No. 889,820. PATENTED JUNE 2, 1908.

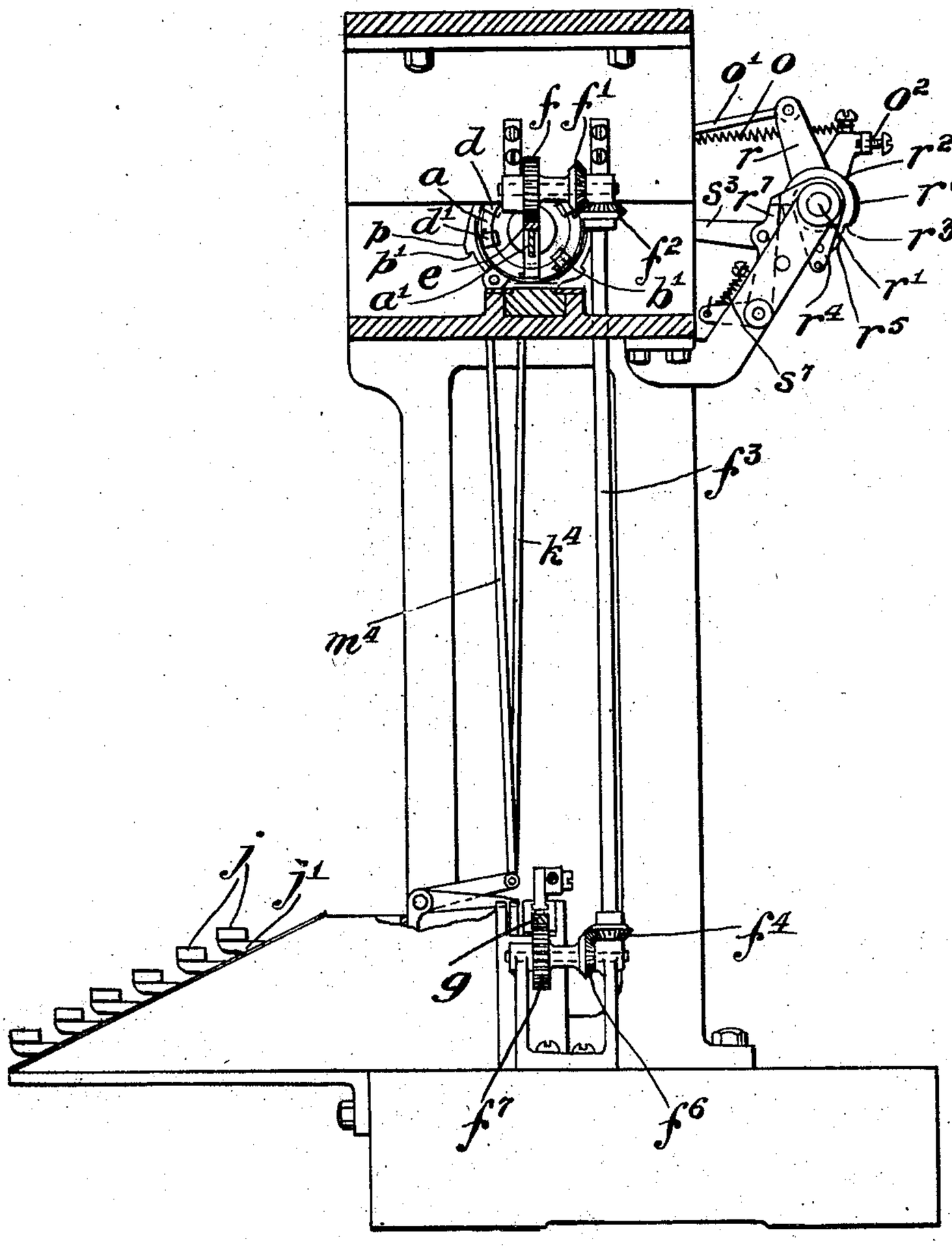
O. V. SIGURDSSON.

TYPE CASTING MACHINE.

APPLICATION FILED JUNE 29, 1907.

6 SHEETS—SHEET 1.

Fig. 1.



WITNESSES

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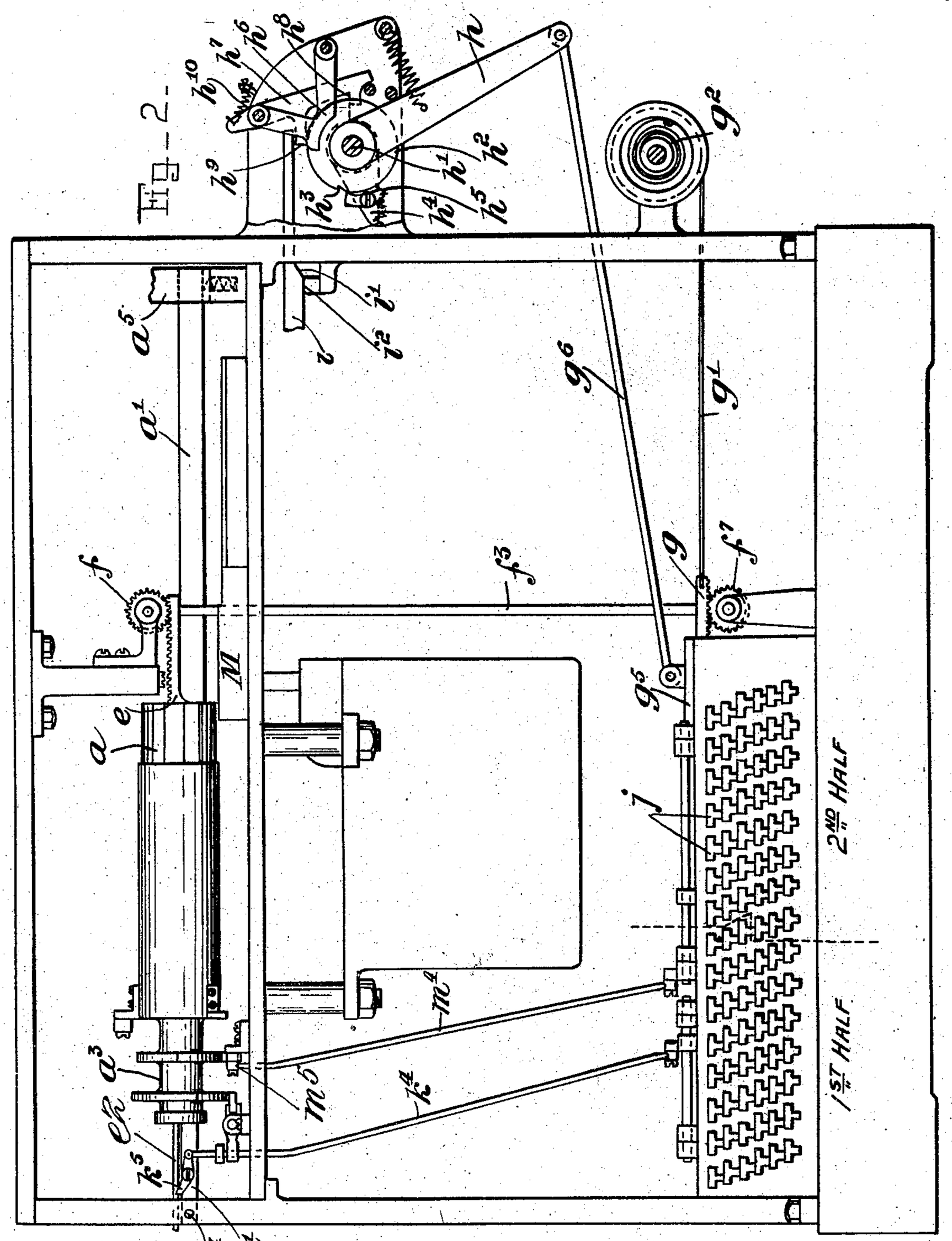
5 SHEETS—SHEET 2.

