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J. THORNE.

TYPE SETTING AND DISTRIBUTING MACHINE.

No. 283,934. Patented Aug. 28, 1883.

Fig. 1.

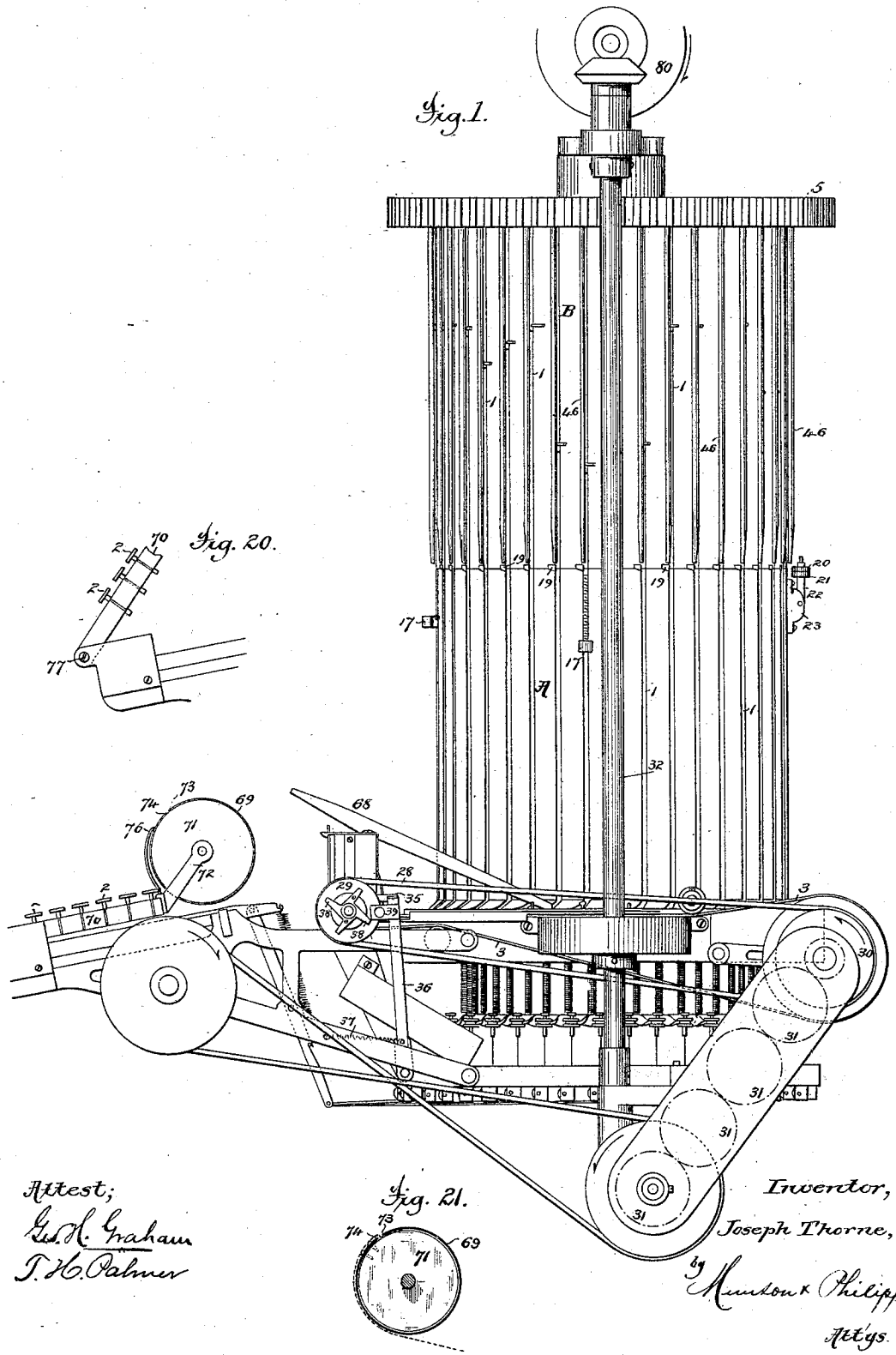

Fig. 20.

Fig. 21.

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Fig. 1.

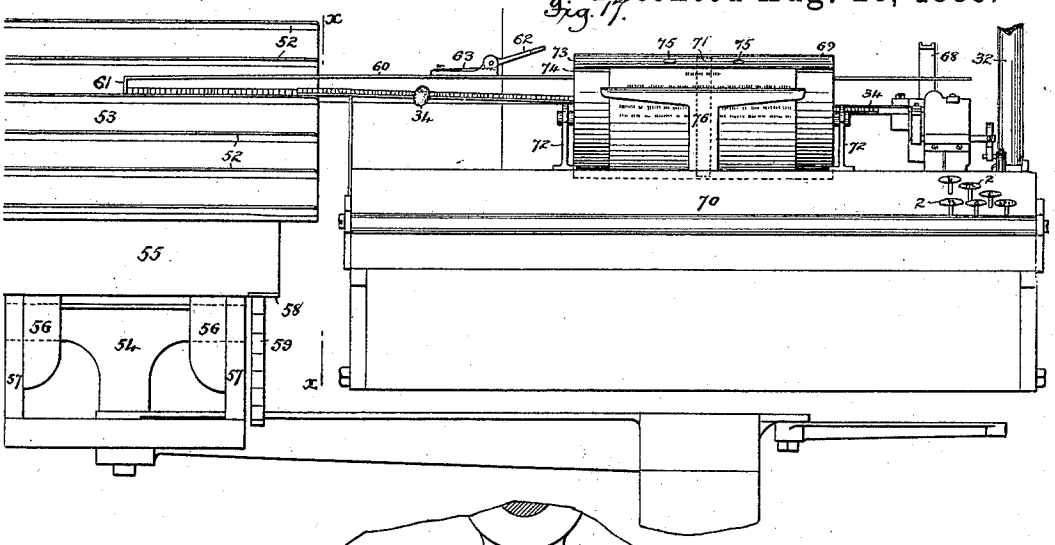

Fig. 3.

