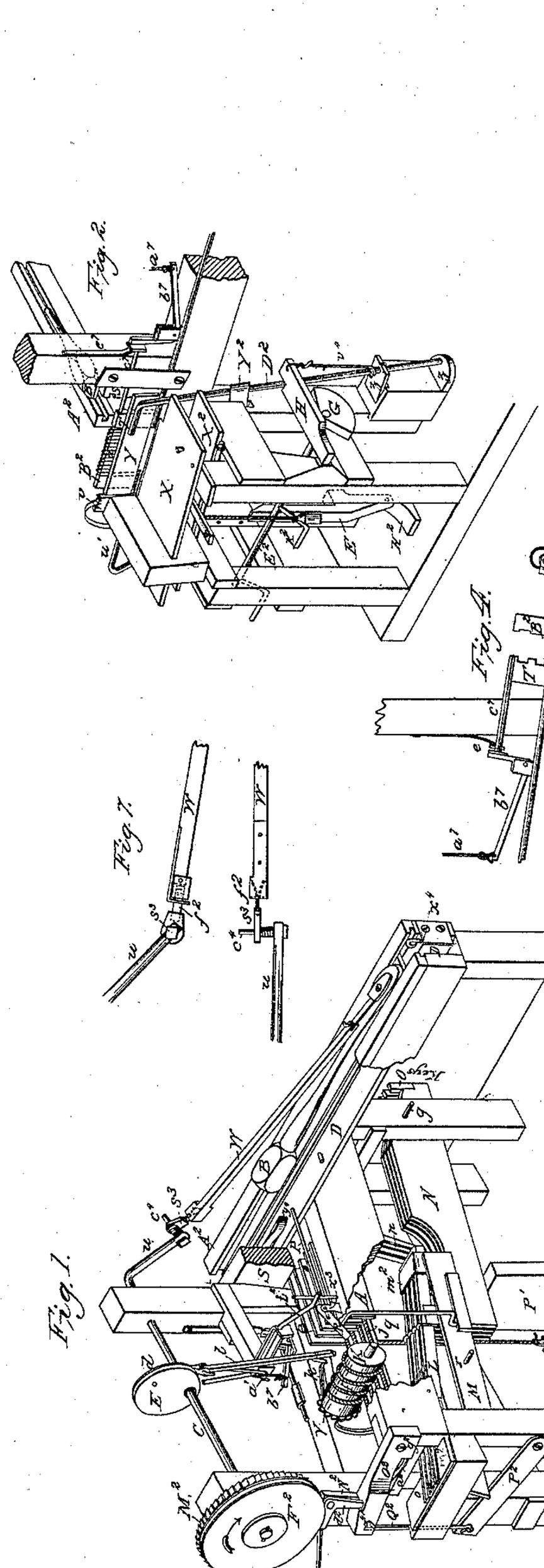
2 Sheets—Sheet 1.

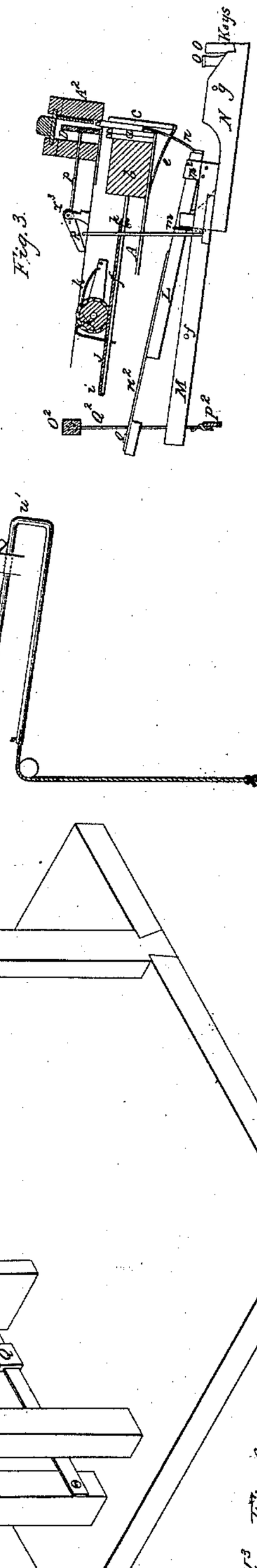
W. H. HOUSTON.

