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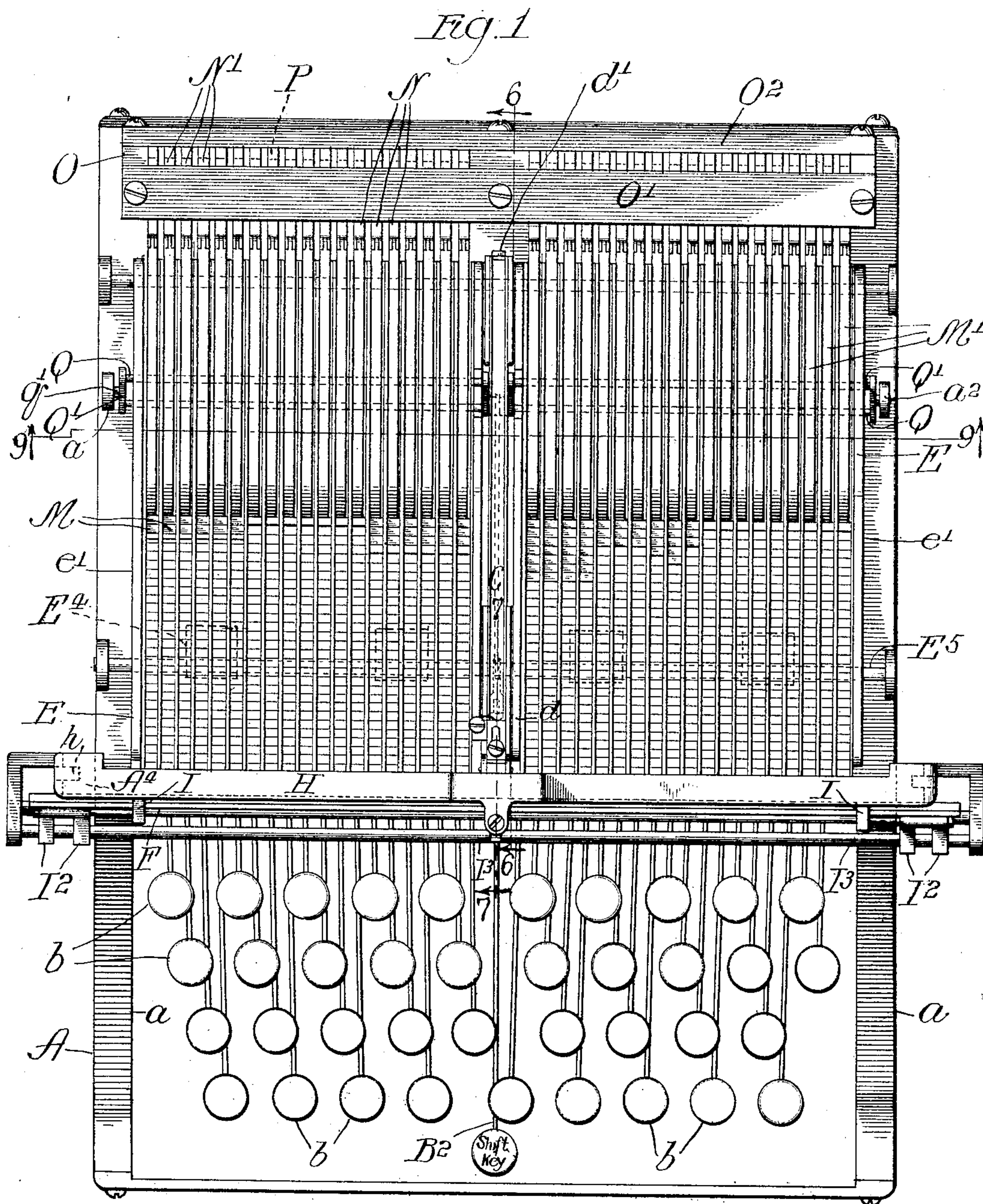
PATENTED DEC. 20, 1904.

T. A. HOUGHTON.  
MACHINE FOR SETTING TYPE.

APPLICATION FILED NOV. 23, 1903.

NO MODEL.

5 SHEETS—SHEET 1.



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W. H. Hall

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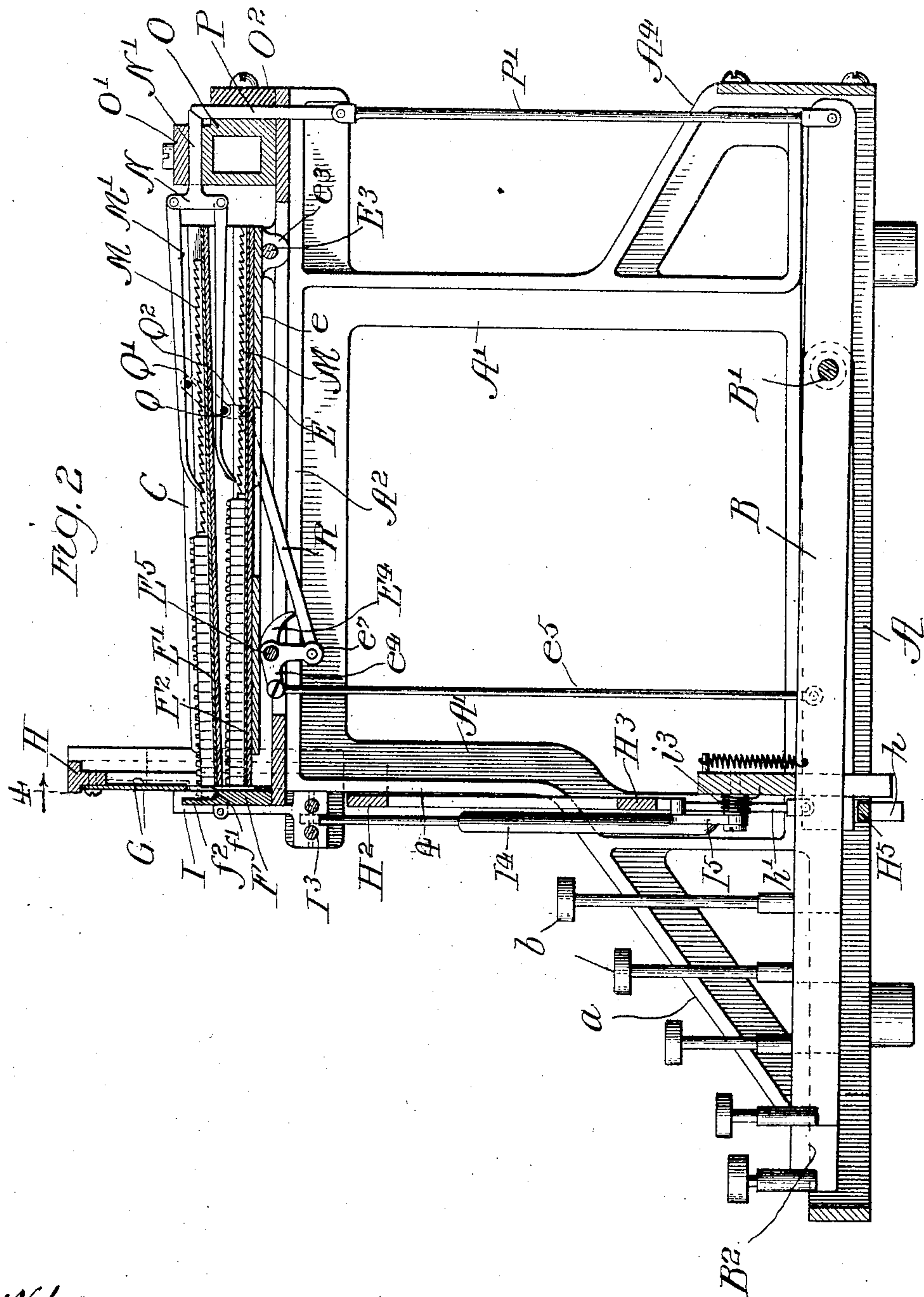
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5 SHEETS—SHEET 2.



