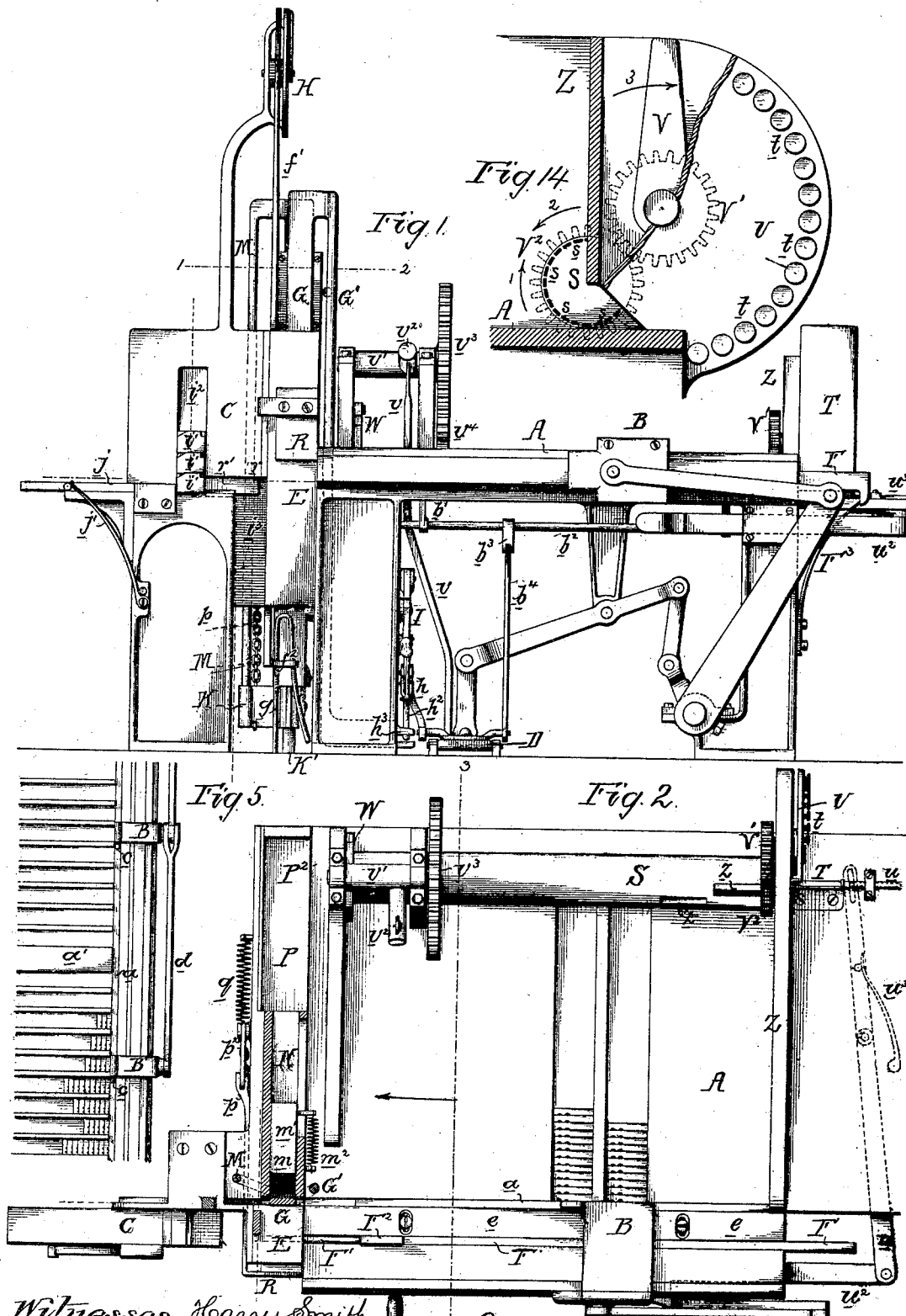


A. COREY.

TYPE-SETTING AND DISTRIBUTING MACHINE.

No. 175,938.

Patented April 11, 1876.



