10, 10′ on a power shaft 11 journaled in suitable bearings 11′, 11′ secured to table B.

Molten metal enters the cylinder space below the piston through an opening 12 during the final stage of the ascending movement of the piston. Upon the descent thereof a valve-forming projection 12′ on the piston enters said opening shutting off the further entrance of metal and confining the metal below the piston in the spout which metal is thereon forcibly ejected through orifice 7 as the piston is forced downward.

Referring to the mold mechanism of the hand-operated machine of Figs. 1 to 8, inclusive, it should be stated that the mold is mounted on a swinging arm 13 adapted to swing about a fixed stud 13′ secured to and projecting upward from table B from a position in which the mold is in contact with orifice plate 7′ to a position away therefrom, see respectively, the full and dotted outline positions in Fig. 4. It is during these to and fro swinging motions that the relative movement of the mold parts is effected. That is to say, rigid with arm 13 and projecting laterally with reference to the plane of movement thereof is a guide 14, angular in cross section, and longitudinally of which is adapted to reciprocate a slide 14′, here of built-up construction and encircling the guide. This slide carries a part 15 whose squared end 15′ forms one face of the mold cavity and which slide is recipro-

cable to open and close the mold in the direction of reciprocation.

Other faces of the mold cavity are formed by a block 16, fixed relatively to arm 13 and over which the end portion of part 15 may slide; a bottom filler or wear plate 17 similarly fixed; a mold section 18 secured to a slide 18′ mounted on arm 13; the matrix 19 in a swinging matrix carrier 19′; while the remaining face is constituted by the face of orifice plate 7′ when the mold is in position ready for casting.

Referring to the construction for opening and closing the mold, that is, shifting part or section 15, section 18′ and matrix carrier 19′ as the result of swinging arm 13 to and away from orifice 7, an enlarged pin or disk 20 rotatively mounted on a pin 20′ extending from stud 13′ in axially eccentric relation thereto is encircled by a strap 21 having an extension 21′ pivoted by a pin 21^2 to the aforementioned slide 18′ carrying mold section 18. Slide 18′ is fitted to ways in arm 13 being retained therein by a gib 22.

It is evident that owing to the eccentric relation of pin 20′ and stud 13′, as arm 13 is swung away from the orifice mold section 18 is withdrawn enlarging the mold cavity in the direction of motion.

In order to enable the width of the mold cavity in this direction to be varied, as in making different size types, disk 20 is peripherally notched and with the same engages a tangent screw 23 mounted in strap 21 whereby the disk may be turned around the axis of pin 20′. After adjustment the strap may be firmly secured to the disk by clamping screw 23′.

Slide 14′ is moved to and fro during the reciprocation of arm 13 by means of a link 24 pivoted at one end to pin 20′ and at the other end to one arm 24′ of an angle lever, the other arm 24^2 of which is pivoted to slide 14′. The said angle lever rocks upon a stud 24^3 extending from guide 14, the slide being slotted, see 24^4, to permit of the play of stud 24^3, and in order to adjust the size of the mold in the direction of reciprocation of slide 14′ (for types of various sizes lengthwise of the type line) arm 24′ is adjustably clamped to a sleeve 24^4 which is rotatably mounted on stud 24^3. This adjustment of slide 14′ is facilitated by a series of sizing blocks corresponding to various sizes of types, any particular one of which may be placed below a stop on slide 14′ and the arm 24′ adjusted on sleeve 24^4 to bring the stop in engagement with the sizing block in which position slide 14′ forms a mold cavity adapted to make the type corresponding to the sizing block used. As illustrated in Fig. 5 the aforesaid stop is in the form of a screw 25, an inserted sizing block 25′ being also indicated.

Swinging matrix carrier 19′ is swung to and fro on its pivot pin 26 simultaneously with the swinging movement of arm 13 by means of a link 26′ pivoted at one end to the matrix carrier and at the opposite end to table B by a pivot pin 26^2.

An operating handle 27 is mounted on a stud 27′ rigid with arm 13. This handle is here used not only for swinging arm 13 but also for locking the mold against the orifice plate when the mold is in its casting position and the matrix carrier against the closed mold. The former results from the engagement of a hook 27^2 on the handle with a fixed pin 27^3 on table B while the latter locking is effected by a slide 28 having a pin $28'$ engaging with a slot 28^2 in handle 27 and a face 28^3 adapted to engage with a shoulder 28^4 on the matrix carrier. Spring 29 urges handle 27 to its locking position relatively to arm 13.

As the swinging movement of arm 13 away from the orifice plate is continued the type is eventually ejected from the opened mold by an ejector 30 and drops through an opening 30′ in table, the movement of the arm being limited by a stop 30^2.

The operation of the construction so far described is apparent; the mold being in its casting position,—see Fig. 4, plunger 8 may thereupon be depressed subjecting the metal confined in spout 6 by valve 12 to pressure and forcibly injecting same into the mold cavity. If handle 27 is now swung to the left in Fig. 3 arm 13 is unlocked from pin 27^3 and slide 28 is actuated to unlock matrix carrier 19′. Continued movement toward the left raises slide 14′ withdraws mold section 18 and swings the matrix carrier backward, all in the manner described. The type is finally ejected by ejector 30. A reverse motion of arm 13 is accompanied by a reverse motion of the parts eventually closing the mold and locking the same against the orifice plate ready for another operation.