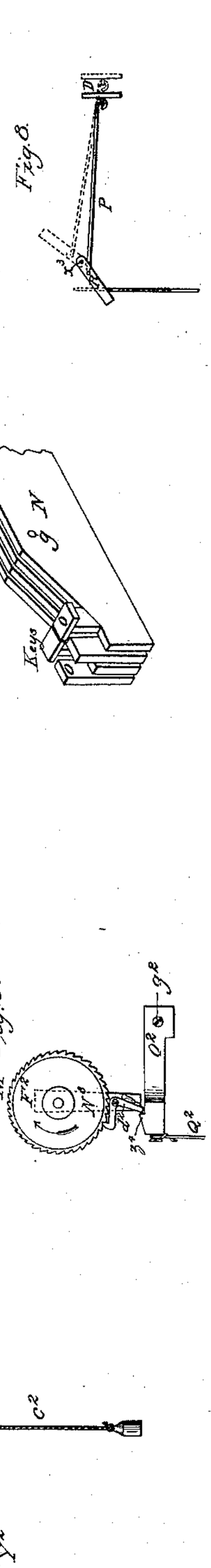
Composing and Distributing Type.

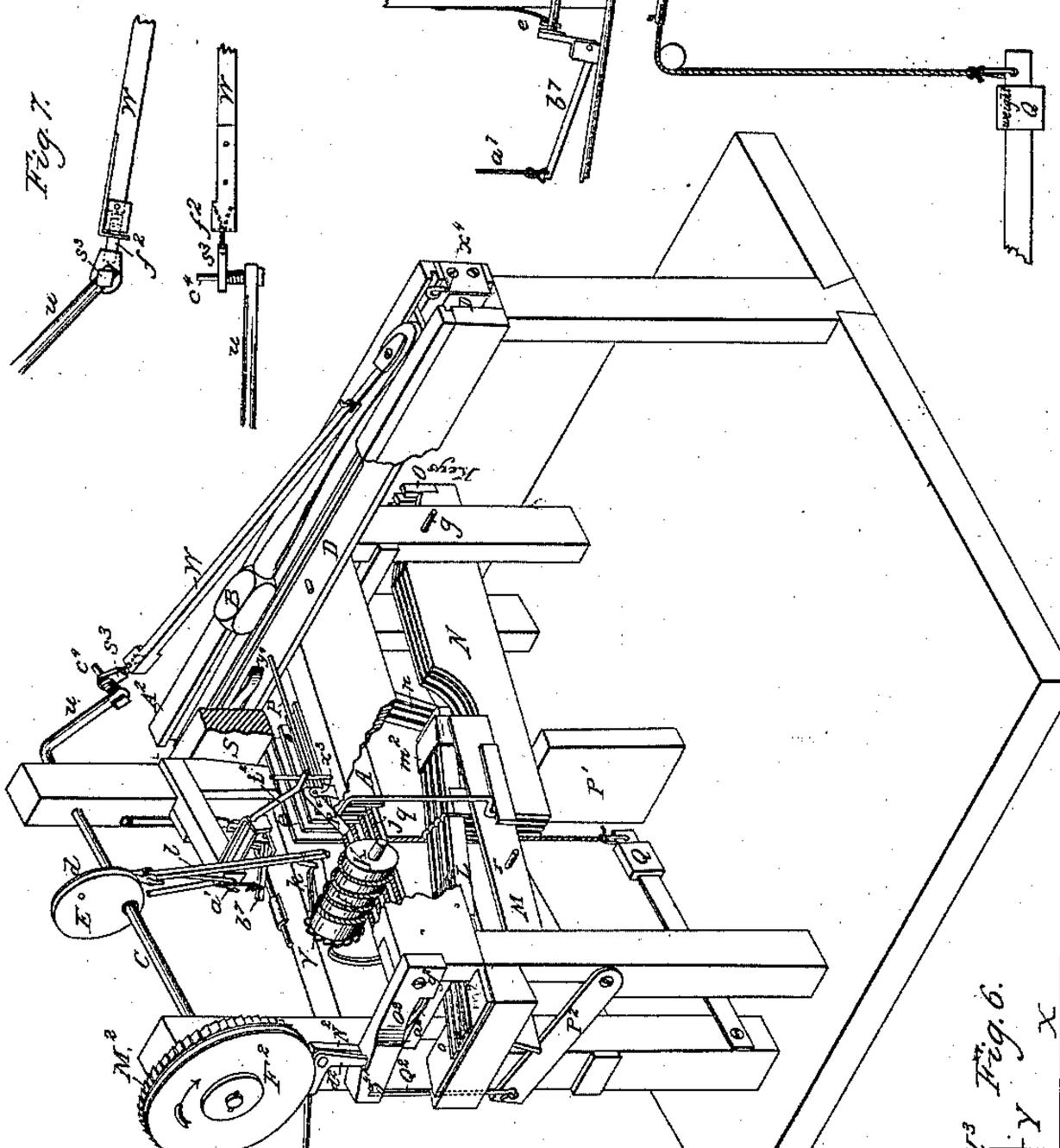
No. 16,947.