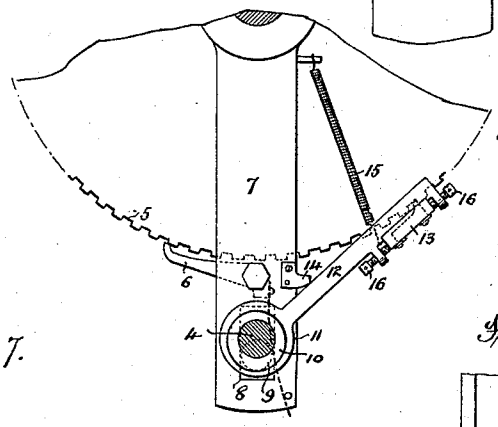

Fig. 7.

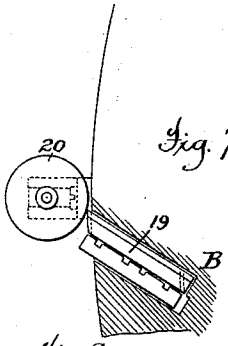

Fig. 2.

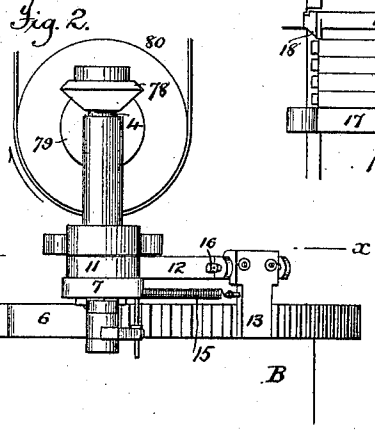

Fig. 4.

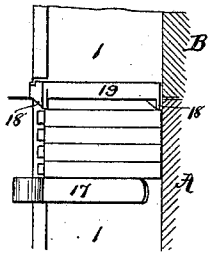

Fig. 5.

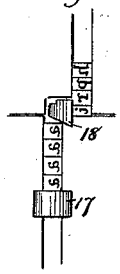

Fig. 8.

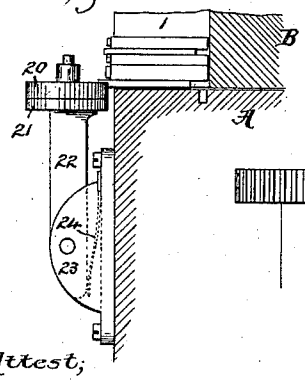

Fig. 6.

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TYPE SETTING AND DISTRIBUTING MACHINE.

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Fig. 18.

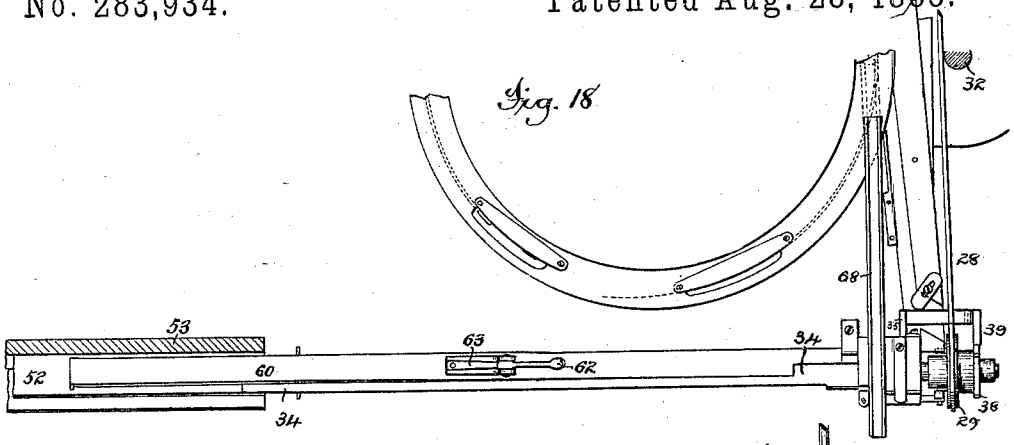


Fig. 10.

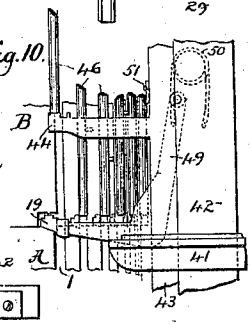


Fig. 10a.

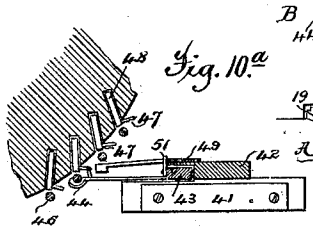


Fig. 16.