Fig. 2.



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5 SHEETS—SHEET 3.

Fig. 3.

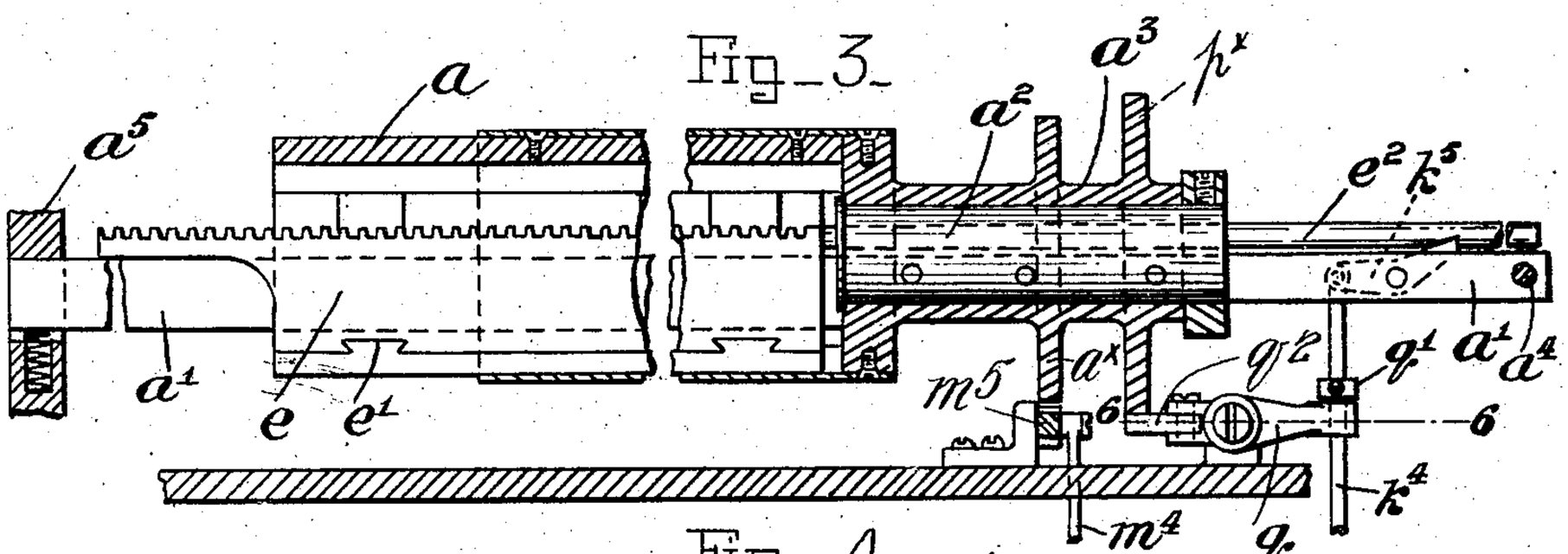


Fig. 4.

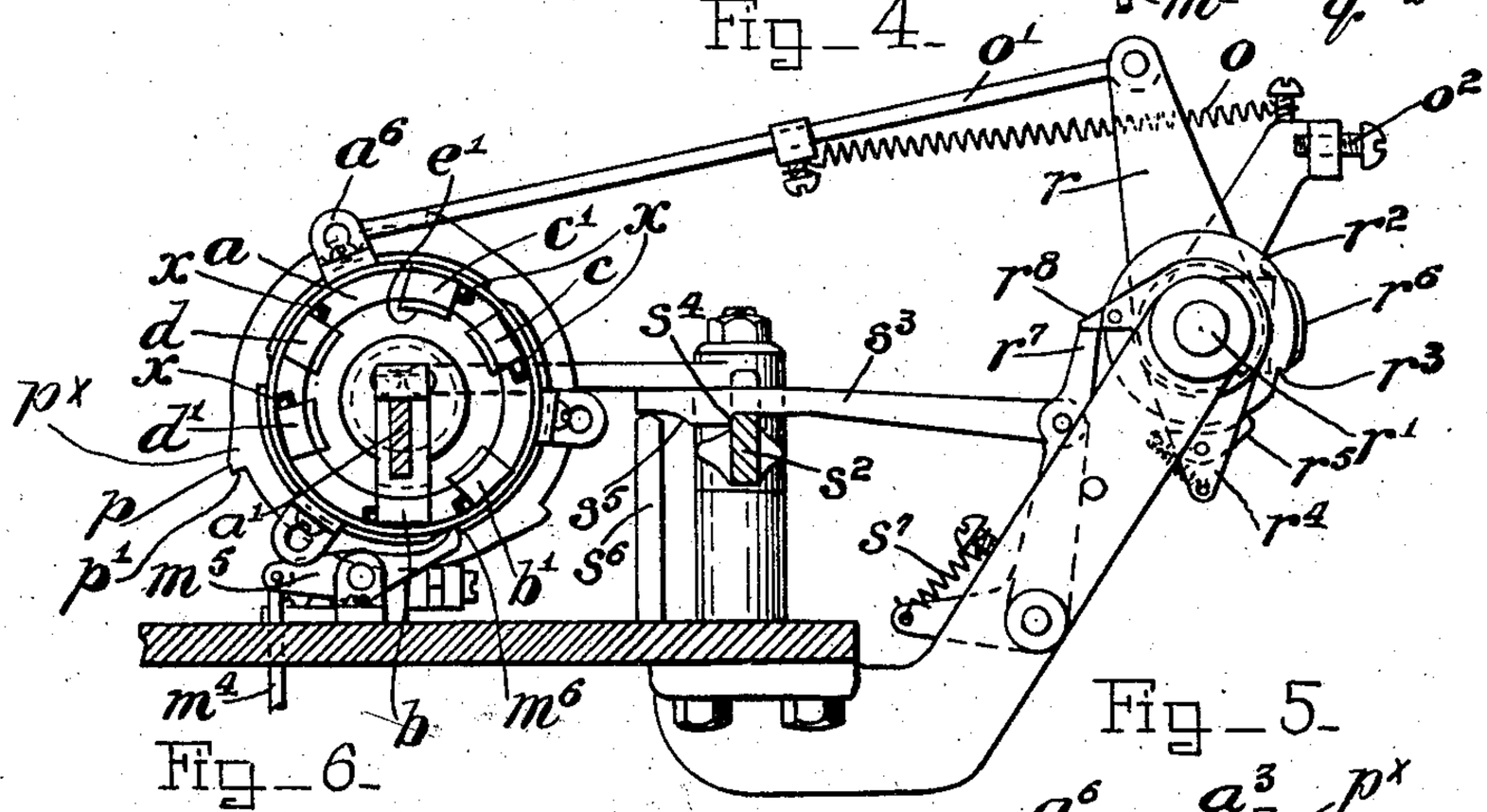


Fig. 6.