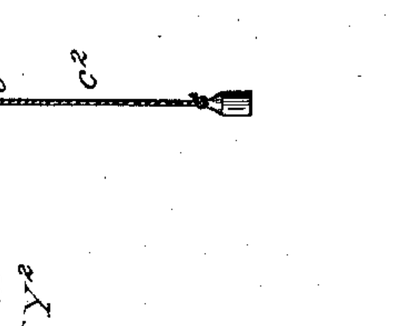
Patented March 31, 1857.











2 Sheets—Sheet 2.

W. H. HOUSTON.

Composing and Distributing Type.

No. 16,947. Patented March 31, 1857.

Fig. 10.

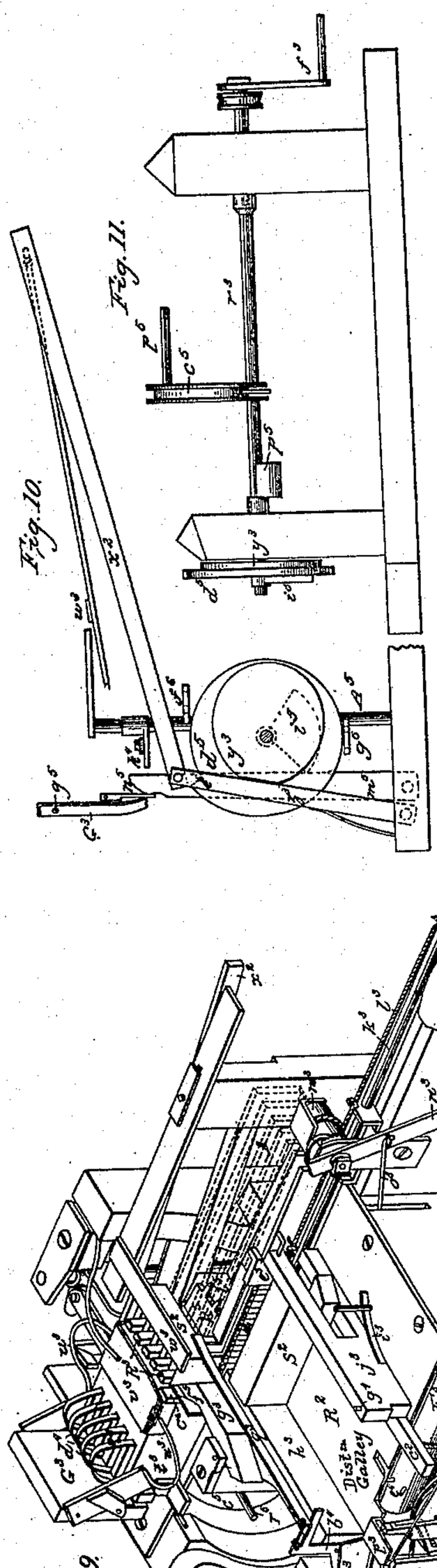


Fig. 11.

Fig. 12.

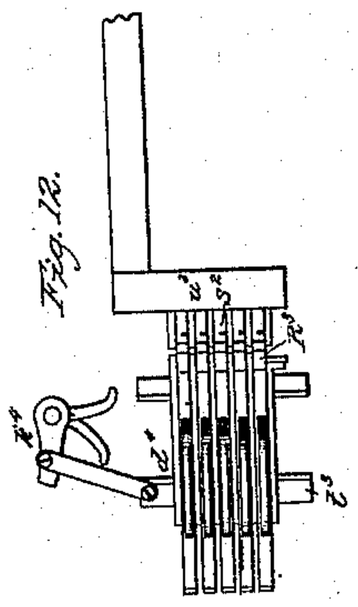


Fig. 14.