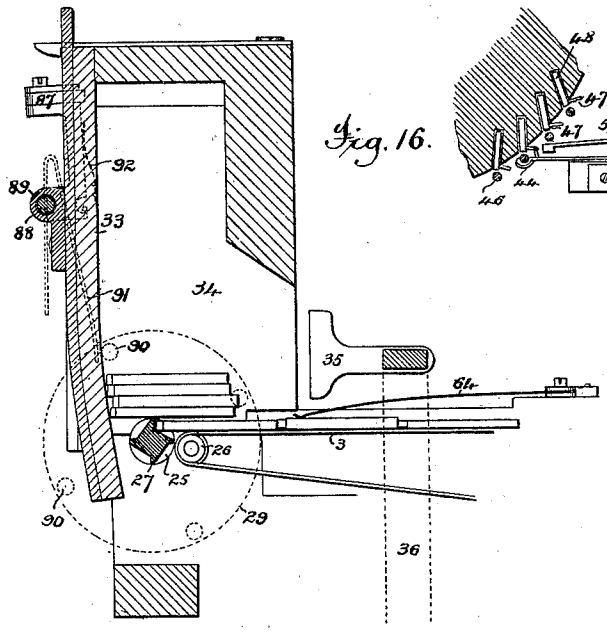


Fig. 9.

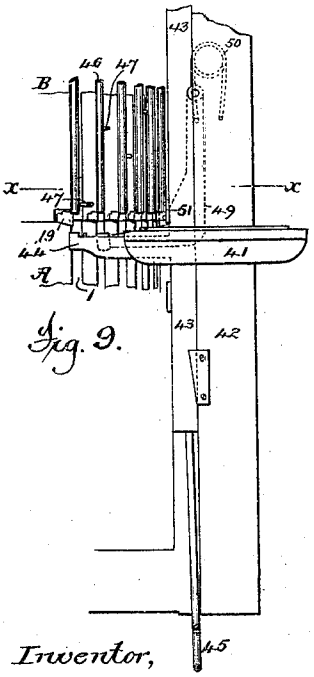
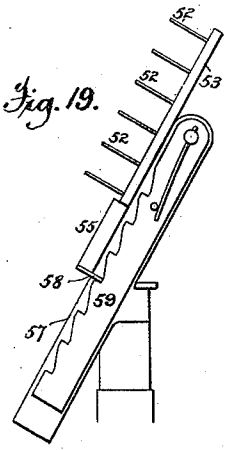


Fig. 19.



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TYPE SETTING AND DISTRIBUTING MACHINE.

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Fig. 12.

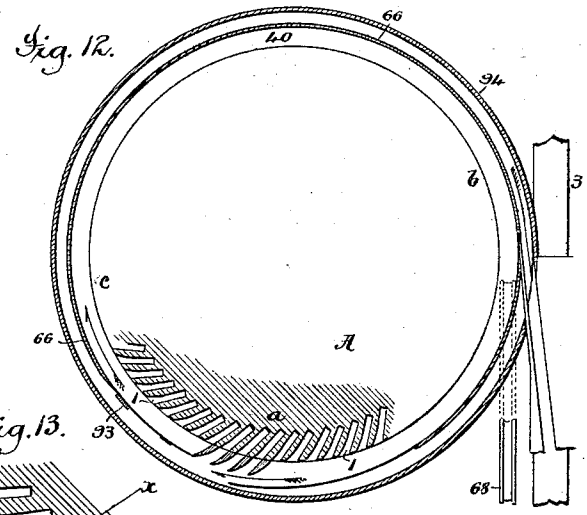


Fig. 13.

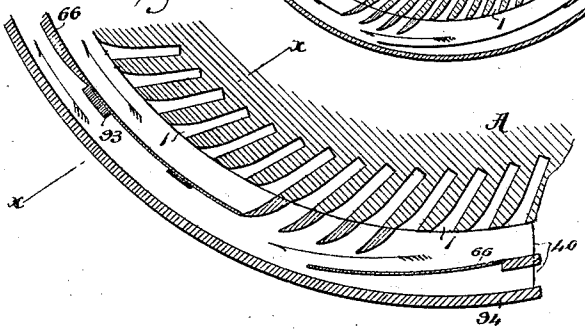


Fig. 11.

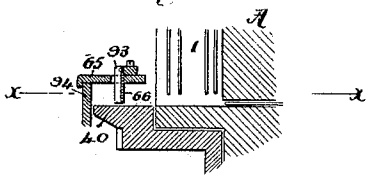


Fig. 14.

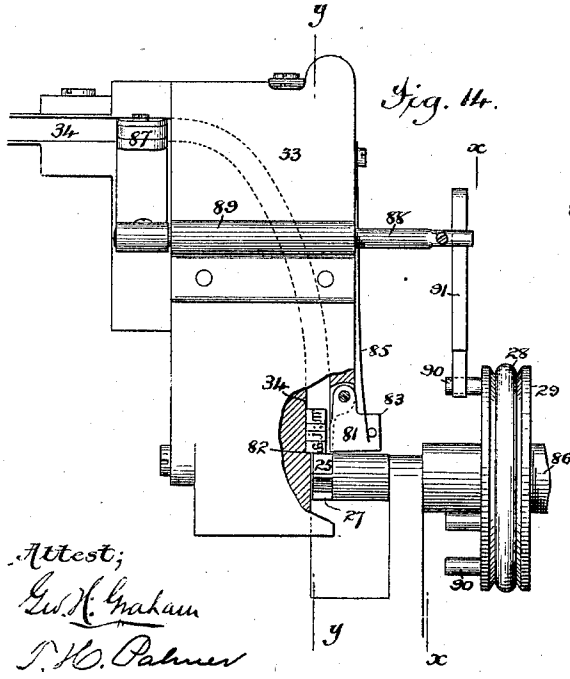
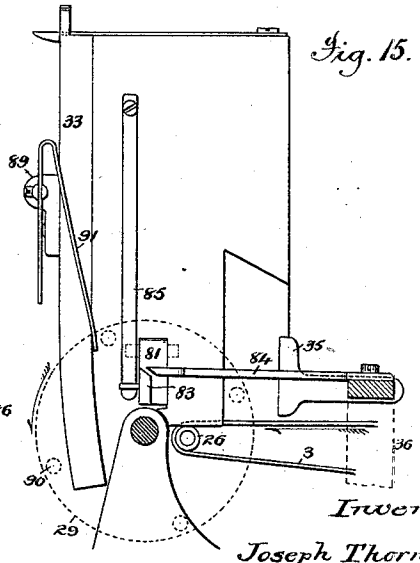