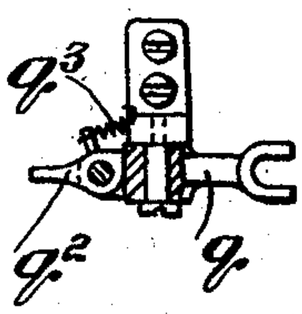
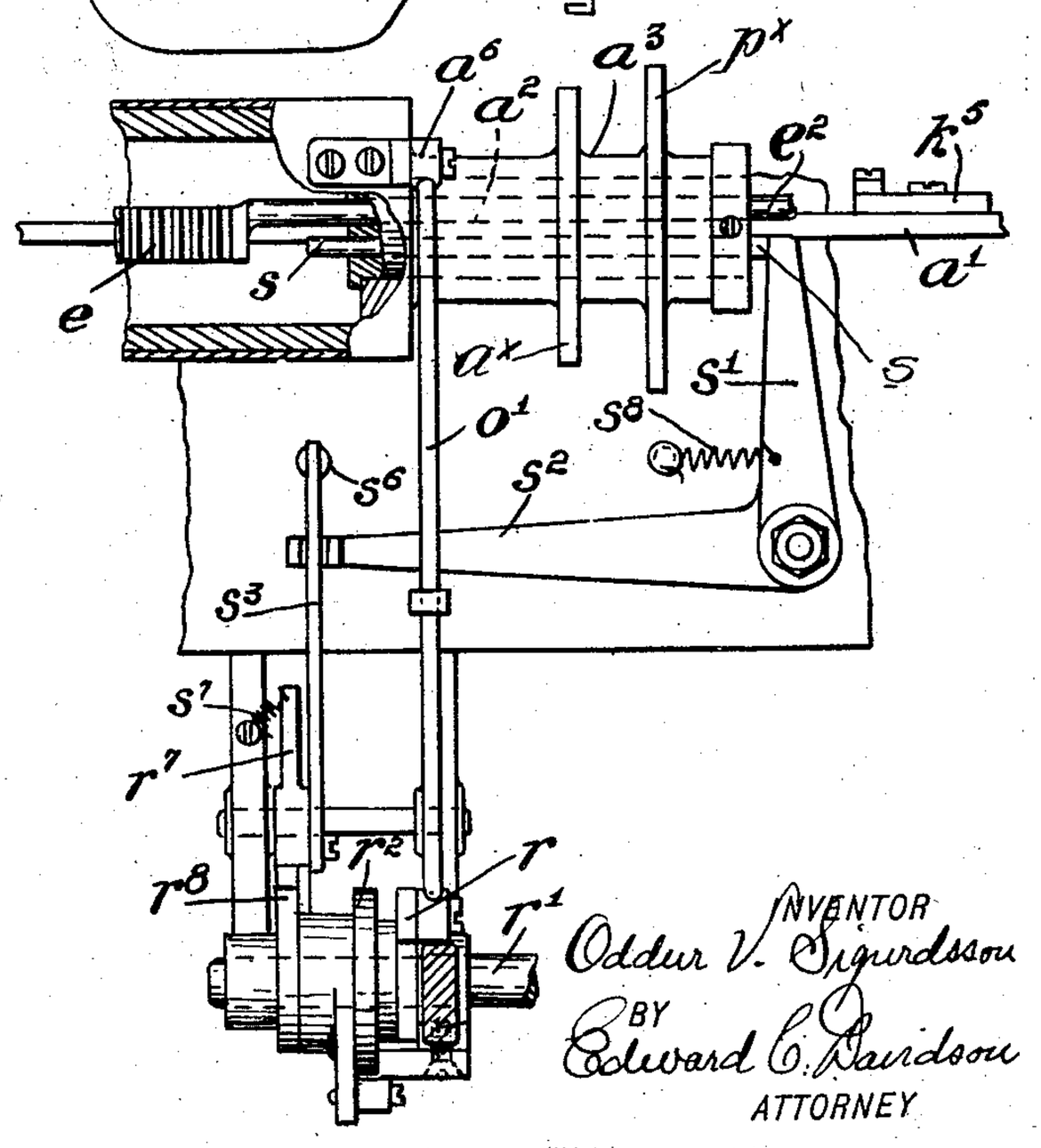


Fig. 5.



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5 SHEETS—SHEET 4.