Witnesses, Harry Smith
Thomas McIlrath

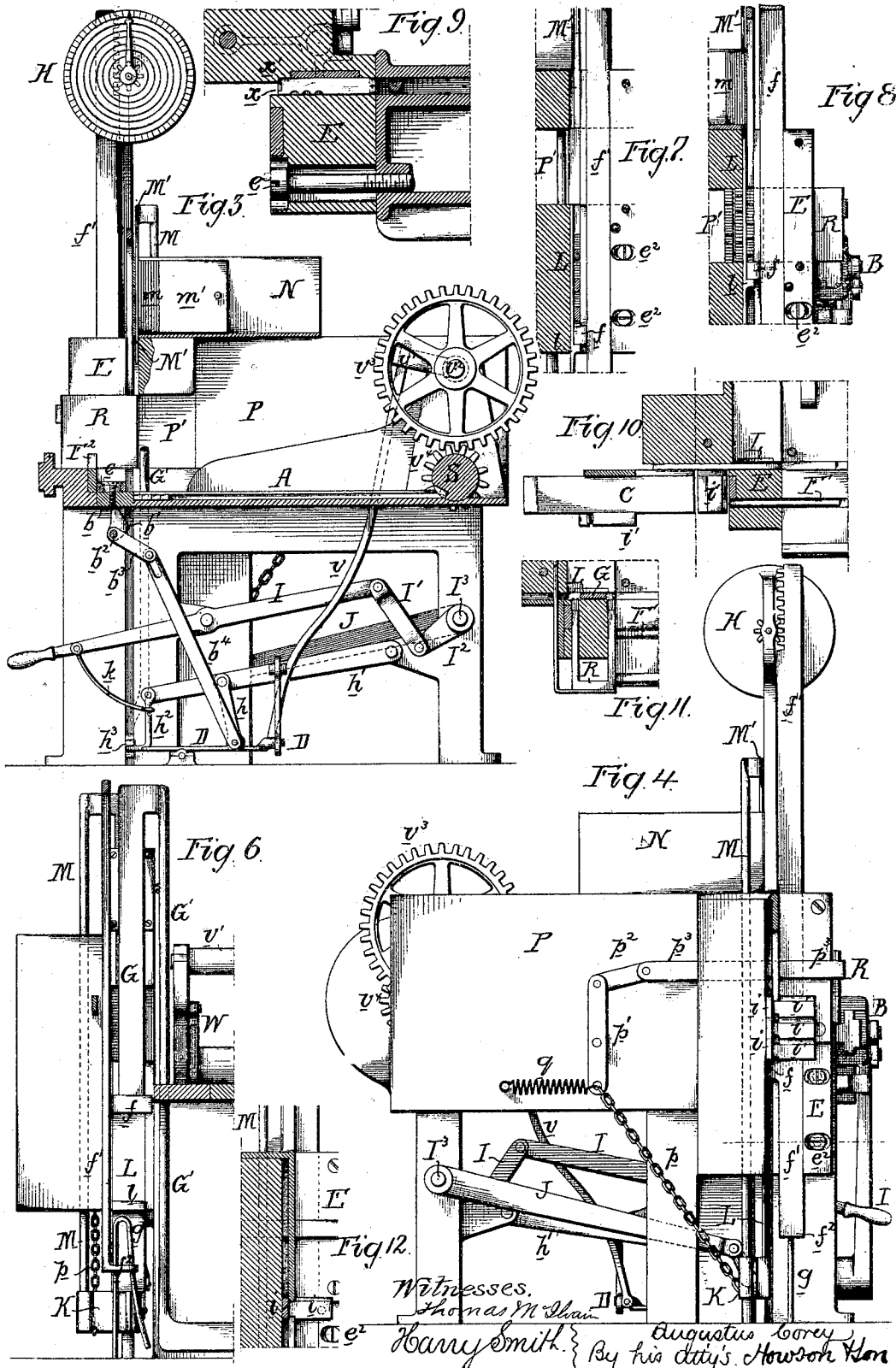
4 Augustus Corey By his Attys Howson & Son

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Fig. 13.

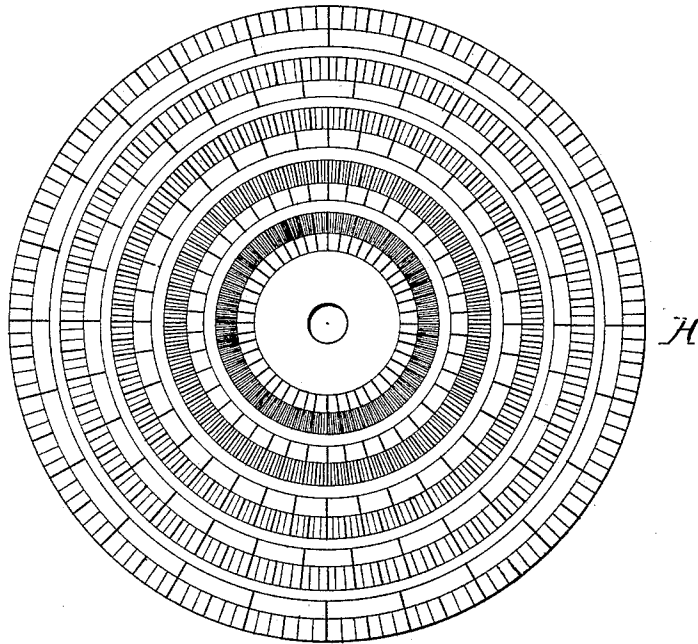


Fig. 15.