Fig. 15.



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UNITED STATES PATENT OFFICE.

JOSEPH THORNE, OF PORT RICHMOND, NEW YORK.

TYPE SETTING AND DISTRIBUTING MACHINE.

SPECIFICATION forming part of Letters Patent No. 283,934, dated August 28, 1883.

Application filed November 10, 1882. (No model.)

To all whom it may concern:

Be it known that I, JOSEPH THORNE, a citizen of the United States, residing in the city of Port Richmond, county of Richmond, and State of New York, have invented certain new and useful Improvements in Type Setting and Distributing Machines, fully described and represented in the following specification and the accompanying drawings, forming a part of the same.

The present invention relates to a type setting and distributing machine of the character shown and described in United States Letters Patent No. 232,157, it being the object of the invention to render certain of the mechanisms therein shown more accurate and reliable in their action, and also to add certain details of construction by which the machine, as a whole, will be greatly improved and its practical efficiency increased.

To this end the invention consists in numerous mechanical details, both singly and in various combinations, all of which will he hereinafter fully explained, and particularly pointed out.

In order to convey a clear understanding of the various features constituting the present invention, the general construction of the machine in which they are embodied will be first briefly described, reference being had to the accompanying drawings, in which Figure 1 shows in side elevation a type setting and distributing machine of the character shown in the patent referred to when modified according to the present invention. This machine comprises in its organization a type-composing mechanism, the type-case A of which is stationary, and a type-distributing mechanism, the type-case B of which revolves with a step-by-step movement, which mechanisms are capable of operating conjointly or independently of each other—that is to say, the type-composing mechanism may be in operation while the distributing mechanism is at rest, and vice versa—or both mechanisms may be simultaneously in operation. These cases A and B are each provided with vertical type-channels 1, adapted to contain columns of superposed types, from the bottoms of which channels the types are removed in the operations of setting and distributing, the types above falling by gravity as the bottom ones are thus removed. The type-channels in the distributing-case have plain sides, so that they may receive columns of types comprising different letters, such as those constituting words and sentences. The type-channels in the composing-case are provided with wards arranged in such number and position as to give to each channel a distinctive form that corresponds with the shape given to particular types by nicks cut into their bodies, by which arrangement only appropriate types can enter into and descend vertically in the channels of the composing-case. The wards of the channels in the composing-case terminate at a short distance from the bottom of said channels, so as to leave the lower type in each channel free to be removed longitudinally by the ejector. As before stated, the composing-case A is stationary, while the distributing-case B revolves with a step-by-step movement, its steps being of such length and its driving mechanism so timed that as it rests after each step its type-channels and those of the composing-case will be in alignment, so that any of the bottom types in the channels of the distributing-case, which are thus brought over their appropriate channels in the composing-case, will drop into the same and be properly distributed. Each of the type-channels of the composing-case is provided with an ejector, which ejectors are operated by keys 2, so as to eject the types in the proper order to form the desired composition, the place of any type thus ejected being at once filled by the one next above it in the vertical column, which immediately drops to the bottom of the channel upon the withdrawal of the ejector. The types as they are ejected from the channels of the composing-case pass onto the revolving type-carrying table 40, (see Figs. 12 and 13,) by which they are deposited on the type-conveying belt 3, to be conveyed to the line-forming mechanism. For a detailed description of this line-forming mechanism, as well as of the type composing and distributing mechanisms, and of the various devices by which they are all operated, reference is made to the Letters Patent before referred to, no further description of these mechanisms being deemed necessary in the present case, except in so far as they affect the particular devices consti-

tuting the present invention, which devices will now be described with particular reference to the remaining figures of the accompanying drawings, of which—