Fig. 7

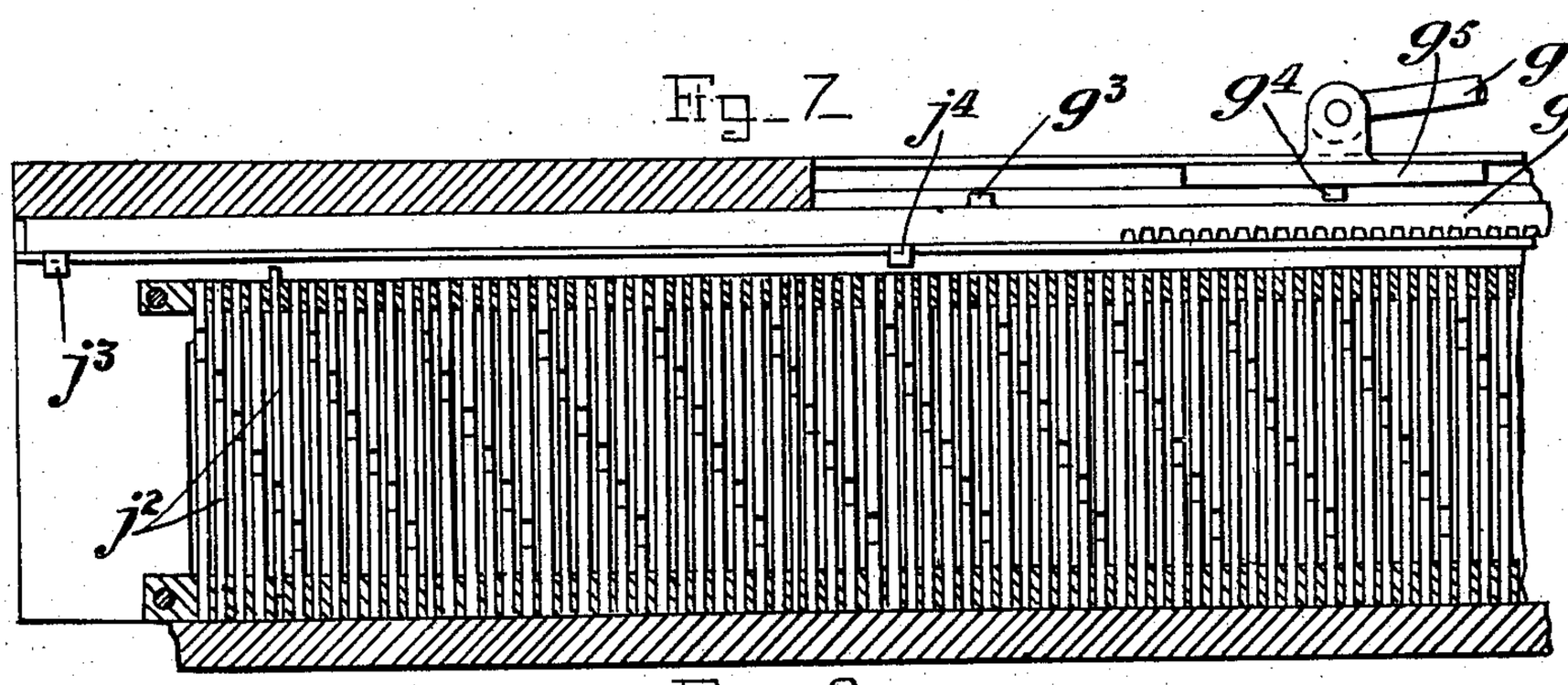


Fig. 8

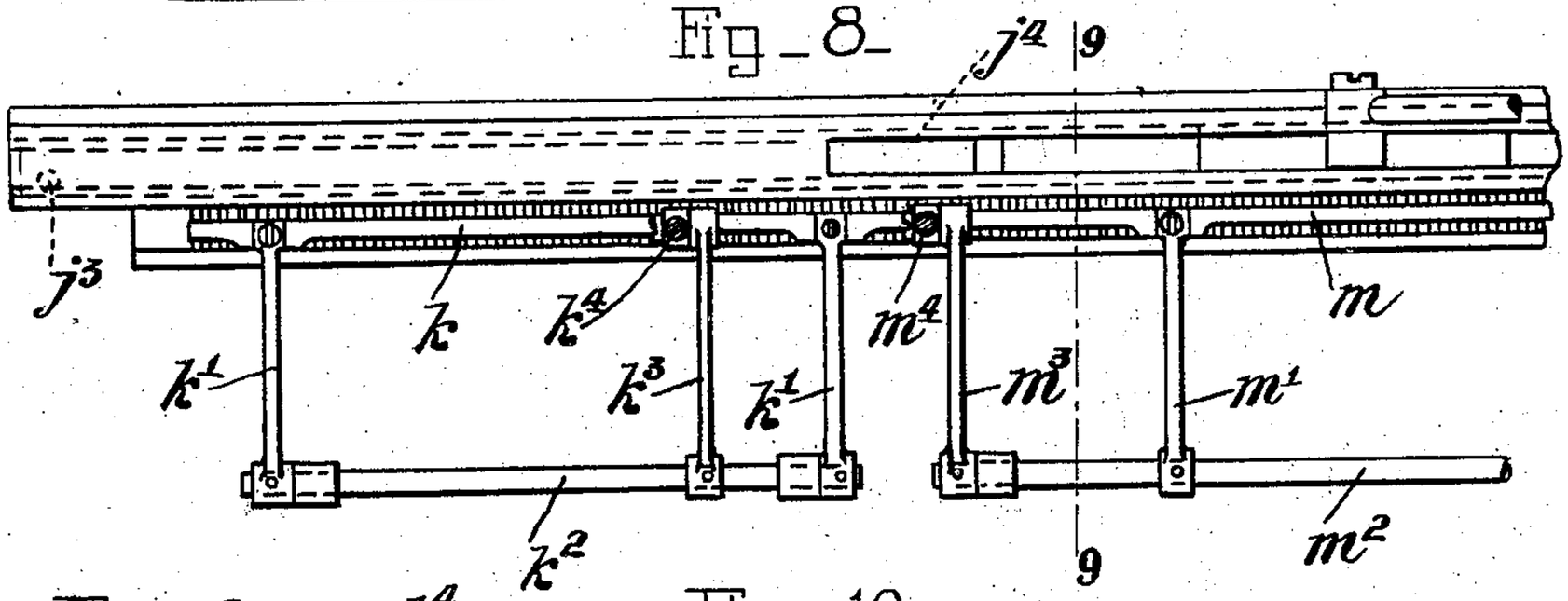


Fig. 9

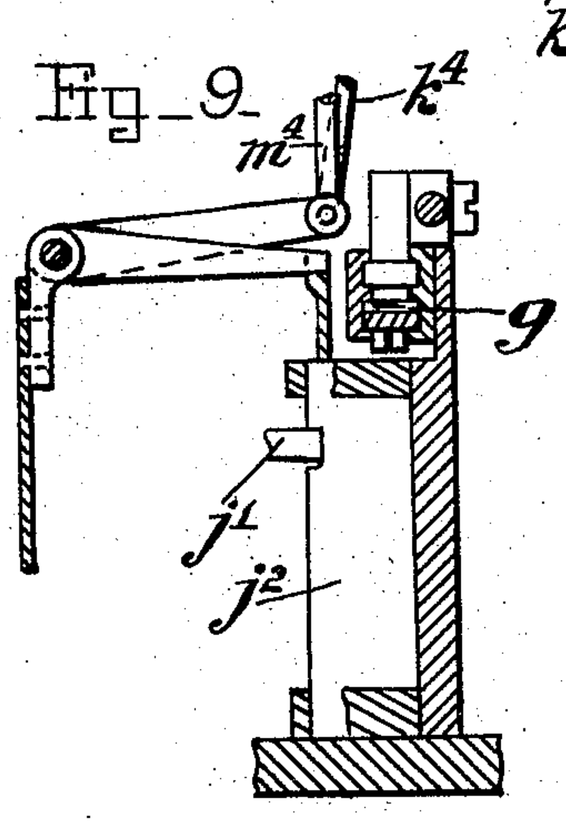
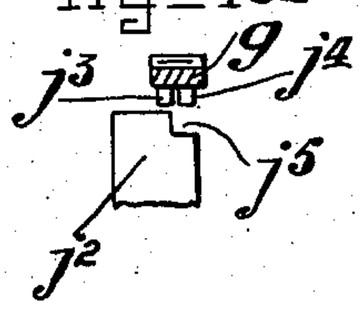


Fig. 10



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5 SHEETS—SHEET 5.

Fig. 11.

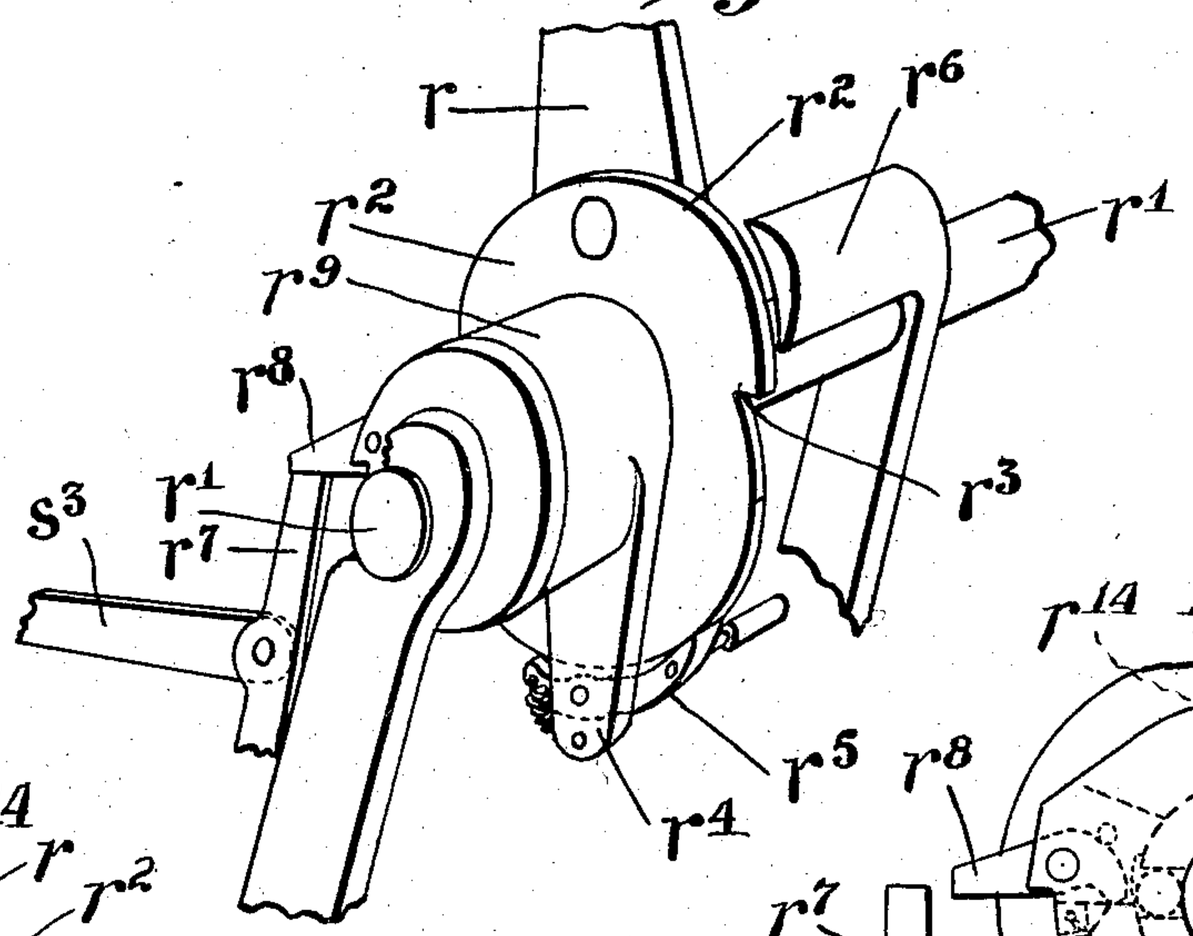


Fig. 12.