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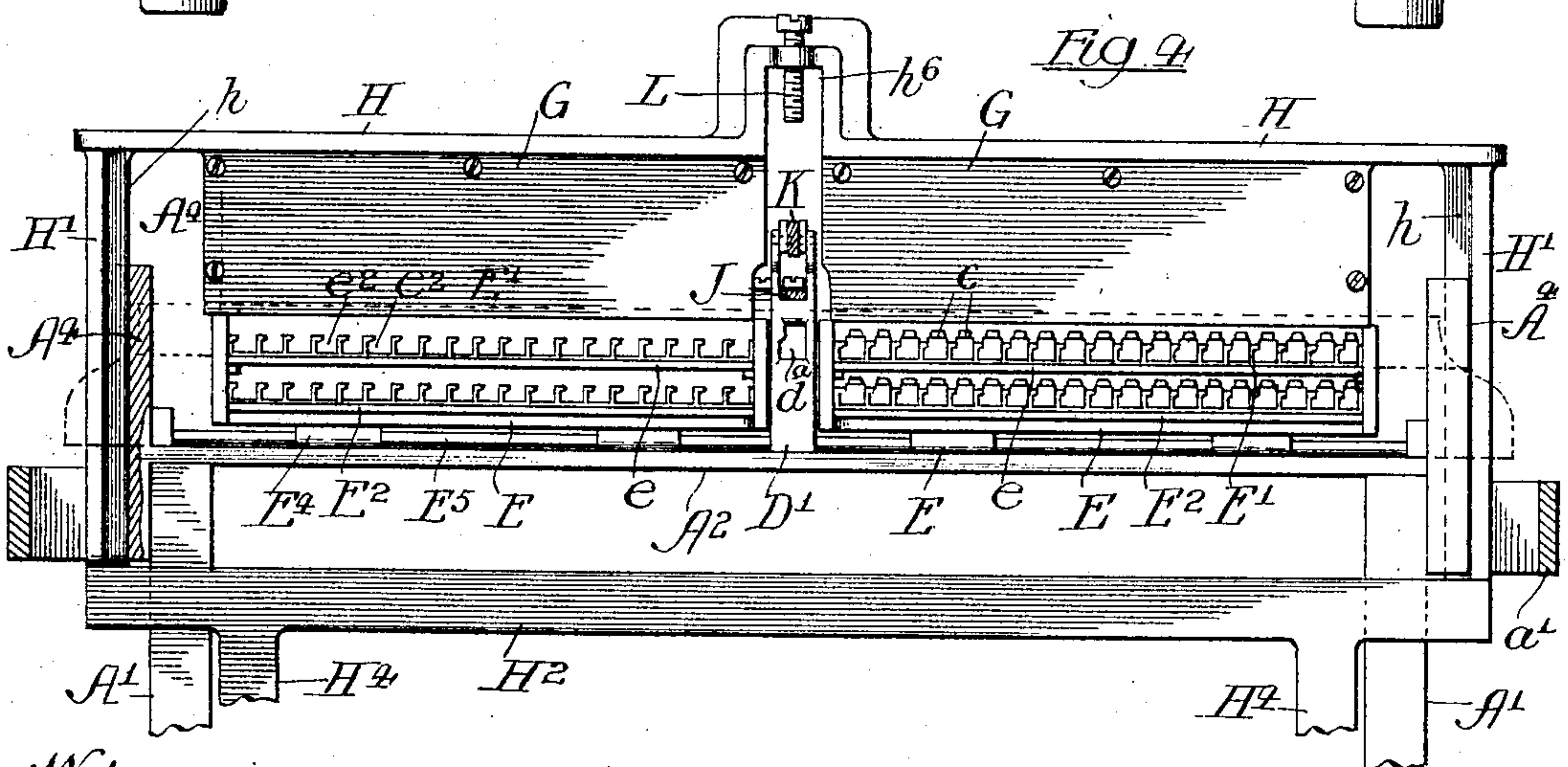
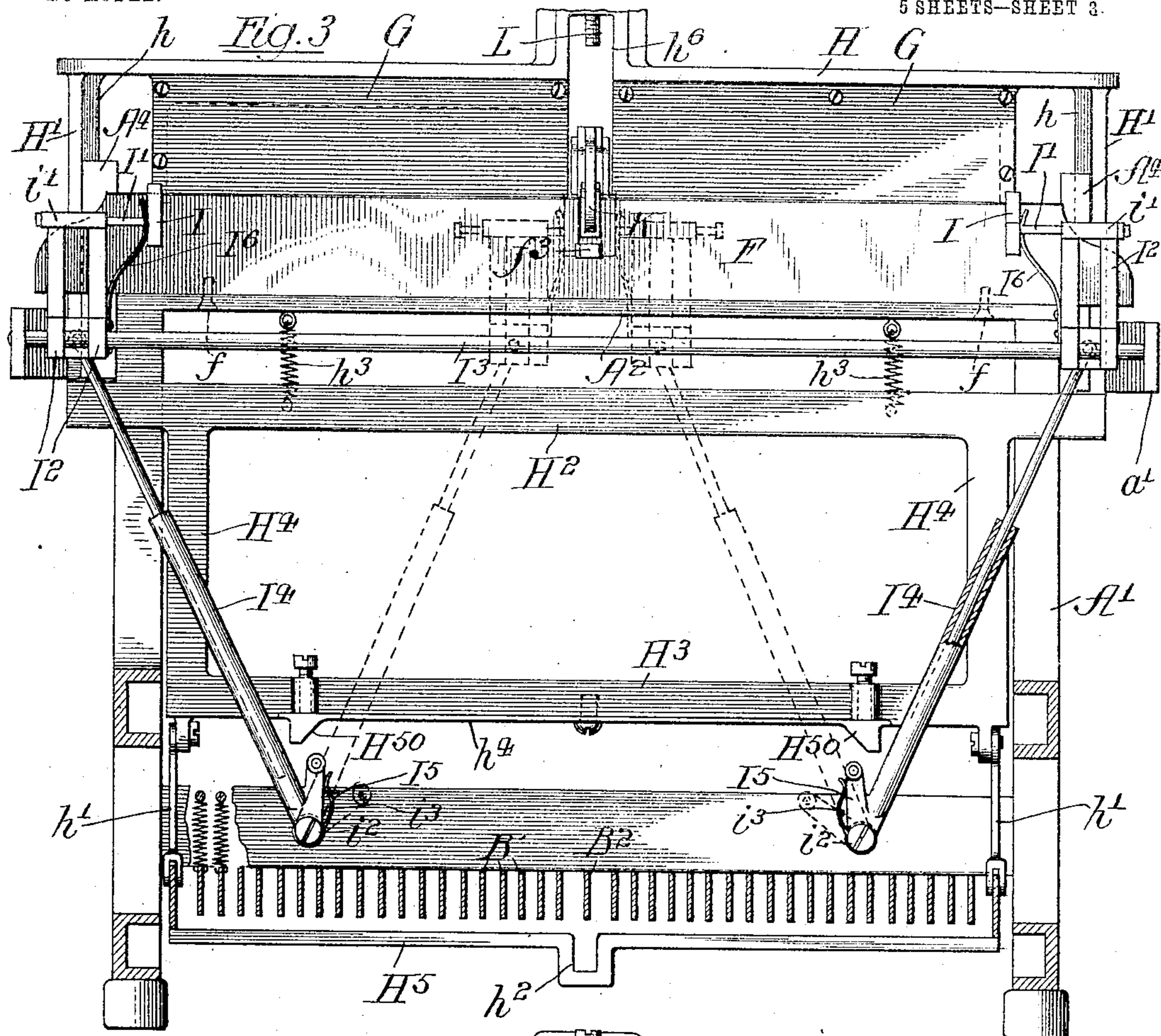
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5 SHEETS—SHEET 3.



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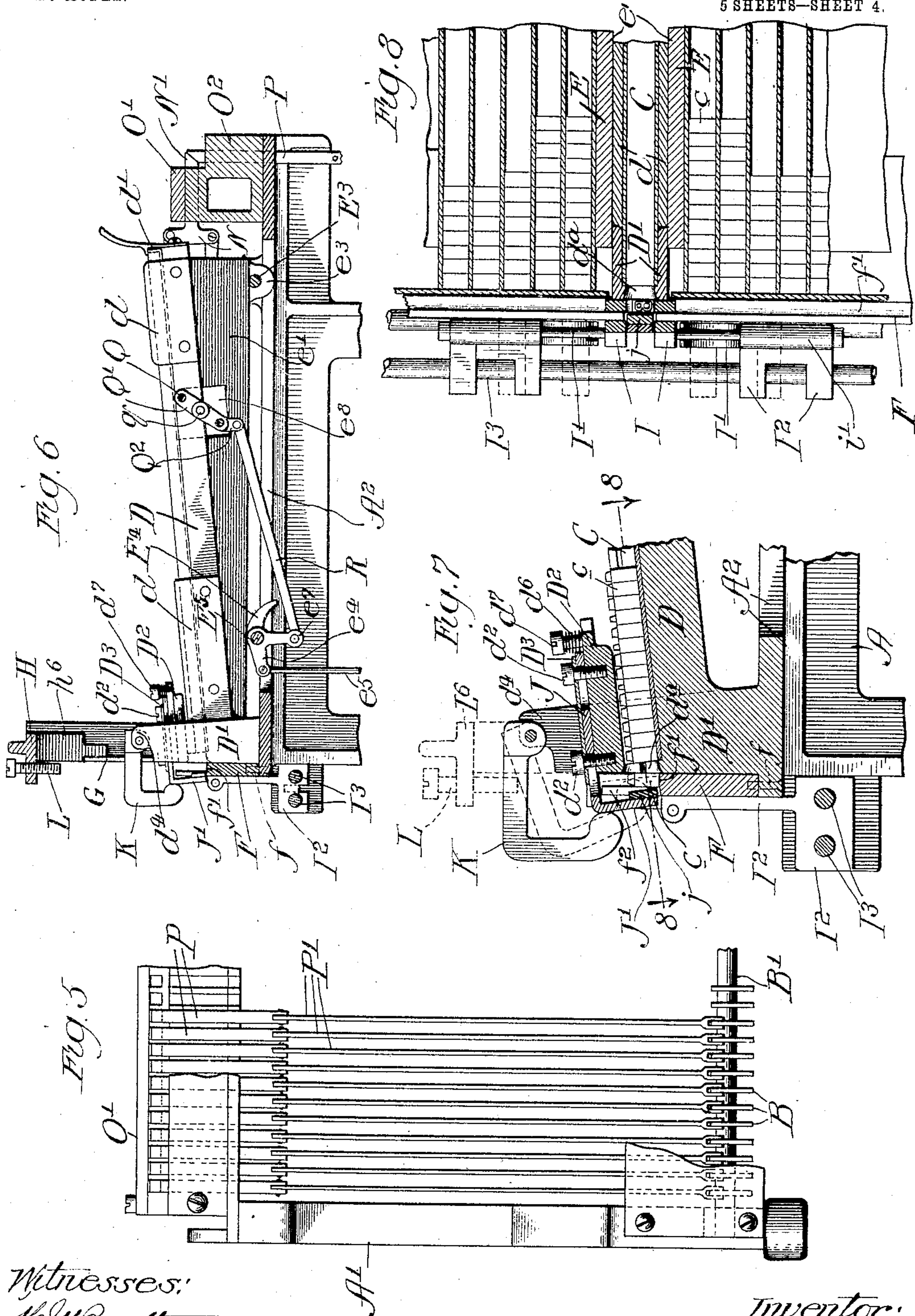
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5 SHEETS—SHEET 4.