Fig. 2 is a side elevation of a mechanism for imparting a slight retrograde movement to the distributing type-case at the end of each forward step; Fig. 3, a horizontal section of the same, taken upon the line *x x* of Fig. 2; Figs. 4, 5, and 6, details showing devices for preventing the types from turning and wedging or binding in the channels of the composing-case; Figs. 7 and 8, like views showing a device for keeping the types and spaces, particularly the latter, pressed inward to the proper position in the channels of the distributing-case; Fig. 9, an elevation of an improved device for removing the fenders and followers when the channels of the distributing-case are to be filled; Fig. 10, a like view of the same parts, showing one of the fenders and followers partly raised; Fig. 10ª, a horizontal section of the same, taken upon the line *x x* of Fig. 9; Fig. 11, a transverse vertical section of the revolving type-carrying table, its cover, and the annular type-guides, the same being taken on the line *x x* of Fig. 13. Fig. 12 is a horizontal section taken upon the line *x x* of Fig. 11, and Fig. 13 an enlarged view of a portion of Fig. 12; Fig. 14, a front elevation, partly in section, of the devices which receive the types from the type-conveying belt; Fig. 15, a vertical section upon the line *x x* of Fig. 14; Fig. 16, a like view upon the line *y y* of same figure; Fig. 17, a front elevation, showing the key-board, copy-holder, composing-stick, alarm mechanism, and composing rack or case; Fig. 18, a plan view of a portion of the devices shown in Fig. 17; Fig. 19, a transverse vertical section taken upon the line *x x* of Fig. 17, looking to the left, and Figs. 20 and 21 details of the key-board and copy-holder.

In the organization shown in the patent referred to, and also in the present case, a forward step-by-step movement is imparted to the distributing type-case B by a pawl-and-ratchet mechanism operated by the crank-shaft 4, connected by bevel-gears 78 79 with the shaft carrying the driving-pulley 80. This mechanism consists of a ratchet-wheel, 5, the teeth of which are engaged by a pawl, 6, pivoted to an oscillating arm, 7, the end of which is provided with a slot, 8, in which works the crank-pin 9 of the said shaft 4, all as shown in Figs. 2 and 3. It was originally designed that the parts of this mechanism should be so adjusted that the distance which the distributing-case was advanced at each step should exactly equal the distance between any two of its type-channels, and that said case should be brought to rest at the end of each step, with its type-channels and those of the composing-case in exact coincidence. It was found in practice, however, that, no matter how accurately the parts were adjusted, it was impossible to always bring the distributing-case to rest with its type-channels in such perfect register with those of the composing-case that the type in the former were sure to distribute into their appropriate channels in the latter. I have found, however, that by causing the distributing-case to make a slight and slow retrograde movement after each step of its advancement this difficulty is entirely overcome and the distribution rendered certain and reliable. If the distributing-case is carried slightly too far in its forward movement, so that the distribution does not take place, this slow retrograde movement will bring it back to the proper position to cause the channels of the two cases to coincide and permit the types to distribute, and such retrograde movement is so slow that the distribution will be effected even if this movement carries the type-channels to the rearward slightly past the position of perfect register.

The devices for securing the action just described are shown in Figs. 2 and 3, in which the shaft 4 is provided with an eccentric, 10, encircled by a band, 11, to which is attached a rearwardly-extending arm, 12, the outer end of which is provided with a pawl, 13, which engages with the teeth of the ratchet-wheel 5. The eccentric 10 is so adjusted upon the shaft 4 with relation to the crank-pin 9 that while the pawl 6 is being drawn backward the pawl 13 will be advanced, and vice versa. Inasmuch, however, as the retrograde movement given by the pawl 13 is equal to but a very small part of the forward movement given by the pawl 6, it is necessary, as will readily be seen, that the pawl 13 should be disengaged from the ratchet before the pawl 6 commences to act. This disengagement is effected by means of the lug 14 upon the arm 7, against which the arm 12 rests, and which acts as a fulcrum upon which said arm is rocked by the eccentric 10, so as to throw the pawl 13 out of engagement when the large side of said eccentric is turned inward. The pawl 13 is provided with a spring, 15, as shown, the tension of which constantly tends to draw the pawl into engagement with the ratchet, and with adjusting-screws 16, by which its position upon the arm 12 can be varied to give it exactly the proper action. Another defect in the machine shown in the patent referred to was due to the fact that the types as they passed from the distributing-case into the channels of the composing-case were allowed to drop at once to the bottoms of said channels, or as nearly to the bottoms as the types already in said channels permitted. When these channels were empty, or nearly so, the fall thus occasioned was considerable, and in making the descent the types, particularly the thinner ones, often turned so as to become wedged, and consequently lodge in the channels before reaching the bottom, which lodging, of course, prevented the proper action of the composing mechanism. To obviate this difficulty I have provided the chan-

nels in the composing-case with followers 17, (see Figs. 1, 4, 5, and 6,) composed of thin pieces of spring metal bent to the form shown in Fig. 6, which, being sprung into the type-channels, will support themselves and the columns of types at any desired height. When the distribution is to commence, these followers are inserted in the type-channels near the top of the case A, so that the first types distributed will drop only a short distance and rest upon said followers. As the distribution progresses the followers and the columns of types resting upon them are gradually pushed downward by the cam projections 18 upon the ends of the drag-blocks 19, so that a space sufficient for at least one type is always left in the tops of the channels of the composing-case. When the types above the followers are needed for composition, the followers are lowered to the bottoms of their channels and withdrawn, allowing the types to pass to the ejectors while they are again inserted in the upper ends of their channels. In pushing the lines of types into the channels of the distributing-case the spaces, which are of less length than the types, are liable not to be forced back snugly against the bottoms of said channels, in which position it is necessary they should be in order to distribute, as in no other position will their nicks coincide with the wards of their appropriate channels in the composing-case.

To insure the spaces being fully entered into the channels of the distributing-case as they arrive at the bottoms of said channels to be distributed, I mount one or more (preferably two or three) presser-rollers, 20, (see Figs. 7 and 8,) upon the composing-case in such position that, as the distributing-case revolves, they will come in contact with any spaces thus protruding and press them inward to the bottom of the channels. These rollers are made of rawhide, or other substance which will not mar the types, and are supported so as to turn upon disks 21, mounted upon arms 22, pivoted in brackets 23, and controlled by springs 24. It will readily be seen that the springs 24 thus arranged will cause the rollers 20 to press any projecting space inward to the bottom of its channel, but will allow said rollers to yield sufficiently to pass over the projecting faces of the types.