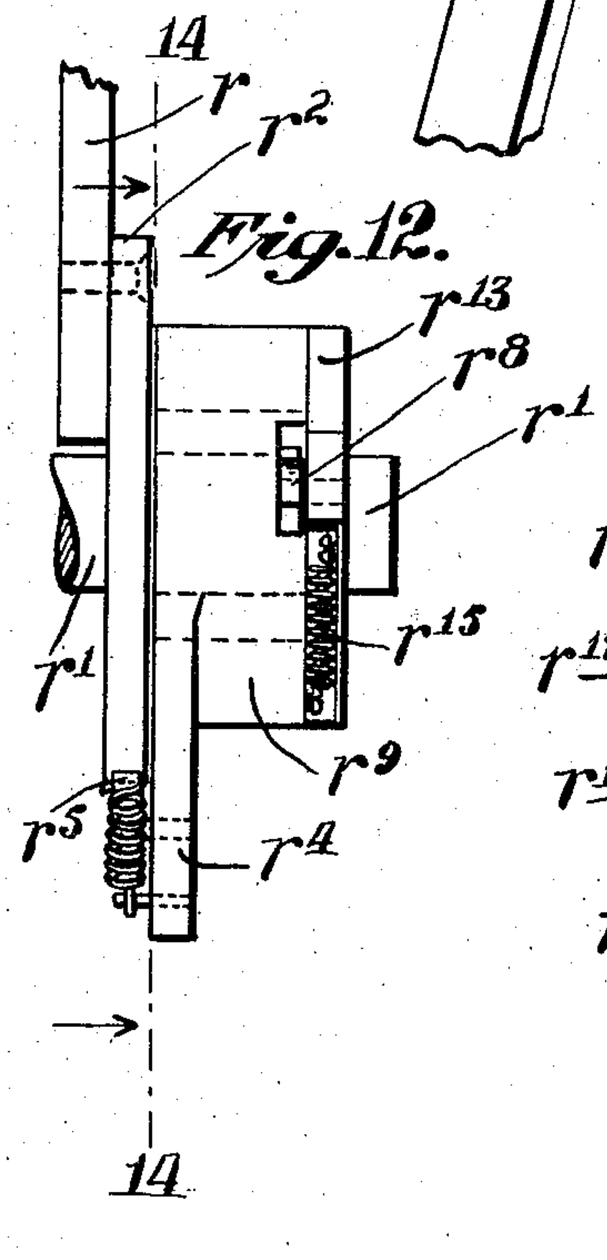


Fig. 13.

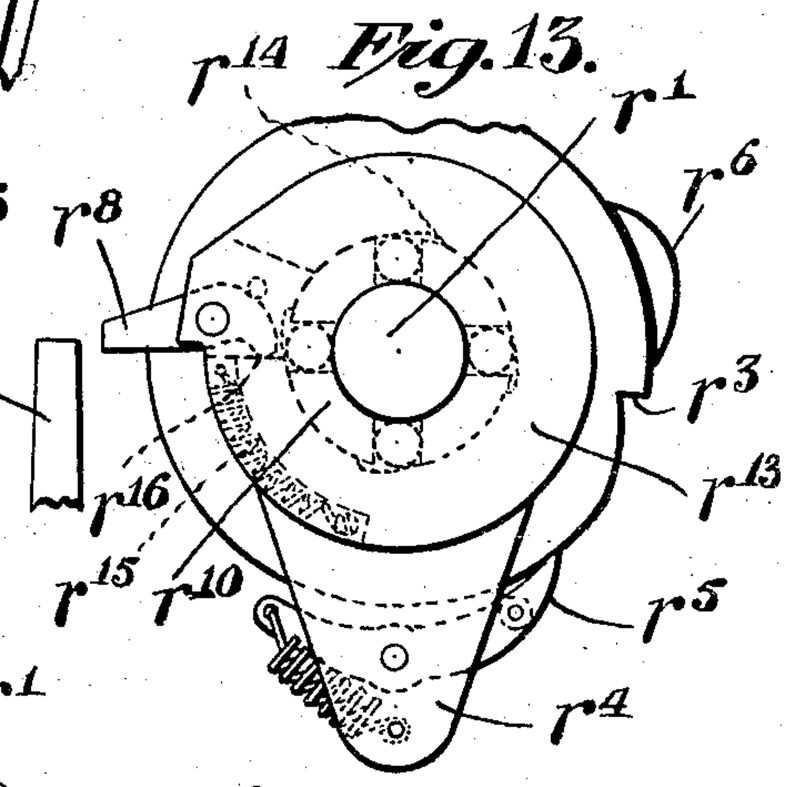


Fig. 14.

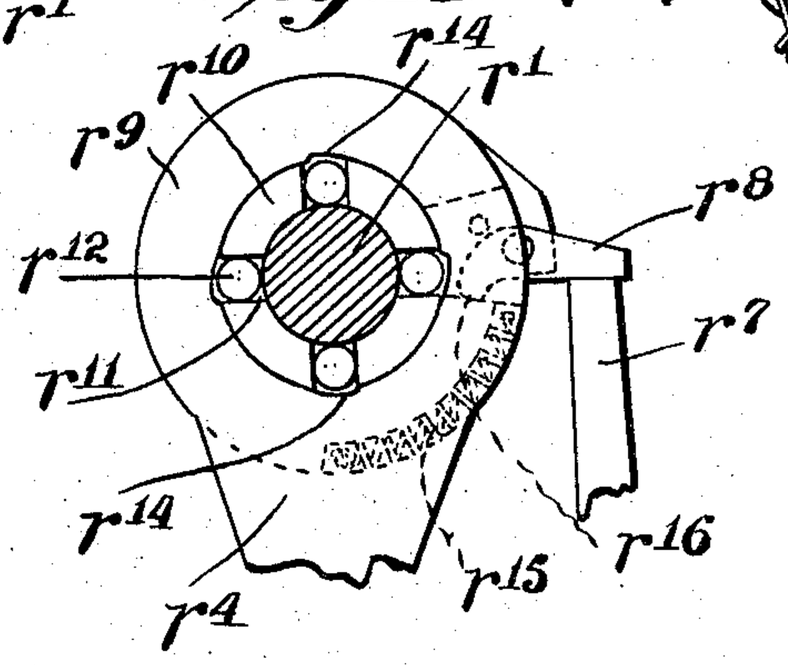
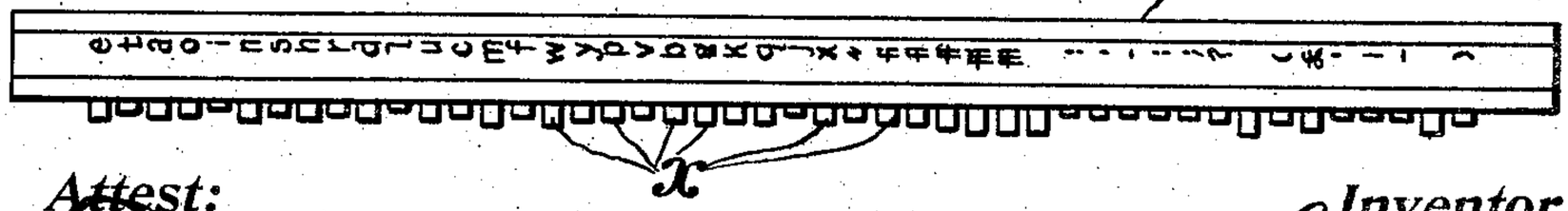


Fig. 15.