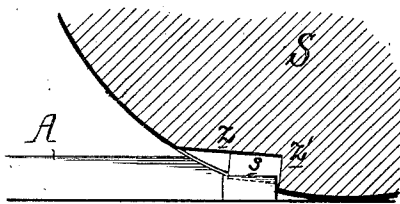
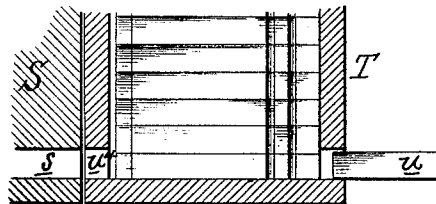


Fig. 16.



Witnesses, Harry Smith
Thomas M. Elram

Augustus Corey
by his Attorneys
Howson and Son

UNITED STATES PATENT OFFICE.

AUGUSTUS COREY, OF PHILADELPHIA, PENNSYLVANIA, ASSIGNOR OF ONE-HALF HIS RIGHT TO ALEXANDER R. HARPER, OF SAME PLACE.

IMPROVEMENT IN TYPE SETTING AND DISTRIBUTING MACHINES.

Specification forming part of Letters Patent No. **175,938**, dated April 11, 1876; application filed November 1, 1875.

To all whom it may concern:

Be it known that I, AUGUSTUS COREY, of Philadelphia, Pennsylvania, have invented certain Improvements in Type Setting and Distributing Machines, of which the following is a specification:

My invention relates to certain improvements in and additions to the type-setting machine for which Letters Patent of the United States were granted to myself and Alexander R. Harper, my assignee, on the 13th day of August, 1872, and the 3d day of September, 1872.

The objects of my present invention are, first, to so construct the pusher-bar that the type will be moved into position in the recess of the type-box by a limited movement of the said bar; second, to provide a ready means of varying the width of the groove into which the type are drawn from the receptacles; third, to effectually close the type-receptacles during the forward movement of the pusher-bar; fourth, to increase the effectiveness and simplify the construction of the devices for supporting a line of type, for raising the same after it has been set up, and for conveying it into its proper position in the galley; fifth, to provide facilities for leading or spacing the matter as it is being moved into the galley; sixth, to improve the construction and operation of the justifying-dial; seventh, to provide for the ready insertion and removal of the extra spaces used in the justifying operation; and, eighth, to combine a simple and efficient distributing apparatus with the machine.

These objects I attain in the manner which I will now proceed to describe, reference being had to the accompanying drawing, in which—

Figure 1, Sheet 1, is a front view of my improved type setting and distributing machine; Fig. 2, a sectional plan view of the same on the line 1 2; Fig. 3, Sheet 2, a vertical sectional view on the line 3 4, Fig. 2, looking in the direction of the arrow; Fig. 4, an end view of the machine; Fig. 5, Sheet 1, and Figs. 6 to 12, Sheet 2, detached views of different parts of the machine; Fig. 13, Sheet 3, an enlarged view of the justifying-dial; and Fig. 14,

Sheet 1, and Figs. 15 and 16, Sheet 3, enlarged views of parts of the distributing apparatus.

The table A has in its upper surface a number of transverse slots forming type-receptacles, which communicate at the front with a longitudinal groove, *a*, extending along the entire length of the table, the type being received into this groove, and being carried along in the same, and discharged into a recess in a type-box at the end of the machine by the action of fingers upon a duplex pusher-bar, as described hereafter. This pusher-bar slides on guides at the front edge of the machine, motion being imparted from a treadle, D, beneath the table, through the medium of a system of arms, cranks, and levers, too fully described in my former patents to need further description here.