Another feature of the present invention is illustrated in Figs. 9, 10, and 10ª, and consists in devices operated in connection with the line-feeding mechanism to clear the channels of the distributing-case when they are to be charged with lines of matter.

The shelf or bracket 41, which supports the galley containing the composition to be distributed, is attached to a standard, 42, which rises from the base of the machine, said shelf being in such position, as shown in Fig. 9, that the lines of matter can be discharged from the galley into the channels of the distributing-case. The standard 42 is also provided with a groove or way in which slides a piece, 43, having an arm, 44, which extends outward in such position (see Fig. 10ª) that when it is moved upward, which can be readily done by means of the handle 45, its forked end will engage with the fender 46 and the stem 47 of the follower 48 of the channel which is in position to be filled, thereby raising both fender and follower and clearing the channel for the reception of the line of matter, as shown in Fig. 10. The sliding piece 43 is at its upper end provided with an arm (not shown) similar to the arm 44, which, as said piece falls or is drawn downward to its normal position, engages with the upper end of the fender and restores it to its proper position. When the types in any channel of the distributing-case have been all distributed before said channel is recharged, its drag-block 19 will be liable to move backward, so as to partly or wholly fill the bottom of said channel and thus prevent the entrance of the lower type in the line. In order to insure the removal of the drag-block in such case, before any attempt is made to inject the line of types, and also to provide a support for the line of types which will prevent any of them from falling into the channel of the composing-case before the line is fully entered into its channel in the distributing-case, the standard 42 is provided with a bell-crank piece, 49, pivoted at its upper end, and provided with a spring, 50, by which it is thrown outward, so as to engage with the end of the drag-block 19 and push it back to its proper position, as shown in Fig. 10. The outer end of the bell-crank piece 49, when in this position, will lie directly in front of and slightly above the channel in the distributing-case which is being charged, and will thus afford the support just mentioned. The sliding piece 43 is provided with a lug, 51, which, as said piece is lowered, engages with an incline upon said bell-crank piece, and swings the same back away from the distributing-case to the position shown in Figs. 9 and 10ª.

In the construction shown in my former patent, heretofore referred to, the types, after being ejected from the channels of the composing-case onto the carrying-table, are guided from said table onto the conveying-belt as soon as they arrive at a point opposite the same. In that machine, also, as well as in the present, the belt is driven at a speed very much below that of the table. In operating the machine thus constructed it sometimes happened that a type ejected from one of the channels a short distance in the rear of the point where the types pass from the table to the belt—as, for example, at *b*, (see Fig 12)—would not acquire sufficient momentum before arriving at the point of departure to be thrown entirely clear of the table and onto the belt. When this occurred the slow movement of the belt would cause the type to be delayed for an instant in the throat of the passage leading from the table, and this slight delay was sometimes

sufficient to permit a type subsequently ejected from a channel still farther to the rear, as at *c*, to overtake and overlap the delayed type, thus occasioning a choke. Such choking, when it occurred, of course impeded the operation of the machine and occasioned annoyance and delay. A construction designed to overcome this difficulty is illustrated in Figs. 11, 12, and 13 of the drawings, in which the cover 65 of the type-carrying table is provided with a downwardly-projecting rim or type-guide, 66, which divides the annular space above said table and between the distributing-case and the rim 94 into a spiral type passage or way, the outer path of which is not of sufficient width to receive two types abreast. From this construction it will be readily seen that a type ejected at the point 6, or at any point in the rear of that at which the types leave the carrying-table for the conveying-belt, instead of passing directly to the belt, must make an entire revolution, or move with the table before arriving in position to leave it, thereby acquiring sufficient momentum to be thrown from the table and onto the belt, and that by reason of this fact, as well as the narrowness of the outer path of the spiral typeway, it is impossible for two types to arrive simultaneously at and form a choke in the exit from the table to the belt. In the present construction it sometimes happens, however, that a type ejected from a channel—at the point *c*, for example—arrives at the entrance to the outer path of the spiral typeway simultaneously, or nearly so, with a type subsequently ejected from a channel at or near the point *a*. To prevent the two types thus brought abreast from wedging in the entrance to the outer pathway, I have provided the rim 66 with an arresting-block, 93, made of rawhide, or other elastic material which will not bruise the faces of the types, against which the inside type will strike, and by which it will not only be arrested and prevented from passing forward into the outer pathway, but will be caused to rebound, so as to take its place in line behind the outside type. I have also in the present construction so proportioned the height of the space between the table 40 and its cover 65 to the thicknesses of the types of the font which the machine is adapted to receive that said cover will prevent any of the types from being partially or wholly turned over while on the table—an accident which sometimes occurred in the former construction.