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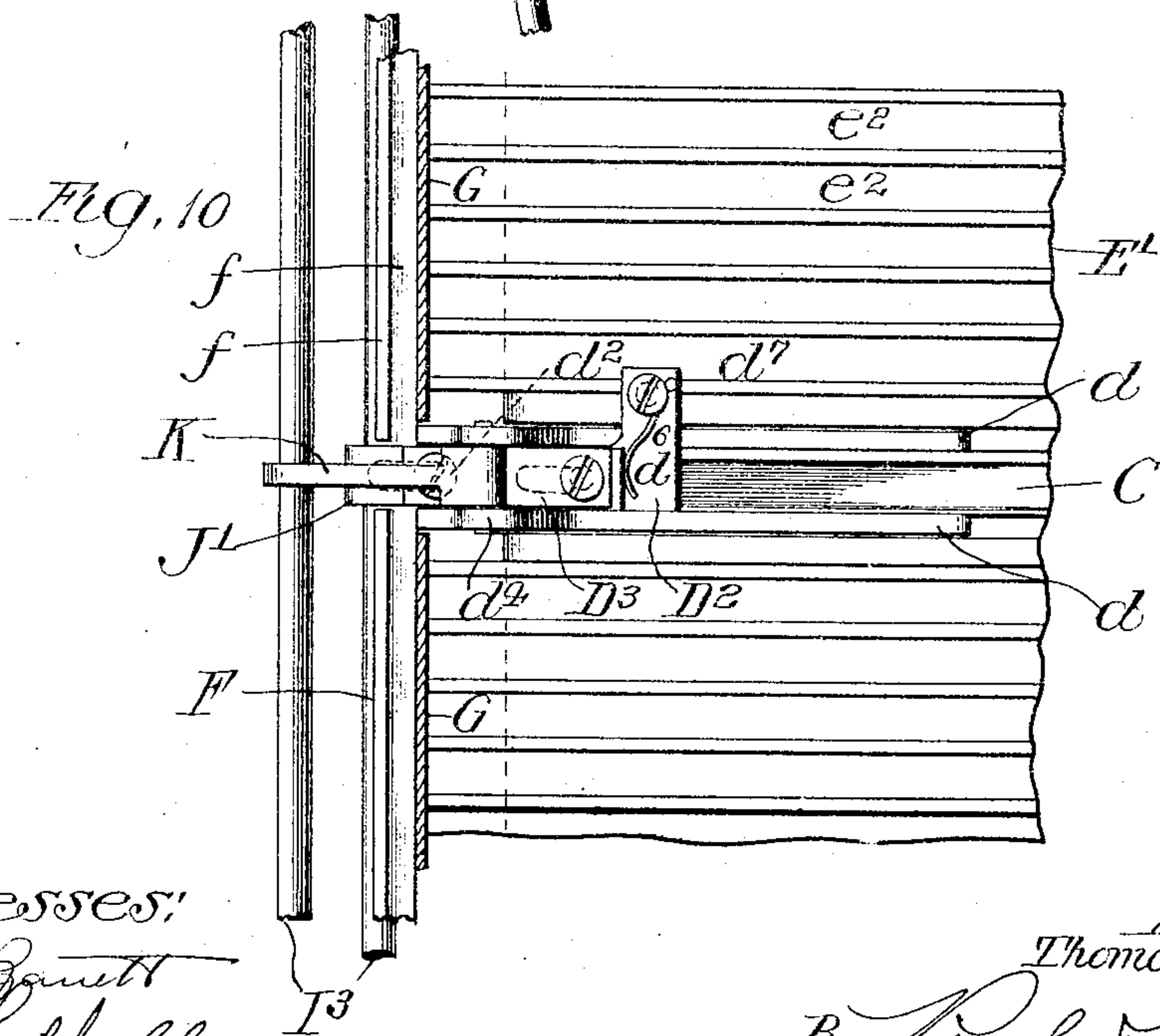
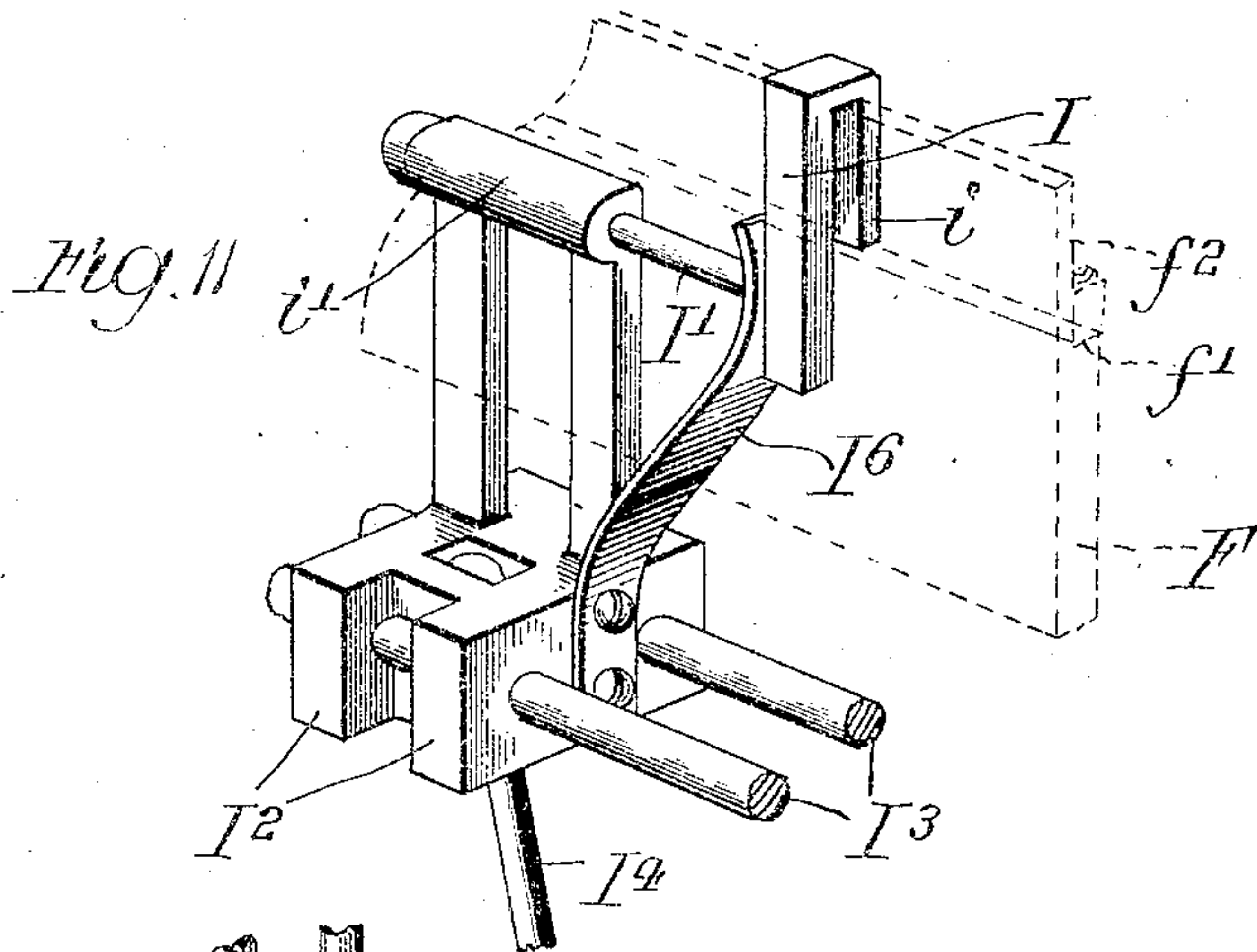
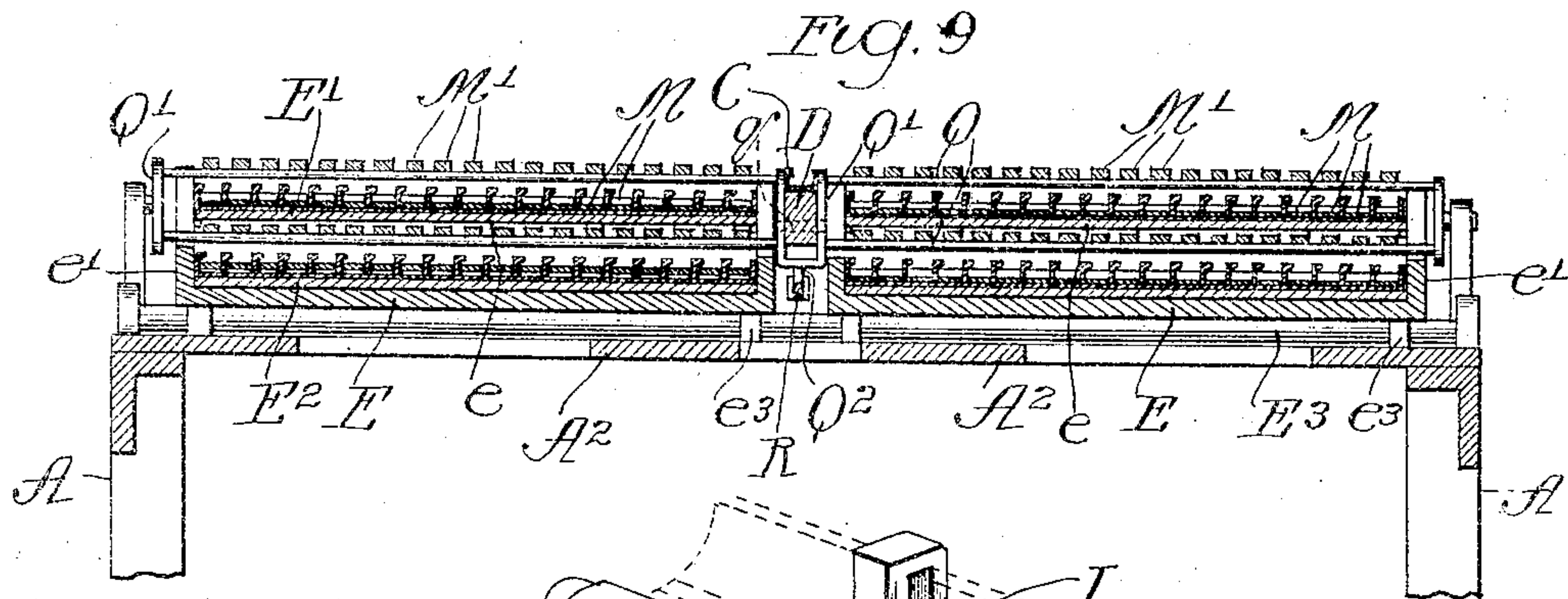
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5 SHEETS—SHEET 5.