As shown in Figs. 1 and 2, but a small portion of the type-table and but a single pusher-bar are shown, owing to want of space in which to properly illustrate the entire table and duplex pusher-bar, the construction of which, however, is shown in Fig. 5, where it will be observed that the pusher-bar B is connected, by means of a rod, *d*, to a similar pusher-bar, B', the distance of the two bars from each other being equal to or slightly exceeding one-half the length of the groove *a*. Each of the bars B B' has a finger, *c*, both fingers projecting into the groove *a*, and serving upon the forward movement of the pusher-bar to carry forward any types which are in the groove. On the backward movement of the pusher-bars B B' their fingers *c* do not affect the position of the type in the groove *a*, as the bottom of the same is depressed, as described hereafter, in order to bring the type beyond the range of the fingers.

Owing to the formation of the duplex pusher-bar a movement of the same to the extent of one-half of the groove *a* only is required, instead of a movement along the whole face of the table, as in my former patents, the type which are moved into the groove *a* from the receptacles on the front side of the partition *a'* of the table being moved along the groove by the finger *c* of the pusher B, and deposited in the recess of the type-box E, while the type which are moved into the groove from

the receptacles on the rear side of the partition a' are first moved by the finger c of the bar B to a position midway or thereabout in the groove a , where they are retained by a suitable stop, and from whence they are removed and deposited in the recess of the type-box by the finger c of the bar B' on the next forward movement of the same.

By this plan the machine can be operated much more rapidly than in the patented machine above referred to, owing to the shorter distance which the pusher-bar has to traverse, and the type can be drawn into the groove a from the receptacles in pairs, two motions of the pusher-bar accompanying each operation.

As before remarked, the groove a has a movable bottom, consisting of a longitudinal bar, b , which is constantly rising and falling during the operation of the machine, being elevated on the forward movement of the pusher-bar, and depressed immediately at or before the said bar commences its rearward movement. When the bar b is in its elevated position, as shown in Fig. 3, its top is on a level with the surface of the table A , and the slots forming the type-receptacles are effectually closed at the ends, but when the bar descends the receptacles are opened and type may be moved out into the groove a .

The bar b is elevated and depressed by means of a cam or eccentric, b^1 , hung to a shaft, b^2 , which is vibrated at proper intervals by the treadle D , through the medium of the arm b^3 and connecting-rod b^4 . The bar b carries on its upper surface a laterally-adjustable plate, e , which can be moved in or out and secured in position by set screws, and this plate forms, when the bar b is depressed, one of the walls of the groove a , so that by changing its position the said groove can be adapted to either large or small type. The type-box E is slotted and secured to the frame by set-screws e^2 , in order that it also may be moved in or out, to increase or diminish the width of the recess in which the type are received, for a similar reason. In a recess in the top of the table A , near the front end of the same, slides a bar, F , having at the front end a rod, F^1 , and being also provided with a lug, F^2 , which projects into the path of the pusher-bar B' , and upon the forward movement of the latter is struck and moved forward to a slight extent for a purpose described hereafter. A spring, F^3 , Fig. 1, attached to the rear end of the bar F , serves to withdraw the same as soon as it is free from the control of the pusher-bar. The type, on falling into the recess of the type-box E , is received upon a plate, f , rendered laterally adjustable, to suit the varying width of the recess, and projecting from a rod, f^1 , having at its lower end a sleeve, f^2 , which embraces the arms of a bent spring, g , secured to the base of the machine. (See Fig. 6.) The rod f^1 is carried up above the type-box, as shown in Figs. 1 and 3, and is provided at and near its upper end with teeth, forming a

rack which gears into a pinion on the pointer-shaft of a dial, H , employed in the justifying operation, as described hereafter. As soon as the type is received in the recess of the box E it is depressed by means of a vertically-reciprocating plate, G , which strikes the topmost type of the line and depresses it below the level of the groove a , the spring-plate f yielding to the extent required at each operation of the plate G . This plate is connected at the upper end to a bar, G' , the operation of which is effected by the treadle D through the medium of the connecting-bar h , pivoted arm h^1 , and hooked rod h^2 , the hook of the latter being adapted to a slotted projection, h^3 , near the lower end of the bar G' , so as to cause a movement of the same in unison with the treadle, as shown in Fig. 3. The mode of justifying in this case is the same as in my former patents—that is, by the introduction of extra spaces during the operation of setting up a line, and the removal of these spaces and the substitution of spaces of the proper size to fill out the line, as the latter is being raised prior to its transfer to the galley, the dial H designating the number and size of the spaces to be supplied to accomplish the proper spacing of the line. The extra spaces are, in the present case, contained in a reservoir, C , Fig. 1, attached to or forming part of the type-box E , and each consists of a block or strip, i , of proper size to form the space, and provided at one end with a lug, i^1 , which when the spaces are contained in the reservoir C , slides in a slot, i^2 , in the side of the same, and, when the spaces are inserted in a line of type in the type-box, slides in an opening, i^3 , between the said type-box and the side frame of the machine. The spaces i are somewhat thinner than the type, in order that they may be introduced through the contracted opening x , Fig. 9, at the rear of the type-recess, said opening being formed by a shoulder, x' , on the frame, which projects across the recess to an extent sufficient to prevent the escape of the type, without interfering with the ready insertion and withdrawal of the spaces.