In the machine shown in the patent heretofore referred to, the types, after leaving the type-conveying belt 3, passed down an inclined chute into one of the steps or receivers of a type-carrying wheel, which wheel, together with a type-elevator, placed the types one after the other in the composing-stick. In the present case the chute, the type-carrying wheel, and the type-elevator are dispensed with and a revolving type-lifter, 25, to which the type-conveying belt 3 delivers the types direct, is used in their stead. This lifter, which is clearly shown in Fig. 16, is of comparatively small size, and is located in close proximity to the pulley 26, over which the type-conveying belt 3 passes, and in such position as to act upon the types as their forward ends are projected over and beyond said pulley. This lifter is made of rawhide, or other similar slightly elastic or yielding material which will not mar or bruise the faces of the types, and is in the form of a small roll or disk, having portions removed so as to leave only a series of radial wings, as 27. The lifter thus constructed is rotated by a belt, 28, passing around pulleys 29 30, the latter of which receives motion through a train of gears, 31, from the driving-shaft 32, as shown in Fig. 1.

As the types arrive at the end of the belt 3 their forward ends will be projected beyond the pulley 26 and above one of the wings 27, which, as the lifter revolves, will raise that end of the type and draw it forward beneath the types already set and against the wall 33 of the stick. As the incoming types are thus crowded upward against those already in the stick their rear ends will be elevated, so as to afford space for the next in succession to pass forward above a wing of the lifter. The side 33 of the composing-stick is made of rawhide, or other material which will not mar or bruise the faces of the types brought against it.

When the machine is being operated rapidly the types are likely to follow each other in close succession upon the belt 3, and as the forward movement of the advanced type is partially arrested when it comes in contact with the wing 27 of the lifter, it follows that the succeeding type will be advanced so as to abut and press against the rear end of the first. As this pressure will be maintained by the movement of the belt beneath the types, it sometimes happened that the front end of the second type was raised with the rear end of the first, which of course prevented the second from passing properly forward beneath the first to the lifter, and consequently caused an interruption in the operation of the machine. To obviate this difficulty I have placed a light spring, 64, in such position (see Fig. 16) that its end bears upon the second type with just sufficient force to hold it down upon the belt and prevent its forward end from being lifted by contact with the preceding type. As each succeeding type is thus raised by the lifter it is acted upon by the oscillating striker 81, (see Fig. 14,) which forces it inward against the bottom 34 of the stick and onto the shoulder 82, which supports it in the position to which it has been raised. As the line of types passes along the stick it will be evened up by the striker 35, which is caused to strike lightly against the ends of the types in the line, so as to press forward any which may not have been carried snugly against the side 33 of the stick by the lifter. This striker consists of a light head secured to a pivoted arm,

36, (see Fig. 1,) which arm is drawn forward by a spring, 37, and thrown back by a series of revolving tappets, 38, upon the shaft 86 of the lifter, which act upon a lug, 39, upon said arm. The striker 81 is also operated in its forward movement by the arm 36, through the laterally-extending arm 84, the inclined end of which acts upon an inclined projection, 83, upon the back of said striker, as shown in Figs. 14 and 15. The rearward movement of the striker 81 is effected by means of a spring, 85, arranged as also shown in said figures. As the types pass out from behind the wall 33 of the stick they are acted upon by a third striker, 87, similar to the striker 35, but composed of rawhide or other similar material not liable to mar their faces, by which they are all pushed snugly against the back wall of the stick, so as to pass to the composing-case in an even and regular line. This striker is mounted upon a short shaft, 88, supported in a bearing, 89, upon the wall 33 of the stick, and is vibrated rapidly by means of tappets 90 upon the pulley 29, which engage with a spring-arm, 91, depending from the end of said shaft. This striker, like the striker 81, is provided with a spring, 92, the tendency of which is to hold it away from the types.

It is to be remarked that the arm 39 may, and in practice usually will, be so placed as to be acted upon by the tappets 90, so that the tappets 38 are dispensed with and one set made to operate all of the strikers.

The line of composed types is delivered from the composing-stick 34 into the ledges or shelves 52 of the composing-rack, as shown in Figs. 17, 18, and 19. This composing-rack consists of a plane back, 53, to which the ledges 52 are secured at suitable distances apart to conveniently receive the lines of type, and is supported in an inclined position upon a suitable frame, 54. The lower edge of the composing-rack rests against a cross-piece, 55, provided with cleats 56, which rest against the insides of the inclined top rails, 57, of the frame 54. One end of the cross-piece 55 is provided with a downwardly-projecting flange, 58, (see Fig. 19,) which is engaged by the teeth of the spring-supported ratchet-bar 59, which is pivoted to the rail 57, as shown in Fig. 19. From this construction it results that the cross-piece 55 can be moved up and down along the rails 57, and supported in any position to which it is so moved, thereby permitting the composing-rack to be adjusted so that any one of its ledges will be in position to receive the line of types from the stick 34. When the line of types has advanced so far as to fill one of the ledges 52 the case will be raised or lowered, so as to bring another ledge into position to receive the types from the stick, and the composition will proceed.

In order that the operator may have timely notice of the filling of a ledge, a mechanism is provided by which an alarm is given a sufficient time before the ledge is full to permit the operator to find, and stop at, a convenient point in the line or sentence being composed. This mechanism consists of a gage, 60, the forward end of which is formed with a flange, 61, which rests upon the ledge just in advance of the line of types, so that as said line is pushed forward the gage will move with it. The rear end of the gage 60, which is supported in any convenient manner, carries a small hammer, 62, controlled by a spring, 63, the parts being so arranged that the hammer can be set in the position shown in Fig. 17. As the gage is advanced this hammer will come into contact with the end of the ledge next above the one being filled, by which contact the hammer will be thrown from its set position, when the spring will cause it to snap down onto the gage, making a noise which will arrest the attention of the operator.