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# UNITED STATES PATENT OFFICE.

THOMAS A. HOUGHTON, OF GRAND RAPIDS, MICHIGAN.

## MACHINE FOR SETTING TYPE.

SPECIFICATION forming part of Letters Patent No. 777,855, dated December 20, 1904.

Application filed November 23, 1903. Serial No. 182,229.

*To all whom it may concern:*

Be it known that I, THOMAS A. HOUGHTON, a citizen of the United States, and a resident of Grand Rapids, in the county of Kent and State of Michigan, have invented certain new and useful Improvements in Machines for Setting Type; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form a part of this specification.

This invention relates to a novel type-setting machine for setting type in type holders or sticks from a case or cases, the lines of type so set up in the holders or sticks being thereafter arranged in proper juxtaposition in a printing device to constitute a printing-surface.

The machine herein illustrated is especially applicable for use in setting rubber type, though the invention may be embodied in a machine for setting metal type.

The invention consists in the matters hereinafter set forth, and more particularly pointed out in the appended claims.

A machine embodying my invention embraces in general terms one or more type-cases wherein all the type appropriated to each character are arranged in such order as to be successively fed or ejected therefrom one at a time, means for supporting in convenient access to the case or cases a grooved type-holder in which the types are to be set, transferring mechanism receiving the types one at a time from the cases and transferring the same into line with the grooved type-holder, means for feeding the types one at a time from the type-cases to the transferring mechanism, and means for inserting the types into the grooved holder after they have been brought into alinement therewith by the transferring mechanism. The type-holding case conveniently used in my machine embraces a plurality of parallel type-holding channels arranged side by side and open at one end or side of the case, and the transferring mechanism embraces a part which reciprocates across or in front of the open ends of said channels and into the path of which the types

are delivered as they are fed one at a time from the type-holding channels. The several mechanisms for effecting the transference of the types from the type-cases to the grooved type-holder and inserting them into the holder are operated by key-levers having keys bearing characters corresponding with the characters on the types to be set, and, as herein shown, all of said mechanisms are operated by a single set of key-levers, though in some instances more than one set of key-levers may be employed. When setting type embracing upper-case or capital and lower-case or small letters, the types of the two sets are arranged in cases one above the other, and mechanism is provided which is constructed to swing the delivery end of either of the upper and lower type-cases into position to deliver the types therefrom to the transferring mechanism, by which the types are transferred into alinement with the type-holder. It is a common practice in this art to supply rubber types in strips or lengths comprising a number of connected types—that is to say, when the types are molded the blocks on which the individual types are formed are only partially severed from adjacent type-blocks. When operating with types thus made, a severing knife or device is employed to sever the individual types from the strip or row of types at the time the types are fed one at a time into the path of the active part of the transferring mechanism.

I have illustrated in the drawings one approved form of machine embodying my invention; but it will be understood that many of the structural details shown may be varied and that for some uses less than all of the different mechanism herein illustrated may be employed.

As shown in the drawings, Figure 1 is a plan view of a type-setting machine made in accordance with my invention. Fig. 2 is a vertical longitudinal section thereof. Fig. 3 is a front elevation showing the key-levers in transverse vertical section. Fig. 4 is a fragmentary section of the upper front part of the machine, taken on line 4 4 of Fig. 2. Fig. 5 is a fragmentary rear view of the machine. Fig. 6 is a fragmentary vertical section taken



on line 6 6 of Fig. 1. Fig. 7 is an enlarged detail section taken on line 7 7 of Fig. 1. Fig. 8 is a fragmentary horizontal section taken on line 8 8 of Fig. 7. Fig. 9 is a vertical section taken on line 9 9 of Fig. 1. Fig. 10 is a plan view of the front central portion of the machine. Fig. 11 is a perspective view of one of the traveling parts of the transferring mechanism.

10 The frame of the machine has the general appearance of the frame of a type-writing machine, embracing an open rectangular base portion A, vertical standards A' A' at the corners thereof, and a top plate or bed A<sup>2</sup>, made of open-work construction and supported on the upper ends of the standards A'. The bottom frame is extended at the front of the machine to afford space for the key-levers, and the side members of said bottom-frame extension are connected with the front standards A' by means of oblique braces *a*.

BB designate a plurality of spring-pressed key-levers which are pivoted near their rear ends to a horizontal shaft B', extending transversely across the base of the machine-frame, and said key-levers are provided at their front ends with keys *b*, attached to vertical key-stems rising from the key-levers. Said key-levers are operatively connected with the several mechanisms of the machine, as will hereinafter more fully appear.

C designates a type-holder in which the types *c* are set, and said type-holder is supported on a bar D, which extends from front to rear of the machine and is attached to or formed integral at its front end with a standard D', rising from the front part of the top plate A<sup>2</sup> of the machine centrally thereof, as herein shown, Fig. 7. The central arrangement of the type-holding support is preferable, inasmuch as it permits the type-cases to be arranged on two sides of the holder, so that the types may be delivered centrally to said holder from both sides thereof, and thus the travel of the transferring mechanism may be kept within suitable limits.

EE designate two type-case-holding frames, one on each side of the type-holder support D' and each comprising a flat bottom *e* and two side walls *e'* *e'*, said frames open at their front and rear ends and support upper and lower type-cases located in each frame, one designed for upper-case letters and the other for lower-case letters.

55 The type-holder C is held laterally in place on its support D between the side plates *d* *d*, attached to said support and rising above the same, thereby constituting a groove to receive the type-holder. The standard D' is provided in line with the type-holder with an opening *d*<sup>a</sup>, and the front end of the type-holder C extends with its front end thereinto in position to receive the types from the transferring mechanism, as will hereinafter more fully appear. Said opening in the standard

is flared at its forward end, as shown in Figs. 7 and 8, to facilitate the passage of the types therethrough and guide the same into the holder. A latch *d'* is provided at the rear end of said type-holder support to lock the holder 70 in place.