Attest:
S. Mitchell
L. L. Browning.

Inventor:
Oddur V. Sigurdsson
by Edward C. Davidson Atty

UNITED STATES PATENT OFFICE.

ODDUR V. SIGURDSSON, OF NEW YORK, N. Y., ASSIGNOR TO ODDUR MANUFACTURING COMPANY, OF NEW YORK, N. Y., A CORPORATION OF WEST VIRGINIA.

TYPE-CASTING MACHINE.

No. 889,820. Specification of Letters Patent. Patented June 2, 1908.

Application filed June 29, 1907. Serial No. 381,395.

To all whom it may concern:

Be it known that I, ODDUR V. SIGURDSSON, a subject of the King of Denmark, residing in the borough of Brooklyn, city and State of New York, have invented certain Improvements in Type-Casting Machines, of which the following is a specification.

This invention relates to typecasting machines having a character keyboard and operating, on depression of a key, to present a corresponding matrix to the mold.

The invention comprises a novel organization in which the matrices of a font are divided among a plurality of bars or carriers mounted upon a rotative support. If the required matrix carrier is not in operative position, the support is rocked to bring it into position and it is then moved to present its required matrix to the mold. By dividing the font between two or more carriers, the size and weight of the respective carriers is reduced. By mounting the matrix carriers on a rotative support, such as a drum or cylinder, a minimum of power is required to actuate it to bring a desired matrix carrier into position. If all the matrices of a font be placed in line upon a bar, the latter would necessarily be about eighteen inches long and speed of operation be limited by its inertia and momentum. If, however, the font be distributed over two bars, each need be but nine inches long; and if over three, each need be but six inches long. By dividing the font among a plurality of carriers and movably mounting the carriers on a rocking support, experience has shown that the speed and efficiency of this class of machines may be very materially increased. All the matrix carriers may coöperate, of course, with a single mold automatically adjustable runningwise of the type to adapt it for type of different width.

A further feature of the invention is the employment of a plurality of series of matrix carriers, each series carrying a different font of matrices, and all the series mounted on the rotative support. By adjustment of the support either of the series carrying a complete font may be set in operative relation to the key controlled mechanism of the machine. In all cases the automatic adjustment of the mold runningwise of the type will provide for variation of width of the type; and, if necessary, the mold may be adjusted in the direction of the height of the letters to adapt it to different fonts. A mold (suitable for use in connection with this invention) automatically adjustable runningwise and manually adjustable for fonts of different heights of letters is disclosed in my application filed March 8, 1907, No. 361,416.

The mechanism by which the matrix carrier support may be properly moved, and that by which the proper matrix bar or carrier is advanced to the molding point, may assume a variety of forms, this invention not being limited to the specific devices herein disclosed.

The accompanying drawings show so much of a complete machine as is desirable to illustrate the subject-matter of this invention. It has been deemed unnecessary to illustrate the mold and its associated parts.

Figure 1 is a side elevation partly in section; Fig. 2, a front elevation; Fig. 3, a vertical longitudinal section through the support in which the matrix bars are slidably mounted; Fig. 4, a detail side elevation showing the support of the matrix bars and its associated parts controlling its movement; Fig. 5, a top plan view, partly in section, of the devices shown in Fig. 4; Fig. 6, a detail section on the line 6, 6, of Fig. 3; Fig. 7, a vertical cross section through parts associated with the keyboard whereby the movements of the several matrix bars are controlled; Fig. 8, a top plan view of the matrix bar controlling mechanism; Fig. 9, a transverse section through Fig. 8 on the line 9, 9; Fig. 10, a detail sectional view of the matrix bar arresting mechanism; Fig. 11, a perspective view of one of the roller clutches; Fig. 12, a front elevation thereof; Fig. 13, an end elevation thereof; Fig. 14, a section on the line 14, 14, of Fig. 12; and Fig. 15, a plan of the face of one of the matrix bars.

The supporting drum or cylinder is hereinafter, for convenience, in the literal description called the "drum". This drum *a* has three sets of matrix bars, two in each set fitted to slide in longitudinal ways formed in its inner wall. Those of the several sets are respectively marked *b b'*; *c c'*; *d d'*. One of the matrix bars, say *b*, is normally opposite the lowermost point in the circumference of the drum and is, therefore, in position to be drawn out to present the selected matrix thereof to the mold which may be located at the point marked M in Fig. 2. A flat bar *a'* extends longitudinally through the drum

and is formed with a cylindrical part a^2 upon which is mounted to rotate the reduced hub or bearing a^3 of the drum. This rod is pivoted at one end on an axis a^4, and at the other end is spring supported in a vertically disposed guide piece a^5 being thereby held normally in substantially horizontal position but capable of slight depression when the selected matrix is pressed against the face of the mold by an appropriately actuated plunger such as known in the art or such, for instance, as is disclosed in my application No. 361,416, filed March 8, 1907. On the bar a' is fitted to slide a frame e whose upper edge is provided with gear teeth. Its under face has formed in it transversely one or more grooves e', preferably dovetailed, in which fit corresponding projections on the lowermost matrix bar b. All the other matrix bars have corresponding projections so that when the drum is turned the matrix bar normally lowermost passes out of interlocking engagement with the sliding frame e and that one of the matrix bars brought into lowermost position passes into interlocking engagement with said frame.

A gear f meshes with the rack on the upper edge of frame e and has rigid with it a bevel gear f' meshing with a corresponding bevel gear f^2 fast on a vertical shaft f^3 at the lower end of which is a bevel gear f^4. The latter gear meshes with a bevel gear ^6f rigid with a gear wheel f^7 that engages a rack on the under side of a bar g that is adapted to slide transversely in suitable ways in the bottom part of the machine adjacent the key board. The movement of this rack will, therefore, correspondingly effect movement of the sliding frame e that advances the matrix bars. A flexible band g' has one end connected with the rack bar g and the other to a spring barrel g^2 so that when the sliding matrix-drawing frame e is released as presently described, the reaction of the spring barrel will effect proper advance of the frame e with that one of the matrix bars with which it is engaged. A projection g^3 on the upper face of the rack bar g extends into the path of a lug g^4 on the under side of a slide g^5 mounted in ways above the rack bar g. A rod g^6 connects the slide with an arm h mounted loosely upon a continuously driven shaft h' and serves, as hereinafter described, to actuate the slide g^5 to return the parts to normal position after a molding operation has been completed. Finger pieces j are mounted upon key levers j' rocking about a common axis intermediate their ends, and having at their rear ends interlocking connection with vertically movable selector plates j^2 located below the rack g. On the under side of this rack near its left hand end and adjacent its front edge is a stop pin j^3 and at a suitable distance from it (in this case a distance equal to half the distance taken up by the selectors j^2) is another stop pin j^4 adjacent the rear edge. See Fig. 7 and, dotted lines, Fig. 8. When one of the keys in the first half of the keyboard,—*i. e.* that half to the left of the broken line passing upwardly through the keyboard in Fig. 2,— is depressed, the selector j^2 connected with that key is raised. The first result of this as is later described in detail, is to release the matrix-carrying sliding frame e which (through the connections described and by reason of the reaction of the spring barrel g^2) is drawn forward carrying with it the matrix bar. This movement continues until stop pin j^3 is arrested by the raised selector plate j^2.

In Fig. 7, the selector plate j^2 that is fifth in order (counting from the left hand end of the series) is shown as so raised and when the movements described have been completed the stop pin j^3 on the rack g will have passed into engagement with said plate thereby arresting, over the mold and in operative relation thereto, the corresponding matrix in the under face of the matrix bar that has been advanced by the sliding frame e. If the finger of the operator be raised from the depressed finger piece, its key lever will nevertheless remain down by reason of the pressure of stop pin j^3 against the selector plate. When the molding operation has been completed slide g^5 will be moved to the left to return all parts to normal position by engagement of lug g^4 with lug g^3 and the selector plate will drop into normal position.