The insertion of the spaces at the proper intervals is effected by means of a suitable key on the surface of the table, the depression of said key causing the inward movement of a plate, j , Fig. 1, arranged immediately beneath the reservoir C , so that it will strike the lug i^1 of the lowermost space i , and force the same into the recess in the type-box, a spring, j' , causing the withdrawal of the plate j as soon as this operation is completed.

The extra spaces are removed from the line of type, at the proper time, by the action of the rod F^1 on the end of the sliding plate F , Fig. 2, as described hereafter.

The devices for effecting the elevation of a line of type, the leading or insertion of spaces between the lines, and the conveyance of the line into its proper place in the galley, are shown in Figs. 3, 4, 6, 7, 8, and 11, Sheet 2.

On reference to Fig. 3 it will be observed that to the inside of one of the end frames of the machine is hung a lever, I, the outer end of which is provided with a suitable handle, and its inner end connected, by means of a link, I¹, to an arm, I², upon a shaft, I³, which carries at its outer end an arm, J, the parts being so arranged that the depression of the handle of the lever I causes the elevation of the outer end of the arm J, and vice versa. The lever I is connected, by means of a curved wire, k, to the hooked rod h², so that as soon as the end of the lever I commences to descend the hooked end of the arm will be withdrawn from the slotted lug h³ of the bar G', and the latter released from the control of the treadle for a purpose hereafter explained.

The outer end of the bar J is connected, by means of a suitable link, to a frame, K, Figs. 4 and 6, which slides upon, and is guided by, a vertical rod, K', secured to the base of the machine, and carries a plate, L, adapted to a recess formed in the type-box at one side of the recess which receives the type. (See Figs. 7, 8, and 11.)

The plate L has a projection, l, which, when the plate is lifted, strikes against the projection f of the rod f¹, and lifts the same, together with the line of type which it supports. To the frame K is also connected a bar, M, to the upper end of which is attached the upper end of a flat plate, M', arranged inside, and adjacent to, the closed front end of a box, N. This box is placed immediately over the front end P of the galley P, and contains a number of flat plates, m, of metal, technically termed "leads," which are of a proper width, and of the same length as the line of type which is being set up, and are inserted between the lines as they are moved into the galley, so as to properly space the same. The leads m are pressed up against the plate M'; or, when it is elevated, are pressed against the closed front end of the box by the action of a follower, m¹, having a pin projecting through a slot in the side of the box N, and acted upon by a spring, m². (See Figs. 2 and 3.)

The type are forced into the galley, after being elevated, by the action of a forked frame, R, as in my former patents, but this forked frame is operated, in the present instance, in one direction, by the frame K, through the medium of the chain p, lever p¹, link p², and arm p³, and in the opposite direction by the action of a spring, g, attached to the end of the lever p¹. (See Fig. 4.)

It will be observed, on reference to Fig. 2, that the rear end P² of the galley P is open at the top and at one side, so that when the type is moved along into this position it can be lifted out and conveyed away for incorporation into a form; or a chase can be placed in this rear portion, and the type pushed directly into the same, the chase, of course, being depressed as each column of type is inserted.

The operation of justifying with my im-

proved machine is substantially similar to that described in my patent of September 8, 1872; but, in order that it may be fully understood, I will give a brief description of it here, reference being had to the enlarged view of the dial shown in Fig. 13, Sheet 3. On this dial are a number of concentric circles, the smallest in diameter representing the smallest-sized type—such as nonpareil—and the largest in diameter the largest size—such as pica—while the intermediate circles represent the intermediate sizes. Each circle is graduated into spaces corresponding in length to an "em" of the type which it represents, and each em-space is divided into sixths, each of the latter graduations thus representing a space which printers term a "six-em space."

In the dial illustrated in Fig. 13, but five graduated circles are shown; but in practice a larger number will be used, the number shown being merely employed to illustrate the principle upon which the dial is constructed. The width of the line to be set up, and the number of extra spaces i to be introduced, are first decided upon. Supposing the line decided upon to be fifteen ems long, and the number of spaces to be six, the base or foundation for calculation on the dial will be 21, supposing each space i to represent an em-quad of the type which is being used. This being determined, a line is set up by the machine, the words being separated by the thick-spaces i only, until six of these spaces have been introduced, and the remaining words in the line, if there are any, being separated by spaces of proper size.