In the power machine of Figs. 9 and 10, parts substantially identical in construction with the parts already described are designated by like characters of reference and need not be again referred to except briefly. The cam operation of the metal plunger has already been described. Clamp arm 24′ and fixed arm 24^2 for shifting slide 14^0 are here secured to a rock shaft (not shown) mounted in a bearing 31 and actuated through a spring-returned cam link 32 from a cam 32′ on shaft 11. Matrix carrier pivot pin 26 extends from table B and matrix carrier 19′ is swung thereon through a spring-returned cam link 33 from a cam 33′ on shaft 11 while matrix carrier locking slide 28^0 is actuated through an eccentric and strap connection 34 from shaft 11.

Mold section 18 is secured to slide 18^0 which here moves as a unit with plate 17^0 through a strap and eccentric connection 35

from shaft 11, the slide being, however, adjustable relatively to such plate (for various size types) as by an adjusting screw 36.

It should be stated as a preface to the description of the manner of ejecting the type here adopted that slide 14° here moves downward instead of upward as in the former case following the making of a type, this downward movement being preceded by the withdrawal of slide 18° sufficiently to carry attached plate 17° out from under the type. The downward movement then forces the type downward across the path of movement of the plate and should the type stick in this position the forward movement of the plate breaks the type loose and it descends through an opening 30° in table B. Before the final positioning of section 18 slide 14° rises, its highest or mold-forming position being regulated by the co-action of a stop 25° on guide 14 and a sizing block inserted between it and lug 25ª in the slide in an analogous manner to what has already been described with reference to stop 25.

The sequence of movements involved in the making and ejection of a type is substantially the same as that already described with reference to the hand operated machine.

It is to be noted that in both the hand and power operated constructions there is a mold section adapted to permit one of the other mold sections to slide along its mold-forming surface.

Fig. 12 illustrates a sprue cutter consisting of a slide 37 mounted in guide-ways in the orifice plate 7′ and limited in its upward movement by a stop 38. When positioned against this stop an elongated orifice 7 is formed which is maintained as long as the molten metal is subjected to pressure. Upon the release of such pressure slide 37 by the reaction of spring 39 aided by its own weight descends, closes the orifice and permits the molten metal in the spout beyond the closed slide to flow back.

Having described my invention, I claim;

1. In a type casting machine, a sectional mold embodying a relatively fixed mold section, a reciprocating slide, a mold section secured to said slide, a third mold section adapted to permit said second mentioned mold section to slide along its mold-forming surface, and a matrix carrier combined with means for regulating the mold-forming position of said slide to correspond to the type to be made.

2. In a type casting machine, a sectional mold embodying a relatively fixed mold section, a reciprocating slide, a mold section secured to said slide, a third mold section adapted to permit said second mentioned mold section to slide along its mold-forming surface, a reciprocating slide to which said third mold section is secured and a matrix carrier, said slides being adjustably positioned in their respective lines of reciprocation for the purpose specified, combined with means for operating said slides to open and close the mold.

3. The combination in a type casting machine, of a sectional mold embodying a swinging matrix carrier, and a pair of reciprocating slides adjustably positioned in their respective lines of reciprocation for the purpose specified, and means for operating said carrier and slides to open and close the mold.

4. The combination in a type casting machine, of a sectional mold embodying a swinging matrix carrier, and a pair of reciprocating slides adjustably positioned in their respective lines of reciprocation for the purpose specified, a lock for holding the matrix carrier rigidly in its casting position; and means for operating said carrier, slides and lock in proper sequence.

5. The combination in a type casting machine of a sectional mold embodying a matrix carrier, and a pair of reciprocating slides adjustably positioned in their respective lines of reciprocation for the purpose specified, a locking device for holding the mold rigidly in its casting position, and means for operating said carrier, slides and locking device in proper sequence.

6. The combination, in a type casting machine of a sectional mold, a melting pot, a plunger, a nozzle having an opening from its interior into the melting pot, and a valve like projection on said plunger alined with said opening.

7. In a type casting machine, the combination of an orifice plate, a swinging arm, a sectional mold mounted on said arm, and means connecting with sections of the mold for opening and closing the mold during the movement of the arm toward and away from the orifice plate.

8. In a type casting machine, the combination of an orifice plate, a swinging arm, a transverse guide on the arm, a slide movable lengthwise of said guide, a swinging matrix carrier, a slide movable lengthwise of said arm, a supporting table, and means on said table for causing the movements of said slides and matrix carrier during the motion of the arm toward and away from the orifice plate.

9. In a type casting machine, the combination of an orifice plate, a swinging arm, a transverse guide on the arm, a slide movable lengthwise of said guide, a swinging matrix carrier, a slide movable lengthwise of said arm, an operating handle for the arm, locking means under the control of said handle for locking the matrix carrier to the mold and the mold to the orifice plate, a supporting table, and means on said table for causing the movements of said slides and

matrix carrier during the motion of the arm toward and away from the orifice plate.

10. In a type casting machine, the combination of a swinging arm, a sectional mold thereon, a supporting table, pivot pins supported by said table eccentric to the pivotal axis of said arm, and links connecting mold sections to said eccentric pivot pins for the purpose specified.

11. In a type casting machine the combination of a swinging arm, a supporting table, separable mold sections mounted on said arm and pivot pins supported by the table eccentric to the pivotal axis of said arm, said separable mold sections being adjustably connected to said pivot pins substantially for the purpose specified.

12. In a type casting machine, the combination of a shiftable mold carrier, a sectional mold thereon embodying a matrix carrier movable relatively to said mold carrier, an orifice plate, a supporting table, a spring-pressed part for operating said mold carrier, means extending from the table and with which said operating part is adapted to engage to thereby lock the mold carrier against the orifice plate, and a lock connected to said operating part for locking the matrix carrier in its casting position.

In witness whereof I have signed this specification in the presence of two subscribing witnesses.

ISAAC SHÖNBERG.

Witnesses:
R. W. PITTMAN,
LOUIS LONG.