Matrices corresponding with the finger pieces in the left hand half of the keyboard are carried by that matrix bar b that is normally in the lowermost position, and the matrices of the other bar b' (of that series of two matrix bars) correspond with the characters of the finger pieces in the right hand side of the keyboard. If, therefore, a finger piece in the right hand side of the keyboard is depressed, the drum a will be moved to bring into the lowermost position and into interlocking engagement with the frame e, the second matrix bar b' of the series and it will be automatically advanced by the sliding frame e for a molding operation as above described. When a key in the second half of the keyboard is depressed, its corresponding selector plate j^2 is raised and by reason of engagement with stop pin j^4 on sliding rack g operates to determine the position of the rack and consequently the corresponding position of said second matrix bar. Since the stop pin j^4 will travel over some of the selector plates j^2 belonging to the last few keys of the first half of the keyboard before it reaches the selector connected with the first key of the second half of the board, the rack will be stopped improperly by contact of stop pin j^4 with any one of the selectors of the last few keys of the first half of the board should it, for any reason, be raised. To prevent this, the last few selectors of the first half of the key board are

notched or cut away as at f^5 (Fig. 10) so as to permit the free passage of pin j^4.

A horizontal bar k normally rests upon the upper ends of the selector plates j^2 belonging to the key levers of the first half of the key board and a second bar m (Figs. 8 and 9) rests upon the selectors belonging to the second half of the key board. These bars rest upon the tops of the selector plates in front of the rack g. Lever arms k' are secured to the top of the bar k and are connected at their outer ends to a rock shaft k^2. Similarly, lever arms m' (one only being shown in Fig. 8) are connected with the bar m and are secured at their outer ends to a rock shaft m^2. When one of the selectors of the first half of the key board is raised, the bar k will be elevated and will rock the shaft k^2. Rigidly secured to this rock shaft is an arm k^3 having joined to its end a vertically disposed rod k^4 that acts when elevated by the rocking of shaft k^2 to disengage the sliding frame e from a pawl k^5 pivoted upon the bar a' and normally acting to lock said frame. If a selector plate belonging to the second half of the keyboard is raised, similarly the shaft m^2 will be rocked and an arm m^3 fast thereon will raise a rod m^4 (Figs. 9 and 4) that acts to release the toothed hub or annular flange $a^\times$ (carried by the part a^3 and turning with the drum a) from pawl m^5 to permit partial rotation of the drum to bring into proper position the second matrix bar of a series. The pawl k^5 normally engages a tooth or notch in a rod e^2 forming part of or rigidly attached to the sliding frame e and extending through an opening in the cylindrical part a^2 of the bar a'. When, therefore, lever arm k^3 is raised and pawl k^5 is disengaged from rod e^2, the whole apparatus is released and reaction of the spring barrel g^2 advances the rack bar g and, through the gearing described, correspondingly advances the sliding frame e that carries with it the matrix bar with which it is in engagement. This movement continues until the stop pin j^3 is arrested by the raised selector plate when the matrix corresponding with the depressed finger piece will be arrested in operative position over the mold.

After the molding operation, the slide g^5 will effect a return of all the parts to normal position in which bar e^2 will be reëngaged by the locking pawl k^5. When lever arm m^3 is raised by elevation of a selector plate belonging to a key in the second half of the key board, rod m^4 (Fig. 4) disengages pawl m^5 from a tooth or notch m^6 in the hub or annular flange $a^\times$ of drum a and permits the reaction of a spring o (applied to rod o') to rock the drum, thereby bringing the second one of the matrix bars of the same font to lowermost or operative position in which the drum is arrested by arm r that comes against a stop o^2. The matrix bar that was in normal position will now have passed out of engagement with the sliding frame e and the second one into engagement with said frame. It is necessary that the pawl k^5 be again actuated to permit the transfer of the selected matrix, in the said second bar, to the mold as already described and this is effected by a cam projection p on an annular flange $p^\times$ turning with the drum, the cam projection, as the drum comes into adjusted position, riding over a latch in the end of a pivoted lever q, Figs. 3 and 6. This lever is forked to embrace the rod k^4 on which, above the forked end of the lever, is a collar q'. The other end of the lever has a pivoted latch q^2 movable in one direction only and held in normal position by coiled spring q^3. The cam projection p in riding over the latch q^2 rocks the lever and elevates rod k^4, the latch immediately thereafter dropping into the recess or notch p' in rear of the cam projection. The lever or arm r is loosely mounted on a continuously driven shaft r' and is connected with the drum a at an ear or lug a^6 by the rod o' to an adjustable block on which rod the coiled spring o is attached. Integral with this lever or secured thereto is a wheel r^2 having a notch or tooth r^3. Also loosely mounted on shaft r' is a lever arm r^4 carrying a spring pressed pawl r^5, the free end of which rests on and extends laterally beyond the periphery of the wheel r^3 so as to engage a stationary tripping cam r^6 that withdraws it from the notch r^3.

The lever r^4 can be locked to shaft r' by any suitable clutch device (a common roller clutch being indicated) that will lock the lever arm r^4 to the shaft when a lever r^7 is withdrawn from the stop r^8 forming part of the lever arm r^4. The sliding matrix-moving frame e at the end of its return movement abuts against a bar s sliding in a longitudinal aperture in the circular part a^2 of the bar a' and abutting at its outer end against one arm s' of a bell crank lever thereby forcing the other arm s^2 of the bell crank lever toward the drum. Resting upon arm s^2 is the free end of a connecting bar s^3 pivoted to the lever r^7 and having a shoulder s^4 on its under side that is engaged by arm s^2. When, therefore, the bell crank lever is rocked, endwise motion is imparted to the bar s^3 causing lever r^7 to move out of engagement with stop r^8 thereby permitting the clutch to engage the constantly rotating shaft r' to effect a sufficient extent of movement of arm r to return the drum to normal position in which it is locked by pawl m^5. As this movement is completed, a cam surface s^5 on the free end of the arm s^3 rides against the face of a cam post or projection s^6 and lifts the arm out of contact with the arm of the bell crank lever thereby permitting spring s^7 to return the lever r^7 into the path of stop r^8 before the revolution of the clutch is completed thereby disengaging r^4 from it.