In setting up type, the last word or section of a word in the line almost invariably falls short of the full length of the line, so that in my machine, when the last word or section of a word which the line will contain has been set up, the pointer on the dial will indicate a number less than 21, which would be the number indicated if the line was full, and it is this difference between the number indicated by the pointer and the number 21, or as I term it the "base," which governs the number and character of the spaces to be introduced in place of the spaces i, in order to make the line of a proper length. Supposing the number indicated by the pointer to be 20, for instance, the space to be filled would equal in length one em, and each of the spaces i would have to be replaced by one six-em space, when the complete line would be exactly fifteen ems long. If the graduation 19 $\frac{3}{4}$ were indicated by the pointer, a space of one and a half em in the length of the line would have to be filled, and this would require the replacing of the spaces i with three three-em spaces, three six-em spaces, and this system is extended to meet all requirements.

It will be evident that when a greater or less number of extra spaces than six are used, the base will vary accordingly.

I propose to use in connection with the dial H a series of tables, one for each graduation

of the dial, so that by referring to these tables the operator can tell exactly the number and size of the spaces which have to be introduced to bring the line up to its full length. By this plan no calculation whatever on the part of the operator is required, the dial indicating which table of the series is to be referred to, and this table pointing out what spaces are required.

Having thus explained the justifying operation, I will now proceed to describe the general operation of the machine: The receptacles in the table A being filled with type, the latter are drawn out into and are moved along the groove *a* by the fingers *c* of the pusher-bars B B¹, and are deposited in proper order in the recess of the type-box E. As fast as a type is introduced the line is depressed by the operation of the plate G to an extent sufficient to permit the introduction of the next type, the spring-plate *f* yielding to permit this movement. When the first word has been completed, the key or other device which controls the operation of the plate *j* is touched, and this plate moves forward, and forces one of the spaces *i* into its proper place in the line of type, and is then withdrawn, owing to the action of its spring. Another word is then set up, and a space inserted as before, and this operation is continued until the pointer and dial indicate that the end of the line has been reached, when the movement of type into the groove *a* from the receptacles is discontinued, and the outer end of the lever I depressed. The first result of this operation is to remove the end of the hooked bar *h*² from the slotted lug *h*³ of the bar G', so that the latter is released from the control of the treadle, and is at liberty to rise, together with the plate G, which is elevated with the line of type. Further depression of the lever I causes the elevation of the outer end of the arm J, and with it the frame K and plate L. As the frame K rises, the lower end of the lever *p*¹ is released from the tension of chain *p*, and is acted upon in a contrary direction by the spring *q*, which causes the drawing back of the frame K.

The upward movement of the frame K continuing, the projection *l* of the plate L commences to lift the plate *f*, and with it the line of type. Meanwhile the bar M is causing the elevation of the plate M' at the front end of the box N. The line of type is elevated until the lug *i*¹ of the topmost space *i* of the line touches the stop *r* at the top of the opening *i*³, when upon the next movement of the pusher-bar, the lug F² of the plate F is struck, and the rod F¹ moved forward, striking the lug *i*¹ of the space *i*, and forcing the same through the slot *r*¹ of the reservoir C, until it reaches the bottom of the slot *i*², when the rod F is retracted. It will be understood that the same forward movement of the pusher-bar which caused the expulsion of the space also caused the introduction of a space of a proper size, as determined by the dial, into the line of type. As the large spaces *i* are

expelled and small spaces introduced, the line, of course, shrinks in length, and this shrinkage is facilitated, and the line kept together by the weight of the plate G, which presses upon the top of the line. The line is thus gradually raised, each of the spaces *i* being treated in the same manner as the first, until the last has been removed. The parts have now been moved from the position shown in Fig. 7 to that shown in Fig. 8, the type being in line with the opening P' of the galley P, the plate L elevated so as to prevent the line of type from falling apart, and the plate M' raised until its lower edge is even with the top of the box N, thus allowing the leads *m* to be moved closely up to the front of the box. The lever I has now reached the limit of its downward movement and the motion is reversed, the first result being the depression of the bar M and its plate M', and also of the plate L, the place of the latter however being supplied by one of the leads *m*, which is pushed down by the plate M'. The line of type during this movement is held firmly in its position vertically by the friction of the spring *g* against the sleeve *f*² of the arm *f*¹. When the upper edge of the plate L has again reached the position shown in Fig. 7—that is, in line with the bottom of the opening P¹ of the galley—the frame K will have reached such a position that the chain *p* commences to act on the end of the lever *p*¹, and causes a forward movement of the forked frame R, which forces the line of type, together with the lead *m*, directly into the opening P'. As soon as this is completed, the plate G falls by its own weight, its lower edge just touching the plate *f*. The falling of the plate G brings the lug *h*³ of the bar G' into proper position for the entrance of the hooked end of the arm *h*², the insertion of which, so as to throw the bar into gear with the treadle, is the last duty performed by the upward movement of the lever I.