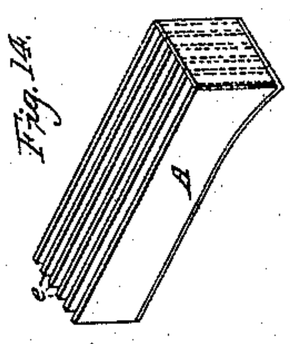


Fig. 9.

Fig. 13.

UNITED STATES PATENT OFFICE.

WILLIAM H. HOUSTON, OF BELFAST, MAINE.

MACHINE FOR COMPOSING AND DISTRIBUTING TYPE.

Specification forming part of Letters Patent No. **16,947**, dated March 31, 1857.

To all whom it may concern:

Be it known that I, WILLIAM H. HOUSTON, of Belfast, in the county of Waldo and State of Maine, have invented certain new and useful Improvements in Machines for Composing and Distributing Types, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, making part of this specification, in which—

Figures 1 and 2 are perspective views of the composing-machine; Figs. 3, 4, 5, 6, 7, 8, and 15, details of the same; Fig. 9, perspective view of the distributing-machine; Figs. 10, 11, 12, 13, and 14, details of the same.

In the composing-machine the types are arranged in a peculiarly-constructed case A, Figs. 1 and 3. This case is divided longitudinally by thin partitions *e* into separate compartments, which are open at the top and rear end. In these compartments, of which there is one for each letter, the types are arranged upon their ends with their faces uppermost, as seen at *a*, Fig. 3, which represents a longitudinal section through one of the compartments, the types being pressed toward the forward end of the case by the quads *b*. The end *c* of the case A, as also one end of the partitions *e*, Fig. 3, running through it, are allowed to project a short distance beneath the bottom of the case for the purpose of guiding and steadying the springs *n*, which throw out the types, as will be presently more fully explained.

The quads *b*, of which there is one for each letter and division of the case A, are metallic or wooden blocks of a width just sufficient to fill the type compartment and to move easily therein. They are kept uniformly and constantly pressed up against the types, and are fed along as the types are withdrawn in the following manner:

J are a series of rods, the forward ends of which press against the quads, the rear ends running in guides in the frame of the machine.

f are bands, (seen in red in Figs. 1 and 3,) which are attached at *i* and *h* to the rods J and pass once around the cylinder or drum K. This drum is caused to turn a short distance upon its axis each time a single type is composed by the pawl *k* upon the arm *l*, the latter being connected with the eccentric E upon the driving-shaft C′ by a strap *d* in the ordinary manner. The pawl *k* thus operated engages with the teeth of the ratchet-wheel V upon the drum and drives it one notch each time the shaft revolves. In those compartments of the case A from which the type has been removed the quads *b*, Fig. 3, are thus fed forward by the friction of the bands *f* upon the drum K, so as to bring the next type up against the end *c* of the case; but in those compartments from which types have not been withdrawn the quads remain stationary, the bands *f*, which drive them, slipping round the drum K as the latter revolves.

The manner in which the types are selected and withdrawn from the case in succession as they are required will now be explained.

N are levers, one for each compartment of the case A, which are arranged side by side beneath this case and are furnished with blocks or keys O, Figs. 1, 3, and 15, to be operated upon by the fingers of the compositor. These levers are pivoted at *g* to the frame-work of the machine, and are each connected by a loop at *m* with a lever L. This lever terminates in a spring n^2, which is furnished at its rear end with a slot, through which passes a screw or pin *o*, by means of which the levers L are adjusted in the exact position required. The levers L are thus allowed to rise and fall without friction whenever the keys are depressed or released. At its forward end each lever carries a spring-finger *n*, which enters a small opening in the end of the type-compartments, and as the key O and lever N are depressed a single type is forced out of its compartment, Fig. 3, into a trough or passage, through which it is transferred to the composing-stick, as will now be explained.

A^2 is a smooth stationary timber or slide, the face of which is in the plane of the inside of the front of the case A, Fig. 3. This slide forms one side of the trough, which receives the type as it is ejected from the case, the other side being formed by the thin guide or plate D, which is hinged to the slide A^2 at x^4, and up to which it is pressed by a spring y^4, by which means the type is held from falling, as will be hereinafter more fully described.