The lower type-cases E<sup>2</sup> are supported on the bottom walls or floors of the frames E, and the upper cases extend between the side walls of said frames and engage at their margins grooves in the inner faces of said side walls. The case-plates E<sup>2</sup> E<sup>3</sup> are inserted into the frames from the ends of the latter. Said plates E' E<sup>2</sup> are provided in their upper faces with a plurality of type-holding channels *e*<sup>2</sup> *e*<sup>2</sup>, Figs. 4 and 8, within which the type *c* are held and from which they are fed to the type-transferring mechanism. Said channels are preferably made of sheet metal folded to constitute parallel longitudinally-arranged channels which are open at the front ends of the cases to permit the types to pass therefrom to the transferring mechanism. Said channels are of undercut form in cross-section, and the types are made wider at their lower 90 than at their upper ends to prevent the same from accidentally rising out of the grooves. Said types are inserted into the channels from the ends thereof.

If the machine be designed for setting single-case letters or characters, I may employ but a single type-case on each side of the type-holder support, and in that event said type-case frames will be fixed stationary to the machine-frame. When upper and lower type-cases are employed for the upper and lower case letters, however, means are provided for movably supporting the frames E on the machine-frame in order that the discharge ends of the type-holding channels of either of said cases may be brought into line with the transferring mechanism, so that the types may be delivered to said transferring mechanism from either the upper or lower case, as desired. For this purpose each of said case-frames are herein shown as pivoted at their rear ends to a horizontal shaft E<sup>3</sup>, extending transversely across the top of the machine at the rear side thereof, said shaft extending through depending lugs *e*<sup>3</sup> on the bottom walls of said frames. The front ends of said case-frames are supported on cams E<sup>4</sup>, Figs. 2 and 6, one beneath each frame, as shown in dotted lines in Fig. 1, which are affixed to a horizontal rock-shaft E<sup>5</sup>, extending transversely across the top of the machine near the front side thereof. Said cams are operated by rocking said shaft on its axis to raise the front end of the frames, and thereby bring either the upper or lower cases in line with the transferring mechanism. The raising-cams E<sup>4</sup> are operated from a shifting-lever B<sup>2</sup>, connected with a rigid arm *e*<sup>4</sup> of said shaft E<sup>5</sup> by means of a vertical link *e*<sup>5</sup>.

The type held in the type-holding channels 130



of the cases are delivered one at a time from the front ends of the said channels into the path of transversely-reciprocating transferring devices which travel across the open ends of the channels and by which said types are moved or transferred into line with the front end of the holder C. Said transferring device travels in a groove located transversely in front of the holding-channels of the type-cases, and it is into this groove that the types are delivered from the type-cases and through which groove they are pushed by the transferring device into line with the type-holder C, as before mentioned. When the holder C is supported in the machine centrally thereof, two transferring devices are employed, one operating from each side of the machine toward the center thereof.

The transferring mechanism herein illustrated is made as follows: F designates a horizontal vertically-arranged plate, which is attached to the front edge of the top plate A<sup>2</sup> of the machine-frame by screws f and fits at its central part against the standard D', as shown more clearly in Figs. 6 and 7. The plate is cut away or rabbeted on the inner side of its upper margin, so as to form at the inner side of said plate an upwardly-facing ledge or shoulder f', which is located at the level of the delivery ends of the channels of the type-case and at the level of the opening in the standard D', through which the types are inserted into the holder, and constitutes the bottom of the transferring guide-groove hereinbefore referred to, through which the types are transferred to the receiving end of the holder C. The outer side wall of said groove is formed by the upper reduced part f<sup>2</sup> of the plate F, and the inner side wall of said groove is formed by two vertically-shifting bars G G, which normally stand above the level of the types, but are lowered below the bottom of the groove after a type has been delivered into said groove, thereby completing the groove. Said bars G are attached to the top transverse member H of a vertically-shifting frame located at the front of the machine, and which is herein shown as shifted downwardly by operative connections with the key-levers and held elevated by springs or their equivalent, as will hereinafter more fully appear. Two bars G are employed, one on each side of the center of the machine, so as to provide space between their adjacent ends for the standard D', with which is connected the type-holder support. When integrally-connected or partially-separated types are employed, the lower margins of said bars G are sharpened to constitute knives to sever each advance type from the strip after it has been delivered into the transfer-groove. When using undivided or separated types, however, the cutting function of the bars is omitted; but said bars in this event serve to separate the advance type from the one next

in rear of the same and to complete when fully depressed one side of the transfer-groove.

The complete vertically-shifting frame, to the top member H of which the cutting or separating bars G are attached, comprises vertical end members H' H', which depend from the top member H, and two horizontal members H<sup>2</sup> H<sup>3</sup>, located in front of and below the top plate A<sup>2</sup> of the machine-frame and connected by end members H<sup>4</sup>. The horizontal member H<sup>2</sup> extends at its ends beyond the end members H<sup>4</sup> and is joined to the top vertical members H' of said frame. Said top vertical members H' are located laterally outside of the top plate of the machine-frame and are provided on their inner faces with vertical guide-ribs h, as shown more clearly in Figs. 1 and 3, which engage outwardly-opening vertical guide-grooves formed in the outer faces of posts A<sup>4</sup>, rising one from each front corner of the machine. Said shifting frame is connected with a universal bar H<sup>5</sup>, extending transversely beneath the key-levers by means of links h', which are loosely connected at their upper ends with the lower horizontal member H<sup>4</sup> of the frame and at their lower ends with the opposite ends of said universal bar. Said universal bar is located a distance below the key-levers, so that it is not acted upon to depress the frame, and thereby the bars G in the initial movement of the key-levers. The universal bar is provided with a central recessed or depressed portion h<sup>2</sup> to permit the case-shifting lever B<sup>2</sup> to be depressed to the limit of its movement without actuating said universal bar. The shifting frame is held in its normal uppermost position by means of spiral contractile springs h<sup>3</sup>, attached at their lower ends to the horizontal bar H<sup>2</sup> of said frame and at their upper ends to the top plate of the machine-frame.

Next referring to the transfer mechanism by which the types are transferred from the delivery ends of the type-holding channels of the cases said parts are made as follows: I I designate two traversers which are notched to fit over the reduced upper margin of the plate F and having parts i, which fit and travel in the type-transferring groove and into the path of which the types are delivered one at a time. The normal positions of said traversers are at the outer ends of said plate F, and they are simultaneously moved inwardly toward the receiving end of the holder C to transfer the type delivered into the path of one of them into line with said holder, and the traversers meet at the center of the groove to center the type in front of the opening d<sup>a</sup>. If but a single case be employed, a single traverser will be employed which will be arrested by a suitably-located stop. To the parts of traversers in front of the plate F are affixed rigid stems I', which have endwise sliding engagement with sleeves i', formed on transversely-movable members I<sup>2</sup>, which slide to-



ward and from each other on horizontal transverse rods  $I^3$ , located below and parallel with the plate F and affixed at their ends to lugs or ears extending laterally and forwardly from the top plate of the machine-frame, as shown in Figs. 1 and 3. Said sliding members  $I^2$  are moved toward and from each other by means of two vertically-swinging levers  $I^4$ , which are hinged at their lower ends to pins  $i^2$ , affixed in the base of the machine-frame, and are loosely connected at their upper ends with said sliding members. Said levers are swung inwardly by means of cam projections  $H^{50}$ , Fig. 3, depending from the lower horizontal member of the shifting frame, which cams engage angularly-disposed extensions  $I^5$  on the lower ends of said levers, and the parts are so disposed that when the shifting frame is depressed it acts, through said cams and extensions, to swing the upper ends of said levers inwardly, and thereby carry the traversers toward each other. The said parts are restored to their normal outer positions by means of springs  $i^3$ , coiled about the pivot-pins  $i^2$  and bearing against the lower ends of said levers. Preferably the extensions  $I^5$  of said levers are provided with antifriction-rollers, against which the cams directly bear. The levers are each made of two telescopic parts or otherwise made longitudinally extensible and contractible, so as to permit the same to shorten as they reach the center of their throw and to lengthen as they approach at limits of their throw, this construction being made necessary by reason of the straight paths of the sliding members  $I^2$ . In order to accurately adjust the throw of the levers, the cams  $H^{50}$  are made separate from the shifting frame and are fixed adjustably thereon. As herein shown, said cams are formed on or attached to the ends of a metal strip  $h^4$ , attached to the lower margins of the frame member  $H^3$  by means of a screw extending centrally through said strip. Screws  $h^5$ , extending downwardly through said frame member  $H^3$  and impinging against the ends of said strip, are provided to adjust the cams toward and from the coacting parts of the levers  $I^4$ .

After each type has been moved by the transferring mechanism described into line with the type-holder C it is inserted through the opening  $d^a$  in the standard  $D'$  into said holder by a charging mechanism made as follows: J designates a sliding charging-plate which is fitted on a flat enlargement or extension  $D^2$  of said standard and is held rising therefrom by a cap-plate  $D^3$  and screw-bolts  $d^2$ , extending downwardly through the cap-plate and through slots in the charging-plate, the slots permitting said plate to slide from front to rear of the machine. Said sliding plate is provided at its forward end with a downturned arm  $J'$ , which is located in front of the opening  $d^a$  in said standard, through which the types are inserted into the holder

and in rear of which the types are delivered by the transfer mechanism. The plate F is cut away or notched at its upper margin to receive said downturned arm of the charging-plate, and said downturned arm of the charging-plate stands normally in front of the plate F, as shown in Fig. 7.