A spring s^8 attached at one end to arm s' and at the other to a fixed post on the frame, returns the bell crank lever and sliding bar s to normal position to again be struck by the sliding frame in its subsequent movement. The period of engagement of pawl r^5 with wheel r^2 before it is thrown out of engagement by cam r^6 is such as to afford a proper extent of movement of drum a. Immediately before the pawl r^5 is disengaged from the wheel, pawl m^5 drops back of tooth m^6 on the drum thereby holding the drum in position against reaction of spring o. In this return movement of the drum to normal position, lever q will not be rocked about its axis because the spring pressed trigger q^2 will yield as the shoulder or cam projection p passes over it. Although the clutch is thrown into operation at each return movement of the sliding frame e (when keys are operated in that section of the key board that requires shifting of the drum) there will be practically no movement imparted to the lever r after drum a is engaged by pawl m^5, because pawl r^5 has then by the action of cam r^6 been disengaged from tooth r^3. There is a recess or tooth m^6 and a lug a^6 as well as a cam projection p and shoulder p' for each set of matrix bars. The operation described is the same whichever set of bars is in use. To change from one set to another it is only necessary for the operator to connect the rod o' with the proper one of the lugs a^6. When the operations described have occurred, on depression of a key in either the first or second half of the keyboard, the parts should be returned to normal position against the reaction of the spring barrel g^2. This may be conveniently effected by the following devices. After a molding operation has been completed, an endwise movable rod i is moved to the right as seen in Fig. 2. This rod may be connected with and be operated by the mold controlling lever (not shown). Slide g^5 is connected by a rod g^6 with a lever arm h loosely mounted upon a continuously driven shaft h'. Integral with this lever arm or secured to it, is a wheel or circular hub h^2 having a tooth or notch h^3. A lever arm h^4 also hung on shaft h' carries a spring pressed pawl h^5 that bears upon the face of the wheel h^2 and extends laterally beyond the wheel so as to be tripped by a fixed cam h^6. The lever h^4 can be clutched to shaft h' by any well known clutch mechanism (a common roller clutch being indicated) that will lock lever h^4 to the shaft when the lever arm h^7 is withdrawn from the stop h^8. This is effected by the endwise movement of bar i which, bearing on the projection h^9 of lever arm h^7, swings it out of engagement with stop h^8 after which the arm i is thrown upwardly into inoperative position, indicated in Fig. 2, by a cam face i' thereon acting upon a fixed cam face i^2 and permitting reaction of spring h^{10} to return lever h^9 into the path of the stop h^8 before the revolution of the clutch is completed to thereby disengage the lever arm h^4 from the shaft at the end of a revolution. The limited movement of the lever arm h determined by the period of engagement of pawl h^5 with wheel h^2 imparts a sufficient thrust to rod g^6 to move slide g^5 to the left, as viewed in Figs. 2 and 7, and, by engagement of lug g^4 with lug g^3 on the rack bar g, to return all parts to the normal position in which they are locked by pawl k^5 engaging rod e^2.

On one side of each matrix bar is a series of projections x and the side of the guideway in which the bar slides is grooved as shown in Fig. 4, to receive them. These pins or projections serve to control closure of the mold as shown in my prior application, Ser. No. 361,416. They form no part of the present invention. Incidentally they serve to hold the bars in their guideways in the upper portion of the drum 1.

Figs. 11 to 14 show roller clutches such as may be employed in this machine. They are well known devices. The hub r^9 from which projects the arm r^4 has within it a hub r^{10} with longitudinal recesses r^{11} in which are seated the clutch rollers r^{12}. This roller hub r^{10} is integral with a disk r^{13} and the continuously revolving shaft r' passes loosely through it and the hub. Opposite the roller slots the inner wall of the hub r^9 is formed with eccentric faces r^{14} equal in length to the length of the rollers. A coiled spring r^{15} is attached at one end to the disk r^{13} and at the other end to the outer hub r^9. The part r^8 is a lever arm pivoted in the hub r^9 and bearing at its inner end on a shoulder r^{16} on the disk r^{15}. When the part r^7 engages the lever r^8, the inner end of the lever turns disk r^{13} until the roller hub is in such position that the rollers are opposite the eccentric faces r^{14} and the clutch is loose on the shaft. When, however, part r^7 is withdrawn from the arm r^8, reaction of spring r^{15} turns back the roller hub r^{10} and carries the rollers into engagement with the adjacent faces of hub r^9 which are of less radius than the faces r^{14}. The hub is now locked to the shaft and revolves with it. The pawl r^5 then engages notch r^3 in disk r^2, and arm r, integral with the disk, is moved until the pawl is tripped by cam r^6.

The clutch, specifically shown in Figs. 11 to 14 inclusive, is that coöperating with the drum 1 and the clutch shown in Fig. 2 that effects operation of the slide g^5 is the same in general construction and mode of operation. The immaterial differences appear only in the shapes of such parts as h^6, h^7 and h^9.

I claim:

1. In a typecasting machine, a matrix carrier support mounted to rock about an axis and a plurality of matrix bars mounted

to move endwise thereon, in a direction parallel with its axis to bring a selected matrix on a bar opposite a molding point.

2. In a typecasting machine, a matrix carrier support mounted to rock about an axis and a plurality of matrix bars mounted to independently move endwise thereon in a direction parallel with its axis to bring a selected matrix opposite the molding point.

3. In a type casting machine, a matrix carrier support mounted to rock about an axis, a plurality of matrix bars each having matrices of the same font and movable endwise on the support in a direction parallel with its axis to bring a selected matrix to the molding point.

4. In a typecasting machine, a matrix carrier support mounted to rock about an axis and a plurality of matrix bars mounted to independently slide endwise thereon in a direction parallel with its axis combined with a key board and operative connections whereby when a key is operated the corresponding matrix bar is moved upon said support to bring that one of its matrices, corresponding with the depressed key, opposite the molding point.

5. In a typecasting machine, an adjustable matrix carrier support and a plurality of matrix carriers movable thereon and each having a plurality of matrices forming part of the same font and all matrices being adapted to coöperate with a single mold, combined with an operating key board, means whereby on operation of a key corresponding with a matrix of that carrier which is in operative relation to the mold said carrier is moved to bring said matrix to molding location and means whereby when a key corresponding with a matrix of another carrier is operated the support is first adjusted and the last named carrier is moved to bring the last named matrix to molding location.

6. In a typecasting machine, an adjustable matrix carrier support and a plurality of endwise movable matrix bars movable thereon in a direction parallel with its axis and each having a plurality of matrices forming part of the same font and all matrices being adapted to coöperate with a single mold, combined with an operating key board, means whereby on operation of a key corresponding with a matrix of that bar which is in operative relation to the mold said bar is moved to bring said matrix to molding location and means whereby when a key corresponding with a matrix of another bar is operated the support is first adjusted and the last named bar is moved to bring the last named matrix to molding location.

7. In a typecasting machine, a matrix carrier support mounted to rock for adjustment about an axis and a plurality of matrix bars mounted to slide endwise thereon in a direction parallel with its axis and each having a plurality of matrices of the same font and all matrices being adapted to coöperate with a single mold combined with a key board having a plurality of sections of keys, one section for each said matrix bar, means whereby on operation of a key of one section the corresponding matrix bar is operated to move its selected matrix to molding location, and means whereby when a key of another key board section is operated said support is adjusted and the matrix bar corresponding with the last named key board section is operated to move the last named matrix bar to bring its selected matrix to molding location.

8. In a typecasting machine, an adjustable matrix carrier support mounted to rock about an axis and a plurality of series of matrix bars carried thereby each series consisting of a plurality of matrix bars of which each has part of the same font of matrices and is movable on the support in a direction parallel with its axis to bring a selected matrix thereon opposite a molding point.

9. In a typecasting machine, an adjustable matrix carrier support mounted to rock about an axis and a plurality of series of matrix bars carried thereby each series consisting of a plurality of independently endwise movable matrix bars of which each has part of the same font of matrices and is movable on the support in a direction parallel with its axis to bring a selected matrix thereon opposite a molding point.

10. In a typecasting machine, a matrix carrier support mounted to rock about an axis, a plurality of series of matrix bars carried thereby, each series occupying a different segmental portion of the support, and consisting of a plurality of endwise movable matrix bars each having part of the same font of matrices and movable on the support in a direction parallel with its axis to bring a selected matrix thereon opposite a molding point, means for adjusting the support circumferentially to bring any series of matrix bars into operative position, and means for bringing a selected matrix of said series to the molding point.

11. A matrix bar adapted to slide longitudinally on a way in a rocking matrix bar carrier and having in one of its faces longitudinally arranged matrices, and having also transversely disposed means in one of its faces adapted, when the bar is moved laterally with the carrier, to engage and disengage means for moving the bar endwise in its way on the carrier.

In testimony whereof, I have hereunto subscribed my name.

ODDUR V. SIGURDSSON.

Witnesses:

ERNEST D. CONDIT,

M. W. CLEPHANE.