During the above operation the lever I is controlled by one hand of the operator, leaving the other free to cause the insertion of the extra spaces into the line, or to perform any other duty which may be required. The operations are all performed very rapidly, and are not interfered with by the ordinary working of the machine, as the only parts which would incommode the raising and conveying of the line of type, namely, the plate G and the bar G', are thrown out of gear at the beginning and not brought into gear again until the end of the operation.

When it is desired to separate the lines to a greater extent than usual, the operation of raising and lowering the lever I may be performed until a sufficient number of leads have been introduced to effect the desired separation, when the operation of setting up another line of type may be proceeded with.

I will now proceed to describe the construction of the distributing apparatus which I employ in connection with, and which is ope-

rated by, the above-described machine. At the back of the table A, and extending along the entire length of the same, is a cylinder, S, (see Figs. 2, 3, and 14,) in which, close to the periphery, are formed a number of channels, *s*, each representing one of the letters of the alphabet, or a space, and terminating in an opening immediately above the receptacle in the table A, in which that letter or space belongs.

At one end of the cylinder S is arranged the selecting device, which consists of an upright case or receptacle, T, for the reception of the type to be distributed, and a circular or segmental plate, U, provided around the outer edge with as many spring-studs or buttons *t* as there are channels in the cylinder S. Between the plate U and a transverse partition, Z, on the table A, works an arm, V, which is connected to a shaft carrying a cog-wheel, V¹, gearing into a similar cog-wheel, V², on the cylinder S, so that as the latter is turned the arm V is vibrated. Each of the buttons *t* is lettered, and corresponds with the channel in the cylinder S, representing the like letter, and when a button is depressed its shank extends across the space between the plate U and partition Z, and prevents the further vibration of the arm V.

Across the bottom of the receptacle T works a thin bar, *u*, operated in unison with the machine through the medium of a lever, *u*¹, and rod *u*², the latter being guided on the front of the table A, and having a projection which is struck either by one of the operating arms of the pusher B, or by the pusher itself on its forward movement, so as to cause the backward movement of the bar *u*, the reverse movement of said bar being caused by a spring, *u*³.

In the edge of the case T, in line with the inner end of the bar *u*, and with the lowermost channel of the cylinder S, is an opening, *u*⁴, (shown more fully in the sectional view, Fig. 15, Sheet 3,) for a purpose described hereafter.

A rotary motion in the direction of the arrow 1, Fig. 14, is imparted to the cylinder S by the treadle D through the medium of the connecting-rod *v* and a shaft, *v*¹, having an arm, *v*², slotted for the reception of the end of the rod *v*, said shaft being provided at the end with a cog-wheel, *v*³, gearing into a pinion, *v*⁴, on the cylinder. This motion is communicated on the downward movement of the inner end of the treadle, to which the rod *v* is connected, but on the upward movement of this end of the treadle, the end of the rod *v* slides loosely in the slot in the arm *v*², so that the cylinder S depends for its movement in the direction of the arrow 2, Fig. 14, upon the action of a spring, W, coiled around the end of the cylinder. A weight may be employed in place of the spring, if desired.

The openings *z*, in which the channels of the cylinder S terminate, are peculiarly constructed, as shown in Figs. 3 and 16, having an abrupt rear edge, *z*¹, which, when the cylin-

der is turned in the direction of the arrow, tends to force a type which has just been expelled from the channel *s* out into the receptacle with which the opening corresponds.