Devices are provided for moving the charging-plate rearwardly after a type has been delivered in rear of the same by the transferring mechanism, consisting, as herein shown, of a vertically-swinging lever K, having a horizontal and a vertical arm and pivoted at the end of its horizontal arm between lugs  $d^4$ , rising from the standard  $D'$  and bearing at the end of its vertical arm against the downturned arm of the charging-plate  $J'$ . Said lever is herein shown as actuated by the shifting frame before mentioned, which actuates the cutting-bars and the transferring mechanism. Such actuation is effected in the present instance by means of a screw L, which extends downwardly through an arched part  $h^6$  of the top member of the shifting frame, said screw engaging at its lower end when the frame is depressed the horizontal member of the lever K, thereby swinging the lever downwardly and forcing the charging-plate inwardly to insert a type deposited in rear of the downturned arm thereof into the type-holder. It will be understood that the insertion of the type into the holder by the charging device described is accomplished in the last part of the depression of the shifting frame, and the bar H is arched in order to allow the required movement of the frame to effect the other operation of the machine before the charging device is brought into operation. As each type is inserted into the holder the types already deposited therein are forced backwardly into the holder, and this operation is repeated until the holder is filled. The front end of the holder does not extend through the opening in the standard as the machine herein shown is organized, and the downturned arm of the charging-plate J is provided on its rear face with an extension  $j$  made of such thickness as to insure that each type is forced fully into the end of the holder. The charging-plate is held normally at the forward limit of its movement by means of a restoring-spring  $d^6$ , attached to a screw  $d^7$ , inserted into the extension  $D^2$  and bearing against the rear end of said plate.

When the traversers of the transferring mechanism have reached the inner limits of their movements and have delivered a type into line with the type-holder, they are arrested by a suitably-located stop-block  $f^3$  on the front face of the plate, as shown in Fig. 3, the forward or outer parts of said traversers striking said stop. The position of the transferring mechanism when the traversers are at the inner limits of their movement is shown in dotted lines in Fig. 3. Inasmuch as the shift-



ing frame must be depressed further in order to effect the actuation of the charging device and inasmuch as such further depression of said frame acts to swing the upper ends of the levers farther inwardly as the machine herein shown is organized it is required that means be provided for effecting a lost motion between said traversers and the levers when the traversers have been arrested by the stop  $f^3$  provided therefor. It is for this reason that the stems  $i'$  are mounted in the sleeve of said sliding members  $i''$  in a manner to slide endwise thereon. Springs  $i^6$  normally hold the traversers projected inwardly from said sliding members, but yield backwardly when the traversers are arrested to permit the levers to swing farther inwardly.

Referring now to the mechanism for feeding the types from the type-holding channels of the type-cases one by one into the guide-groove of the transferring mechanism, said mechanism is made as follows: Located in each of said channels in rear of the row or series of type therein is a bar M, which is provided on its upper surface with a series of rearwardly-inclined ratchet-teeth and is free to slide endwise in said groove.  $M'$   $M'$  designate a series of upper and lower endwise-reciprocatory pawls, one series coöperating with the upper series of ratchet-bars and the other with the lower series thereof. Said pawls are arranged to operate in pairs, the pawls of each pair coöperating with the ratchet-bars located in channels located one vertically above the other. The two pawls of each pair are loosely connected at their rear ends with the cross-head N of an endwise-reciprocating bar N', which extend rearwardly through horizontal guide-openings in a transverse bar O, supported on a rearward extension of the top plate of the machine. As herein shown, Fig. 5, the guide-openings are formed in the upper face of said bar and are closed by a cap-plate O', secured on said bar by screws. The said reciprocating bars N' are provided on their rear ends with beveled or cam surfaces, and the several inclined or cam surfaces are engaged by the upper inclined ends of a like number of vertically-reciprocating plungers P, located in vertical guide-openings in the frame-plate A<sup>2</sup> and the bar O. Said guide-openings for the plungers are formed in the rear face of the bar O and closed by a plate O<sup>2</sup>, attached to the bar by screws. Said plungers P are connected, by means of vertical links P', with the rear ends of the key-levers B in rear of the pivot B' of said levers, as clearly shown in Fig. 2. Depression of the front ends of the key-levers raises the plungers P, and by reason of the inclined or cam contact ends of the plungers P and bars N' the pawls M' connected therewith are shifted forwardly a sufficient distance to eject one of the types from the type-holding channel corresponding with the key-lever depressed, it being understood

that there is a lever for each channel of each type-case.

When the upper and lower cases are employed, as herein shown, and two series of pawls are therefore provided for separately ejecting the type from the upper and lower cases, means are provided for holding one set or series of the pawls out of engagement with its associated ratchet-bars M when the other set is engaged with its series. The means herein shown for effecting this result are made as follows: Q Q designate upper and lower parallel rods, one pair at each side of the type-holder support, which are connected at their ends by means of short inner and outer vertical rocking bars Q' Q, as more clearly shown in Figs. 1, 2, and 6. The inner rocking bar of each set is pivotally connected with a pin  $q$ , attached to the adjacent side face of the type-holder support, while the outer rocking bars are pivoted to pins  $q'$ , attached to lugs  $a^2$ , rising from the top plate of the machine-frame, at the sides thereof. The upper rod of each pair extends transversely beneath and supports the upper series of pawls, while the lower rod in like manner supports the lower series of pawls, as more clearly shown in Fig. 2. As shown in Fig. 2, the rocking bars Q' are inclined rearwardly at their rear ends, and when in this position the lower rods engage the lower series of pawls to raise them from their associated ratchet-bars M, while the upper rods are out of contact with the upper series of pawls and permit them to engage the upper series of ratchet-bars M. When the parts are in this position and one of the key-levers B is depressed, the upper pawl of the pair corresponding to said key-lever is moved forwardly to eject a type from the associated type-holding channel of the upper case. At this time the delivery ends of the upper cases are in position to deliver types therefrom to the transfer guide-groove. If, however, the rocker-bars be oscillated to carry the upper rod forwardly and the lower rod rearwardly, the upper series of pawls will be raised out of engagement with their ratchets, while the lower series of pawls will be allowed to fall by gravity into contact with their corresponding ratchets. When the parts are in the positions last mentioned, depression of one of the key-levers acts, through one of the lower pawls, to eject a type from the corresponding type-holding channel of the lower case. When this occurs, the lower type-cases will have been raised in position to deliver type therefrom to the transfer guide-groove. Any suitable means may be employed for rocking said devices to thus shift the pawls out of and into engagement with their racks. As herein shown, such oscillating movement is effected through the medium of the key-lever B<sup>2</sup>, which operates to raise and lower the type-cases to bring the same in position to deliver types from either



of said cases into the transfer guide-groove. A convenient device for effecting this result is made as follows: R designates a link which is loosely connected or pivoted at its forward end with an arm  $e^7$ , made rigid with the arm  $e^4$  of the rock-shaft  $E^1$  and loosely connected at its rear end with an arm  $Q^2$ , made integral with the inner rockers  $Q^1$ . With this construction at the time the key-lever  $B^2$  is depressed to shift the front or delivery ends of either the upper or lower case into position to deliver the types to the transferring-groove the pawl-shifting device is oscillated to bring that series of pawls into engagement with their ratchets which are associated with the case which has been so shifted to bring its delivery end into alignment with the transfer guide-groove. The side walls of the cases are cut away, as shown at  $e^8$ , Fig. 6, to permit the relative movement of the cases and the pawl-shifting devices.