In ordinary printing there are quite a large number of characters—such as italic letters, quotation-marks, asterisks, &c.—which it is necessary to use occasionally, and which yet do not occur frequently enough to make it expedient to provide for them appropriate channels in the composing-case. These characters may be omitted in making up the composition upon the machine, and be afterward inserted by the justifier; but it is preferable that they should be put in their proper places in the first instance. To do this readily I place a type-case containing these characters in convenient position to be reached by the operator, and provide the machine with an inclined chute, 68, leading from a position just in advance of the key-board to the revolving type-carrying table 40. By this arrangement all that the operator has to do when he desires to insert a character not contained in the composing-case is to select the same from the extra case and drop it into the chute 68, from which it will pass onto the table 40, and be carried onto the conveying-belt 3 in its regular order.

In order to hold the copy in a position where it can be readily seen by the operator, a copy-holder is mounted upon the forward edge of the key-board 70. This copy-holder consists of a disk or roll, 71, mounted to revolve in bearings in arms 72, secured to the forward edge of the key-board, as shown in Figs. 1, 17, and 21. The disk or roll 71 has bent around it, so as to form a cylinder, a sheet of tin or other elastic substance, 69, the meeting edges 73 74 of which are not united, but are left free to receive the head of the sheet of copy between them. The edge 74, and preferably a portion of the circumference of the cylinder 69, is secured to the core 71, but the edge 73 is left free, and is provided with finger-holes 75, so that it can be lifted away from the core to permit the insertion of the copy. The copy being inserted, the edge 73 will be released, when it will spring down and grasp the copy. The holder will then be given one turn, so as to bring the head of the copy around between

the holder and the line-indicator 76, as shown in Figs. 17 and 21.

In order to secure ready access to the mechanism lying beneath the key-board, the latter is provided with hinges or pivots 77, as shown in Fig. 20, so that it and the copy-holder can be swung back out of the way when desired.

What I claim is—

1. The combination, with the stationary composing-case and the movable distributing-case, of means for imparting a step-by-step forward movement to the latter, and means for imparting a slight retrograde movement after each forward step, all substantially as described.

2. The combination, with the movable distributing-case having a ratchet, as 5, of a pawl, as 6, for imparting a forward step-by-step movement to said case, and a pawl, as 13, for imparting a slight retrograde movement after each forward step, substantially as described.

3. The combination, with the distributing-case and its ratchet, of the oscillating arm 7, carrying pawl 6 and lug 14, crank-shaft 4, carrying eccentric 10, and arm 12, carrying pawl 13, substantially as described.

4. The combination, with the stationary composing-case and movable distributing-case having vertical type-channels, as described, of the followers 17 and means for pushing the types downward as they are distributed, all substantially as described.

5. The combination, with the stationary composing-case and movable distributing-case having type-channels, as described, of the followers 17, and the drag-block 19, provided with cams 18, substantially as described.

6. The combination, with the movable distributing-case and its type-channels, of means for pressing the "spaces" inward to the backs of said channels, all substantially as described.

7. The combination, with the movable distributing-case and its type-channels, of the yielding-pressure roll or rolls 20, substantially as described.

8. The combination, with the movable distributing-case, its type-channels and their fenders, of the sliding piece 43, having the arm 44 for elevating said fenders, substantially as described.

9. The combination, with the movable distributing-case, its type-channels and their fenders, followers, and drag-blocks, of devices, substantially such as described, for elevating said fenders and followers and pushing forward said drag-blocks to clear said channels for charging.

10. The combination, with the movable distributing-case, its type-channels and their fenders, followers, and drag-blocks, of the standard 42, sliding piece 43, having arm 44 and lug 51, and the pivoted bell-crank piece 49, substantially as described.

11. The combination, with the composing-case A and the type-carrying table 40, of the rim 94 and type-guide 66, substantially as described.

12. The combination, with the composing-case, type-carrying table, and type-conveying belt, of rim 94 and type-guide 66, substantially as described.

13. The combination, with the composing-case and type-carrying table, of the rim 94, type-guide 66, and elastic arrester 93, substantially as described.

14. The combination, with the type-conveying belt 3 and the composing-stick 34, of the rotating type-lifter 25, substantially as described.

15. The combination, with the type-conveying belt 3 and the rotating lifter 25, of the pressing-spring 64, substantially as described.

16. The combination, with the stick 34, provided with shoulder 82, of the rotating lifter 25 and striker 81, substantially as described.

17. The rotating type-lifter 25, made of rawhide, or other equivalent material, as and for the purpose set forth.

18. The combination, with the stick 34, having shoulder 82, of the striker 81, substantially as described.

19. The combination, with the type-conveying belt 3 and the composing-stick 34, of the rotating type-lifter 25 and the striker 35, substantially as described.

20. The combination, with the stick 34, having shoulder 82, of the lifter 25, striker 81 and striker 35, substantially as described.

21. The combination, with the lifter 25 and stick 34, of the strikers 35, 81, and 87, substantially as described.

22. The combination, with the composing-case and the rotating type-carrying table 40, of means for ejecting the types from said case onto said table, and the independent chute 68, for conveying types fed by hand to said table, all substantially as described.

23. The key-board 70, carrying the copy-holder, and provided with hinges at its front side, whereby said board and copy-holder can be swung forward so as to expose the mechanism beneath them, all substantially as described.

In testimony whereof I have hereunto set my hand in the presence of two subscribing witnesses.

JOSEPH THORNE.

Witnesses:
JAS. A. HOVEY,
T. H. PALMER.