The operation of the above-described distributing apparatus is as follows: The receptacle T having been filled with type the operator takes a printed slip of the matter to be distributed, and touches the knob or button representing the first letter on the copy which corresponds with the bottom type of the column in the receptacle T. The bar *u* is now drawn back, and at the same time the cylinder S is turned in the direction of the arrow 2, Fig. 14, by the action of the spring W, this movement causing a movement of the arm V in the direction of the arrow 3, Fig. 14. When this arm arrives at the depressed button its movement, and consequently that of the cylinder S, is stopped, and the result is the bringing of the channel *s*, representing the letter corresponding with the depressed button, in line with the opening *u*⁴ of the receptacle T, so that on the forward movement of the bar *u*, the bottom type of the column will be forced into said channel. Immediately after the forward movement of the bar *u* the operation of the treadle causes the restoration of the arm V to its normal position, Fig. 14, ready for another stroke. This is continued until the column of type in the receptacle T is exhausted, when it is replaced by another column, and the operation repeated. The type in the channels, when they arrive at the openings *z*, fall into the type-receptacles, and on the next movement of the cylinder S are pushed forward out of the way.

A channel, *s*, may be provided for type or spaces which have no receptacle on the table A, this channel extending completely through the cylinder S, so that the type or spaces may fall into a general receptacle at the end.

Owing to the fact that the motion of the cylinder S in the direction of the arrow 2 is communicated by a spring or weight, the sudden stoppage of the arm V will have no injurious effect on the machine.

I claim as my invention—

1. The duplex pusher-bar B B', arranged and operating, in respect to the type-receptacles of the tube A, substantially as described.

2. The combination of the bar *b*, forming the bottom of the groove *a*, with devices, substantially as described, for elevating and depressing said bar, so as to close the type-receptacles on the forward movement of the pusher-bar, and open them on its rearward movement, as specified.

3. The combination of the bar *b* with the treadle D and the cam *b*¹, shaft *b*², arm *b*³, and rod *b*⁴, by which the motion of one is communicated to the other, as set forth.

4. In combination, with the adjustable type-box E, and with the front ends of the type-receptacles, the bar *e*, rendered adjustable in respect to said ends, for the purpose set forth.

5. The sliding spring-plate F, its bar F¹ and

lug F^2 , in combination with the pusher-bar B' , by which it is operated, as set forth.

6. The bar f^1 , its plate f , and sleeve f^2 , in combination with the spring-arms g , embraced by the latter, as set forth.

7. The plate G and its bar G' , provided with a recessed lug, h^2 , in combination with the hooked rod h^2 , operated by the treadle, and with devices, substantially as described, by which the rod and lug may be thrown into and out of gear with each other, for the purpose set forth.

8. The extra spaces i , each having a lug, i^1 , in combination with devices, substantially as described, by which the said spaces are introduced into, and expelled from, the line of type.

9. In combination with the spaces i , narrower than the type, the contracted space x at the rear of the type-receiving recess in the box E , said contracted space being formed by the shoulder x' on the frame, as set forth.

10. The combination of a type-setting machine with the justifying-dial H , provided with concentric circles, graduated to suit different sizes of type, as set forth.

11. The combination of the plate L , adapted to a recess in the type-box, and provided with a projection, l , with the type-supporting plate f , the two being arranged and operating in respect to each other, substantially as and for the purpose set forth.

12. The combination of the laterally reciprocating forked frame R with the vertically-reciprocating frame K , and with the chain p , lever p^1 , link p^2 , arm p^3 , and spring q , operating substantially as and for the purpose described.

13. The combination of the lever I with the bar J , and with the link I^1 , arm I^2 , and shaft I^3 , connecting the two, as set forth.

14. A type-distributing apparatus, in which are combined the following elements, namely: a cylinder, rotated, or partly rotated, in opposite directions, and provided with longitudinal channels terminating in openings communicating with the various type-receptacles; a bar or plate, operating in unison with the cylinder, for forcing in rotation into the channels a number of type contained in a reservoir; and a device, substantially as described, for determining the point at which the rotation of the cylinder in one direction shall be stopped.

15. The combination of the key-board U and vibrating arm V with the cylinder S , vibrated in one direction by a positive movement, and in the opposite direction by the action of a spring or weight, as set forth.

16. The cylinder S , provided with channels s , terminating in openings z , having abrupt rear edges z' , for the purpose specified.

17. The combination of the channeled cylinder S , the reservoir T , and its opening u^4 , with the reciprocating bar u , operated in one direction from some moving part of the machine, through the medium of the lever u^1 and arm u^2 , and in the opposite direction by a spring, u^3 , as set forth.

18. The galley P , having at the front an opening for the entrance of the column of type beneath devices, substantially as described, for leading the same, and having a rear portion open at the top and at one side, as and for the purpose set forth.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

AUGUSTUS COREY.

Witnesses:

HARRY HOWSON, Jr.,

HARRY SMITH.