The operation of the machine as a whole may be briefly stated as follows: The type-holding channels are filled with type in the manner more clearly shown in Figs. 1 and 2, the types being inserted from the ends of the channels and filling the spaces from the front ends of the ratchet-bars M to the front ends of said channels. When the types are to be inserted into the channels after the machine has been assembled, this may be accomplished by removing the cutting-bars G and swinging the forward ends of the case-frames upwardly sufficiently to permit the insertion of the types thereinto or in any other suitable manner. As before stated, the types set by the use of this machine are usually connected together in strips, though, if desired, the types may be distributed after having once been used, and in this event will be inserted one at a time into the channels. A type-holder C is thereafter inserted in place on the supporting-bar D, with the forward end thereof extending into the opening  $d^2$  in the standard  $D'$ . It will be understood that there is a key-lever for each type-holding channel and that the key appropriated to said lever bears thereon a character corresponding to the character contained in its associated channel. In transferring a type from one of the channels to the holder C this is accomplished by depressing that one of the keys appropriated to the channel containing that particular type. The first effect of the depression of the key is to operate, through the associated plunger P and bar  $N'$ , that one of the pawls  $M'$  corresponding to said key-lever. The shifting of the pawl forwardly in this manner forces the corresponding ratchet-bar M forwardly, advances the row of type in its channel sufficiently to deliver the forward or advance type into the transfer guide-groove. After the pawl has been shifted forwardly sufficient to accomplish this result the further raising of the plunger P by the depression of its associated key-le-

ver B will have no further effect to advance said pawl, inasmuch as the straight front face of said plunger will have been elevated to the level of the inclined rear end of the bar  $N'$ . In the further depression of the key-lever B said key-lever strikes the universal bar  $H^5$  and draws down the shifting frame, which carries with it the bars G G, so as to separate the advance type from the one immediately in rear of the same. If the types be connected or made integral with each other in the manner before mentioned, the lower sharpened margin of the bars will act at this time to sever said advance type from the strip. In any event such bars act to separate the advance type from the type in rear of the same, and in the further descent of the bars the latter are brought into position to constitute the rear wall of the transfer guide-groove into which the type has just been delivered. In the further descent of the type-bar B and the shifting frame the cams  $H^{50}$  are brought into contact with the extensions  $I^5$  of the levers  $I^4$  of the transfer mechanism, and said levers are swung inwardly at their upper ends, thereby carrying the traversers toward each other. In the inward travel of said traversers one of them strikes the type which has been delivered into the guide-groove and carries it into line with the type-holder, and the traversers are arrested by the stop  $f^3$ . In the further descent of the key-lever and shifting frame the screw L is brought into contact with the charging-lever K and acts on the charging-plate J to force the type rearwardly through the opening in the standard  $D'$  into the front end of the holder. As the types are successively thrust into said holder the last type forces the type already deposited therein rearwardly until the holder is completely filled. After the type has been arrested in line with the holder and while the shifting frame is being drawn downwardly to effect the operation of the charging devices the upper ends of the springs  $H^6$  and the sliding connection of the traverser-stems with the sliding members  $H^2$  permit the upper ends of the levers  $H^6$  to continue to swing inwardly until the shifting frame has reached the limit of its movement. After a type has been inserted into the holder in the manner described the key is released and said key-lever is returned to its normal position by its restoring-spring, while the shifting frame is likewise restored by its springs  $h^3$ .

It is obvious that many of the structural details herein shown may be varied from those illustrated without departing from the spirit of my invention, and I do not wish to be limited to such details excepting as hereinafter made the subject of specific claims. It is, furthermore, obvious that the several movements of setting mechanism may be effected by more than one set of key-levers, if desired, and that less than all the mechanisms described may be employed.



I claim as my invention—

1. A type-setting machine comprising a frame, a type-case supported horizontally thereon and provided with a plurality of type-channels which are opened at the front side of the case, a support for the type-holder located horizontally at one side of the case, a transferring mechanism embracing a horizontal groove extending transversely in front of said type-case and into which the types are delivered from the type-channels of said case, a traverser traveling in said groove from one end to the other and adapted to transfer the type delivered into the groove into line with a holder placed on said support and means for forcing the types from said transfer-groove into said holder.

2. A type-setting machine comprising a type-case, a type-holder support, a type-transferring mechanism which receives type from the case and transfers it into line with said holder, means for cutting or separating the advance type from the type immediately in rear of the same as it is delivered to the transferring mechanism, and means for inserting the types into a holder placed on said support.

3. A type-setting machine comprising a type-case, a type-holder support, a type-transferring mechanism embracing a guide-groove into which the types are delivered one by one from the case and a part traveling in said groove for transferring the types there-through to the receiving end of the holder, means for inserting the types into a holder placed on said support, and key-levers through which power is transmitted for operating all of said mechanisms.

4. A type-setting machine comprising a type-holder support, type-cases arranged one on each side of said support, a type-transferring mechanism embracing parts which travel simultaneously toward each other from the outer sides of said cases inwardly toward the centrally-located holder-support for delivering the types fed from said cases into line with the type-holder and means for inserting the types into said holder.

5. A type-setting machine comprising upper and lower type-cases, a type-holder support, a type-transferring mechanism which delivers type received from said cases into line with a holder placed on said support, means for inserting the types into said holder and means for delivering types from either of said cases to said type-transferring mechanism.

6. In a type-setting machine, the combination with a case in which the types are arranged in rows and a type-holder support, of means for transferring the types one at a time from the case to a holder placed on said support, and independent means for severing the advance type of each row from the type in rear of the same as it is delivered from the case.

7. A type-setting machine comprising a

type-case provided with type-holding channels which are open at one side of the case, means for supporting a type-holder, a transferring mechanism comprising a part which travels across the open ends of said channels, means for delivering the types from said channels one by one into the path of said traveling part to be thereby delivered into line with the holder, means independent of said delivering means for separating or dividing the advance type as it is delivered into the path of said transferring part from the types in rear of the same, and means for inserting the types into a holder placed on said support.

8. A type-setting machine comprising two type-cases, a type-holder support located between said cases, a type race or guide-groove into which the types are delivered from said cases, two traversers traveling in said race or groove, means for moving said traversers simultaneously toward and from each other whereby the types delivered into said race or groove are shifted toward the type-holder support, and are centered by said traversers in line with a holder on said support and means for forcing the types from the race or groove into said holder.

9. A type-setting machine comprising two type-cases, a type-holder support located between said cases, a type race or guide-groove into which the types are delivered from said cases, two traversers traveling in said race or groove, means for moving said traversers simultaneously toward and from each other whereby the types delivered into said race or groove are shifted toward the type-holder support and are centered by said traversers in line with a holder on said support, means for forcing the types from the race or groove into said holder, and yielding connections between the traversers and their actuating devices permitting continued movement of said actuating devices after the movement of the traversers is arrested.

10. A type-setting machine comprising a type-case provided with type-holding channels which are open at one side of the case, a type-holder support, a transferring mechanism comprising a groove extending across the open ends of said channels, a traverser traveling in said groove from the outer end thereof to said holder-support, and means for inserting the types into a holder on said support, the inner wall of said groove embracing a movable part which, when the type is delivered into the groove, is located above said type and which is thereafter depressed to constitute the inner side wall of the groove.

11. A type-setting machine comprising a case provided with type-holding channels open at one side of the case, a type-holder support, a transferring mechanism embracing a groove extending transversely across the open ends of said channels and in front of a type-holder placed on said support, and a traverser travel-



ing in said groove from the outer end thereof toward said type-holder, means for feeding the types one by one in said groove in the path of said traverser, a bar which is forced between  
 5 the advance type as it is delivered to said groove and the next type in rear of the same for separating said type from the others, and which constitutes during the time the type is transferred through said groove one side of  
 10 the groove, and means for inserting the type from said groove into said type-holder.

12. A type-setting machine comprising a centrally-located support for a type-holder, two type-cases, one on each side of said holder-  
 15 support provided with type-holding channels which are open at the front sides of the cases, a transferring mechanism embracing two traversers which travel simultaneously toward and from each other transversely in front of  
 20 the open ends of said channels, means for delivering the types one by one into the path of said traveling parts to be thereby moved into line with a type-holder placed on said support, and means for inserting the types from said  
 25 transferring mechanism into said type-holder.

13. A type-setting machine comprising a centrally-located type-holder support, two type-cases one on each side of said holder and provided with parallel type-holding channels  
 30 which are open at the front sides of the cases, a transferring mechanism embracing a groove extending in front of the open ends of said channels and in front of a holder placed on said support, two traversers traveling simul-  
 35 taneously in said groove from the outer ends toward the center thereof to deliver the types in line with said type-holder, means for delivering the types one by one from said groove, and means for inserting the types from said  
 40 groove into the holder.

14. A type-setting machine comprising a type-case, a type-holder support, a transferring mechanism which receives types from the case and delivers them into line with a holder  
 45 placed on said support, means for delivering types from said case to said transferring mechanism, key-levers for operating said type-delivering means, and means, operated by said key-levers, for inserting the types into the  
 50 holder.

15. A type-setting machine comprising a type-case, a type-holder support, a transferring mechanism which receives types from the case and transfers them into line with a  
 55 type-holder placed on said support, means for delivering the types one by one from said case to said transferring mechanism, means for inserting the types into said holder, and a set of key-levers operatively connected with  
 60 said type-feeding means, the transferring means, and type-inserting means for successively operating the same through power applied to said key-levers.

16. A type-setting machine comprising up-  
 65 per and lower type-cases provided with type-

holding channels which are open at the front sides thereof, a type-holder support, transferring mechanism embracing a part traveling across the front ends of said channels for de-  
 70 livering the types into line with a holder placed on said support, means for feeding the types one by one into the path of the movable part of said transferring mechanism to be transferred into line with the holder, means  
 75 for inserting the types into said holder, and shifting means for moving either of said cases into position for delivering types therefrom to the transferring mechanism.