The levers M, of which there is one at each end of the machine, are pivoted at *r* and are

connected together by the bar m^2, which rests upon the top of all the bars L, and whenever one of the latter is raised by the depression of a key the bars M are raised and the plate D is allowed to press against the type and hold it steadily as follows: This plate is connected with a short lever R by the rod P. This lever is pivoted to the frame-work at x^3, and is seen detached in Fig. 8, where it is represented in two positions, one being indicated in black, the other in red. When the lever is in the position indicated in red, the plate D is pressed up against the type, and the latter is held from falling by a slight friction. Previous to the elevation of another type the lever R is thrown over into the position seen in black, and the plate is thus drawn back to permit the type to enter between it and the slide A^2. This motion of the lever R is effected by a cam upon the side of the eccentric E, which actuates at the required moment a crank t^2, by which the lever is thrown over into the position seen in black, and the plate D is drawn away from the slide. So soon as the type has entered a short distance between it and the slide the plate is caused to return to the position seen in red, Fig. 8, by the following means: q is a standard or rod which rises from one of the levers M, and as this lever is raised by the depression of any one of the keys it strikes against the lever R and throws it again into the position seen in red in Fig. 8. The type is now to be transferred to the stick, and this is effected by means of the plunger B, which slides in grooves, the one in the slide A^2 and the other in a side piece s. (Seen in end view in Fig. 2, in section in Fig. 3, and broken away in Fig. 1 to show the parts behind it.)

t, Fig. 3, is a thin rod or plate projecting down from the plunger B and between the slide A^2 and plate D, Fig. 3, by which means the type is carried along as the plunger advances until it is delivered onto the "stick" immediately in advance of another plunger T, which is retracted slightly, as will be presently explained, for the purpose of admitting it. The plunger B is actuated by a crank u upon the shaft C, and the plunger T is set in motion as follows: a^7, Figs. 1 and 4, is a rod connected with the strap d, that surrounds the eccentric E. At the other end it is hinged to the lever b^7, the short arm of which presses against the rod c^7, attached to the plunger T, and as the lever b^7 is raised by the revolution of the eccentric the plunger T is moved forward a distance equal to the thickness of the type, the spring e^7 serving to retract it. As each type is moved on by the plunger T, the types preceding it in the line are forced forward against the movable stop B^2, which yields as the successive types are added to the line and is held up against them by the weight Q. To prevent the return of the stop B^2 when the plunger T recedes, a spring-pawl v engages with a rack upon the bar u', attached to the stop B^2 or with a ratchet-wheel in gear with the said bar, and the stop is thus prevented from returning.

When a new line of type is to be commenced, the spring-pawl v is tripped by hand or otherwise, and the stop is drawn back by its weight Q into position to receive the first type of the next line. The finished line of type is now to be moved forward onto the galley X. Between this galley and the bottom L^2, Fig. 6, upon which the types stand, there is a space of sufficient width to permit the passage of a single lead from the galley X^2 below, which lead is thrown up in front of the types in the following manner: a, Figs. 2 and 6, represents the finished line of type resting upon the ledge or bottom L^2 between the ledge and the galley X. As before stated, there is a narrow slit or space for the passage of the leads m', which are seen (in section) resting upon the galley X^2 in Fig. 6. These leads are kept up against the "bottom" L^2 by the plunger Z, which is forced forward by the weighted cord C^2, which passes over the bar y.

Y is a rule, and Y^2 a thin plunger, both attached to the post D^2, which is allowed to slide up and down in the bearings or guides z.

H is a beam, which is pivoted at one end to the frame-work and at the other is secured to the post D^2 by the wire w^4.

E^2 is a shaft, to which one revolution is imparted by hand upon the completion of each line of type. The beam H is thus raised by the cam G, and with it the post D^2 and the rule Y and plunger Y^2. As the latter rises, it forces one of the leads m' up in advance of the line of type, the rule Y at the same time rising to give place to the lead. A portion of the cam G is concentric with its axis of revolution, so that the rule Y is held up out of the way long enough to permit the line of type to be advanced onto the galley X, which is effected as follows:

F is a lever pivoted to the block H^2, and which bears against the bottom of the lever I^2, Fig. 6. This lever is pivoted to the frame-work at b^2 and carries upon its top the cross-bar G^2, which lies immediately in the rear of the line of type a.