17. A type-setting machine comprising upper and lower type-cases, each provided with  
 80 type-holding channels which are open at the front sides of the cases, a type-holder support, a transferring mechanism embracing a groove extending across in front of the open ends of said channels, and two parts traveling from  
 85 the outer ends of said groove toward the center thereof to deliver the types in line with said holder, means for delivering the types one by one from said channeled cases into said groove in the paths of said traveling parts,  
 90 means for inserting the types from said transfer-grooves to said holder, and means for elevating and depressing the front ends of said cases to bring either case into position to deliver types therefrom to said transfer-groove.  
 95

18. A type-setting machine comprising a type-case provided with type-holding channels, which are open at the front side of the case, a type-holder support, a transferring  
 100 mechanism for receiving types from said channels and delivering them into line with a holder placed on said support, means for delivering the types one by one from channels to said transferring mechanism embracing a bar in  
 105 each groove in rear of the row of types therein, key-levers, one for each bar and one acting in each operation of the machine to advance its bar forwardly a distance to deliver one type from the forward end of the chan-  
 110 nel, and means for inserting the types from said transferring mechanism into said holder.

19. A type-setting machine comprising a type-case provided with type-holding channels, which are open at the front side of the case, a type-holder support, a transferring  
 115 mechanism receiving types from the case and delivering them into line with a holder placed on said support, means for feeding the types one by one from said channels to the transferring mechanism, embracing a bar located  
 120 in each of said channels in rear of the row of types therein, ratchet-teeth on the upper face of said bar, a series of pawls engaging the ratchet-bars, key-levers, one for each bar, operatively connected with said pawls, and means  
 125 for inserting the types from said transfer mechanism into said type-holder.

20. A type-setting machine comprising two type-cases, each provided with type-holding  
 130 channels which are open at the front sides of



the cases, a type-holder support, a transfer mechanism embracing two transversely-reciprocating traversers which travel in front of the open ends of said channels from the sides to the center of the machine, means for delivering the types one by one into the paths of said traversers, two swinging levers connected at their upper ends to said traversers and means operating on said levers for swinging the upper ends of the levers and the connected traversers inwardly toward each other, and means for inserting the types from the transfer mechanism to a holder placed on said support.

21. A type-setting machine comprising a type-case provided with type-holding channels which are open at the front side of the case, a type-holder support, a transferring mechanism embracing a traverser which reciprocates in a straight path in front of the open ends of said channels, means for delivering the types one at a time into the path of the said traverser, a telescopic lever connected at one end with said traverser, means acting on said lever for moving the traverser toward a type-holder placed on said support to deliver the types one by one into line with said holder, and means for inserting the types into said holder.

22. A type-setting machine comprising a type-case provided with type-holding channels which are open at the front side of the case, a type-holder support, a transfer mechanism embracing a traverser which reciprocates in front of the open ends of said channels toward a holder placed on said support, means for delivering the types one at a time into the path of said traverser, a swinging lever connected at one end with said traverser, means acting on said lever for moving the traverser toward said type-holder to deliver the types one by one in line with said holder, a charging mechanism for inserting the types into said holder, and operated by the same means which operates said transferring-mechanism lever, a stop for arresting said traverser at the inner limit of its movement and yielding connection between said lever and traverser permitting the lever to continue its inward movement after the movement of the traverser has been arrested.

23. A type-setting machine comprising a type-case provided with type-holding channels which are open at the front side of the case, a type-holder support, transfer mechanism embracing a part which travels across the front ends of the channels for delivering the types into lines with a holder placed on said support, means for feeding the types one by one into the path of said traveling part, and means for inserting the type into said holder comprising a sliding spring-pressed charging-plate provided with an arm which is located in line with said holder and in rear of which the types are delivered, and means for shift-

ing said plate toward said holder against the action of its spring.

24. A type-setting machine comprising a type-case provided with type-holding channels which are open at the front side of the case, a type-holder support, a transferring mechanism comprising a part which travels transversely across the open ends of said channels for delivering the types into line with a holder placed on said support, means for feeding the types one by one from said channels into the path of said traveling part, and means for inserting said type from said transfer mechanism into said holder, comprising a charging-plate, a shifting frame and operative connections between the said shifting frame and the transfer mechanism and the charging-plate constructed to first move said traveling part of the transfer mechanism inwardly toward the holder and thereafter operate charging-plate to insert the types from the transfer mechanism to the holder.

25. A type-setting machine comprising a type-case provided with type-holding channels which are open at the front side of the case, a type-holder support, a transferring mechanism for transferring the type into line with a holder placed on said support, means for feeding the types one by one from said channels into the path of said transferring mechanism, a charging-plate for inserting the types from said transferring mechanism to the holder, a plurality of key-levers, one for each channel of the type-case, and operatively connected with the means for feeding the types from said case into the path of said traveling part of said transferring mechanism, a shifting frame for operating said transferring mechanism and charging-plate, and a universal bar located beneath said key-levers and operatively connected with said shifting frame.

26. A type-setting machine comprising a centrally-located type-holder support, type-cases located one on each side of said support and provided with type-holding channels which are open at the front sides of the case, a transferring mechanism embracing a part which moves transversely across the front ends of said channels for delivering the types into line with a holder placed on said support, means for feeding the types one by one from said channels into the path of said movable part, a plurality of key-levers, one for each channel, operatively connected with the means for feeding the types from said channels to the transferring mechanism, two swinging levers operatively connected with the movable part of the transferring mechanism, a shifting frame, a universal bar located beneath said key-levers and operatively connected with said shifting frame, cams on said shifting frame for operating said levers to move the upper ends thereof and the traveling parts connected therewith inwardly, a charging device for



inserting the type from said transferring mechanism to the holder, and operative connections between said shifting frame and the charging device for operating the latter.

5 27. A type-setting machine comprising a type-case provided with a plurality of type-holding channels which are open at the front side of the case, a transferring mechanism comprising a part which travels across the  
10 front ends of said channels for delivering the types into line with a holder placed on said support, means for feeding the types one by one from said channels into the path of the movable part of the transferring mechanism  
15 comprising a ratchet-bar located in each of said channels in rear of the row of types thereon, a plurality of pawls engaging said ratchet-bars and provided with parts having cam-surfaces, a plurality of key-levers, plungers operatively connected with said key-levers and  
20 engaging said cam-surfaces of said pawls, and a charging device for inserting the type from said transferring mechanism into said holder.

28. A type-setting machine comprising upper and lower type-cases, each provided with  
25 parallel type-holding channels, a support for a type-holder, a transferring mechanism embracing a part which travels across the open ends of said channels for delivering the types into line with a holder placed on said support,  
30 means for feeding the types one by one into the path of said movable part of the transferring mechanism embracing ratchet-bars located in said grooves in rear of the rows of type thereon, pawls arranged in upper and  
35 lower pairs, the pawls of each pair cooperating with ratchet-bars located vertically over each other, means for raising and lowering the front ends of said cases in position to deliver the types from either of said cases to the  
40 transferring mechanism, means operating to release the series of pawls from their corresponding ratchet-bars associated with the case which is out of operative relation with said transferring mechanism, and charging means  
45 for inserting the type from said transferring mechanism to said holder.

29. A type-setting machine comprising upper and lower cases, each provided with a plurality of type-holding channels which are open  
50 at the front sides of the cases, a transferring mechanism which embraces a part which travels across the open ends of said channels for delivering the types into line with a holder placed on said support, means for raising and  
55 lowering the front sides of said cases to bring either case into position to deliver types therefrom into the path of said movable part of the transferring mechanism, means for delivering the types one by one into the path of said  
60 movable part of the transferring mechanism,

comprising upper and lower independently-movable ratchet-bars in said channels in rear of the rows of types therein, upper and lower pawls arranged in pairs and engaging said  
65 ratchet-bars, means whereby each series of pawls is engaged with its corresponding ratchet-bars at the time the case associated therewith is in position to deliver type to the transferring mechanism, a horizontally-reciprocating stem connected with each pair of  
70 pawls, plungers having cam engagement with said stems, key-levers operatively connected with said plungers and a charging device for inserting the types from said transferring mechanism into said holder. 75

30. A type-setting machine comprising upper and lower cases, each provided with a plurality of type-holding channels which are open  
80 at the front sides of the cases, transferring mechanism embracing a part which travels across the open ends of said channels for delivering the types into line with a holder placed on said support, a lever for raising and lowering the front sides of said cases to bring  
85 either case into position to deliver types therefrom into the path of said movable part of the transferring mechanism, means for delivering the types one by one into the path of said movable part of the transferring mechanism, comprising upper and lower series of ratchet-bars movable in said channels in rear of the  
90 rows of type thereon, upper and lower pawls arranged in pairs and engaging said ratchet-bars, means actuated by the case-shifting lever whereby each series of pawls is engaged with its corresponding ratchet-bars at the  
95 time the case associated therewith is in position to deliver type to the transferring mechanism and the other pawls are at this time released from their ratchet-bars, means for severally actuating said pawls to advance its ratchet-bar to deliver a type from its corresponding channel, and a charging device for  
100 inserting the type from said transferring mechanism to said holder. 105

31. In a type-setting machine, a type-case having type-holding channels adapted to receive strips of partially-separated types, means  
110 for forcing the strips of type forwardly, means for separating the advance type from the strip as it is delivered from each type-channel and means for setting the severed types in a holder.

In testimony that I claim the foregoing as  
115 my invention I affix my signature, in presence of two witnesses, this 4th day of November, A. D. 1903.

THOMAS A. HOUGHTON.

Witnesses:

FRED R. JEAN,

ALEXANDER S. PALMER.