K^2 is a cam upon the shaft E^2, which strikes the lever F as the shaft revolves, by which means the cross-bar G^2 is forced forward, and the line of type a is moved onto the galley X, the block H^3 serving to support the first line of type. As each succeeding line of type is thus thrown forward, it carries with it the column of matter upon the galley a distance equal to the thickness of the line of type. The rule Y and the plunger Y^2 are now allowed to descend as the cam G revolves, and another line is composed, as before. The crank u, Figs. 1 and 7, is connected with the pitman W, which actuates the plunger B in a peculiar manner, which is represented in Fig. 7.

s^3 is a block, through a hole in which passes the pin c^4 upon the crank u, and to which are secured the two thin springs f^2. These

springs enter a mortise in the pitman W, and in case of any obstruction to the motion of the plunger B the springs f^2 yield and are drawn out of the mortise in the pitman, and the parts are easily separated without occasioning fracture or other injury.

The above-described machine is operated by power applied in the following manner:

F^2 is a pulley that runs loosely upon the shaft C and is driven by a band from any motive power. M^2 is a ratchet-wheel, which is secured to the pulley F^2 and runs with it constantly upon the shaft. At intervals, when the machine is in operation, the pulley and ratchet-wheel are clutched with the shaft by the following device:

N^2 is an arm secured to the shaft C and carrying a pawl d^2, which, when left to itself, engages with the teeth of the ratchet-wheel M^2, and thus the shaft C is caused to rotate with pulley F^2.

O^2, Figs. 1, 3, and 5, is a lever pivoted to the frame at g^2 and having a notch z^4 at its other end, against which the pawl d^2 strikes when the lever is allowed to rise, by which means the pawl is disengaged from the ratchet-wheel and the pulley revolves without carrying the shaft. Whenever the lever O^2 is depressed, the pawl d^2 engages with the teeth of the ratchet-wheel, and the shaft revolves with the pulley. The lever O^2 is connected with another lever P^2 by the bar or rod Q^2, and is forced down by the levers M whenever the latter are raised by the depression of the keys O. The levers O^2 and P^2 are retained in an elevated position when not depressed by the levers M by a spring a^4, Fig. 1, or in any other suitable manner.

The operation of this machine is as follows: The types being arranged within the compartments of the case A, a single key O is depressed, by which means the corresponding lever L is raised, its spring n entering the slot in the end of one of the compartments and forcing out a type, as seen in Fig. 3. The lever R is now tripped by the revolution of the eccentric E, and the plate D is allowed to spring up and hold the type against the slide A^2. As soon as this has taken place the lever M strikes against the lever P^2, by which means the other lever O^2 is also drawn down, and the pawl d^2 being thus left free engages with the ratchet-wheel M^2, and the shaft C is set in motion. The plunger B now advances, and the type is carried to the end of the trough. At this point the type is received by the plunger T, which carries it into the line of type, Fig. 2, being composed, the stop B^2 being forced back against the operation of its weight Q a distance equal to the thickners of the type and prevented from returning by the spring-pawl v. When the line of type is full, the operator turns the shaft E^2 and raises the rule Y, at the same instant forcing up a lead m', Fig. 6, from the galley X^2 directly in front of the types. The cross-bar G^2 is now thrown forward by the cam K^2 upon the shaft E^2, and the line of type is transferred to the galley X. Another key is then depressed and the operation continues as before. Between each separate step the drum K is fed slightly forward for the purpose of forcing up the types in the apartment from which the last one was extracted.

P′ is a block which sustains the rear ends of the levers N.

The machine by the use of which the types are distributed will now be described.

The case A is drawn out of the composer and placed in the distributer, as seen in red in Fig. 9. Figs. 10, 11, 12, 13, and 14 are details of this machine.

The column of type to be distributed is placed upon the galley R^2 in front of the plunger S^2, which is fed up gradually as the types are distributed, as will be hereinafter described. This galley has a stationary side h^3 and a spring side j^3. The latter is pivoted at one end at g^4 and at the other extends to within the breadth of a type of the edge of the galley. It is pressed up by a spring i^3, and thus the column of type is held stationary with the exception of the first line, which is left free to be fed along as the types are distributed.

$a\ a$, Fig. 9, represent a line of type being distributed, it being the last line of the column. The types are selected from the extreme end of this line by means of a spring-finger, a^5, Fig. 13, which passes up and down through an aperture in the corner of the galley and is similar to the finger m of Fig. 3. This finger is attached to a bent lever c^3, which is elevated by a spring b^3, which is secured to the frame at d^3, Fig. 13. The lever c^3, which is arranged and operates exactly like the lever L in the composer, is actuated by a cam c^5, Fig. 11, (seen dotted in Fig. 13,) upon the shaft r^3. This shaft carries a crank f^3, by turning which motion is communicated to the operating parts of the machine. As the type is thrown up, it is received between the case t^3 and the lever g^3, one end of which is pivoted to the frame, the other end being furnished with a cushion f^5, which permits the passage of the type, but holds it with a gentle pressure between the lever g^3 and a plate c^6, attached to the case t^3. This latter case is called the "forwarding case," and is furnished with compartments corresponding to those in the case A. At intervals it is vibrated back and forth in the following manner:

d^5 is a cam upon the revolving shaft r^3, and has a projecting tooth e^5, which strikes one or the other of the pins f^6 g^6, that project from a vertical post A^5, Fig. 10. This post carries at its upper end a crank k^4, Figs. 10 and 12, which is so connected with the forwarding-case that, as the shaft A^5 vibrates, the case shall be carried back and forth an amount equal to the distance from center to center between two of its contiguous compartments.

R^3, Fig. 12, are quads, of which there is one

in each compartment of the case t^3, and which are pressed up toward the end of the case by springs d^4.

s^2 is a stationary case called the "trial-case," which is also furnished with compartments corresponding to those in the other cases. This case is placed directly in front of the forwarding-case t^3 and immediately over the case A.

The edges of the types are furnished with nicks, the position of which varies upon each letter, and the compartments of the trial case s^2 (seen in plan in Fig. 12) are furnished with pins, the position of which corresponds with the nicks upon the types, each type having a certain combination of nicks differing from that upon all the others, while each compartment of the case s^2 has a certain arrangement or combination of pins corresponding to the nicks upon one of the types. If now a type be presented to one of the compartments of the case s^2, if the nicks upon the type correspond with the pins in this compartment, the type is allowed to enter and drop through into the corresponding compartment of the case A. Should the arrangement of nicks upon the tpye differ from that of the pins in the compartment, the type is rejected and passed along to the next compartment. It is thus offered to each of the compartments of the case s^2 until it arrives at the compartment having the proper combination of pins, when it is allowed to enter, as before stated, and is passed through to the case A beneath. This part of the operation is performed as follows: The type after having been raised is held by the cushion f^5 upon the lever g^3 opposite to the end of the forwarding-case t^3.

w^3, Fig. 9, is a plunger which is connected by the rod x^2 with an upright lever Z^3, Fig. 10, that is actuated by the cam q^3 upon the shaft r^3. So soon as the type is elevated the forwarding-case t^3 is moved back a sufficient distance to bring its first compartment opposite to the type just raised. The plunger w^3 is now brought up and forces the type into the first compartment of the forwarding-case t^3 and retains it there, the quad R^3 yielding to permit it to enter.

v^3 is a rest upon the top of the forwarding-case t^3. This rest is pressed toward the case s^2 by springs u^3. To enable this case to be thus moved the quads R^3 are drawn back sufficiently to permit them to clear the case s^2 in the following manner:

G^3, Figs. 9, 10, and 13, is a plate pivoted at g^5 and connected at h^5 with all the quads R^3. At the required instant a cam i^5 (seen dotted in Fig. 10) strikes against the lever m^5, which throws back an arm n^5, by which the plate G^3 is retracted, and draws it and the quads back, so that the latter entirely clear the case s^2. The forwarding-case is now moved along, as before explained, until the compartment containing the first type is opposite to the second compartment of the case s^2. The plunger w^3 is now retracted, which permits the type to enter the first compartment of the case s^2. If the arrangement of the pins in this compartment corresponds with that of the nicks in the type, the latter is forced past the pins and drops through into the case A below. A new type is now thrown up, as before explained, and the case t^3 is vibrated back again and the plunger w^3 is caused again to advance. If the first type still remains in the mouth of the case s^2, it is carried by the plunger w^3 into the second compartment of the case t^3, the second type being at the same time forced into the first compartment of this case, which is now again vibrated so as to bring its second compartment opposite to the second compartment of case s^2. The plunger w^3 is now again retracted, and the first type is forced into the mouth of the second compartment of the case s^2. If it again finds the pins in this compartment unfavorable to its entrance, it is once more returned to the case t^3 by the plunger w^3 and is presented in succession to each compartment of the trial-case s^2 until the one is found having the proper arrangement of pins, when it is allowed to pass through, as before explained, to the case A below. Beneath the case t^3 is a bar k^5, Fig. 9, to which bar are attached a series of pins l^5, each of which pins extends horizontally through an orifice in the front of the case A. This bar is forced forward by a cam p^5 on the shaft r^3 and retracted by a spring, by which means the pins are moved in and out of the case at each revolution of the shaft, thus pressing forward the types which are in the case A to make room for those that drop from the case s^2.

The manner in which the line of type is forced forward as each type is withdrawn will now be explained.

e^3 is a plunger upon the end of the rod k^3. This rod and plunger are fed forward by the slipping band l^3, which passes once around the drum m^3, the latter being actuated in a manner similar to the drum K of the composer by suitable connections n^3 o^3 with the shaft r^3, the rod o^3 being connected with the foot of the lever q^5, which is actuated by the pin r^5, projecting from the face of the cam c^5.

When a line of type has been distributed, the plunger e^3 is withdrawn as follows: A^3 is a wheel similar to the wheel F^2 of Fig. 1, and like it running loosely upon its shaft. B^3 is an arm attached to the shaft and having a pawl that engages with a pin projecting from the face of the wheel A^3. This pawl is tripped by striking against the stop p^3. When this stop is raised, the pawl engages with the wheel, and the shaft a^4 is caused to revolve with the wheel. The stop p^3 is raised in the following manner: q^3 is a lever pivoted in the center and connected by means of the arm b^4 with the stop p^3, which is held down by the spring t^5. When the last type in the line is distributed the plunger e^3 strikes against the lever q^3 and raises the stop p^3, and the shaft a^4 immediately commences to revolve. The cam

C^3, secured to this shaft, now strikes against the lever D^3, which is connected with the lever T^3 by the cord E^3, and by this means the plunger e^3 is withdrawn, the opposite end of the lever T^3 being connected with the rod k^3 by a cord. The stop p^3 immediately returns to its place, and after a single revolution the wheel A^3 is disengaged from its shaft and continues to revolve without it.

The manner in which the successive lines of type are brought up will now be described.

S^2 is a plunger, which rests against the column of type and forces it forward. c^2 is a rod connected with this plunger and is fed forward by the band d^6, which passes round the drum F^3. e^4 are a series of pins projecting from the drum F^3, against which a cam upon the shaft a^4 (not shown in the drawings) strikes at the proper time, and thus the drum F^3 is revolved a short distance and the plunger S^2 is fed up, carrying with it a new line of type into line with the plunger e^3, and the distributing continues as before.

For the purpose of breaking the type apart and preventing them from adhering together, the top of the type is pressed over, so as to break it loose from the adjoining type. The device for this purpose is not shown in the accompanying drawings.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. The within-described machine for composing types, operating in the manner substantially as set forth.

2. The method herein described of selecting the types from the cases by means of the springs n or their equivalents, operating in connection with the keys O in the manner substantially as herein set forth.

3. The method of transferring the types to the stick by means of the plungers B and T, or their substantial equivalents, as set forth.

4. Raising the rule Y and throwing forward the line of type upon the galley by the means herein described or by any means substantially the equivalent thereof.

5. The method of feeding forward the types in the cases by means of the slipping bands f, rods j, and cylinder K, or their equivalents, operating in the manner substantially as herein set forth.

6. The wheel F^2, with its ratchet-wheel M^2, and the connections N^2 O^2 d^2, or their equivalents, whereby this wheel is caused to give motion to the shaft C whenever any one of the keys is depressed, as set forth.

7. The within-described method of connecting the crank u with the pitman W by means of the springs f, operating as set forth.

8. The distributing-machine constructed, arranged, and operating in the manner substantially as herein described, by means of which a column of type when placed in the machine is distributed automatically in the manner set forth.

9. The method herein described of forwarding the types to the trial-case by means of the vibrating case t^3, operating in the manner substantially as set forth.

WM. H. HOUSTON. [L. S.]

Witnesses:
N. F. HOUSTON,
I. C. ABBOTT.