

(No Model.)

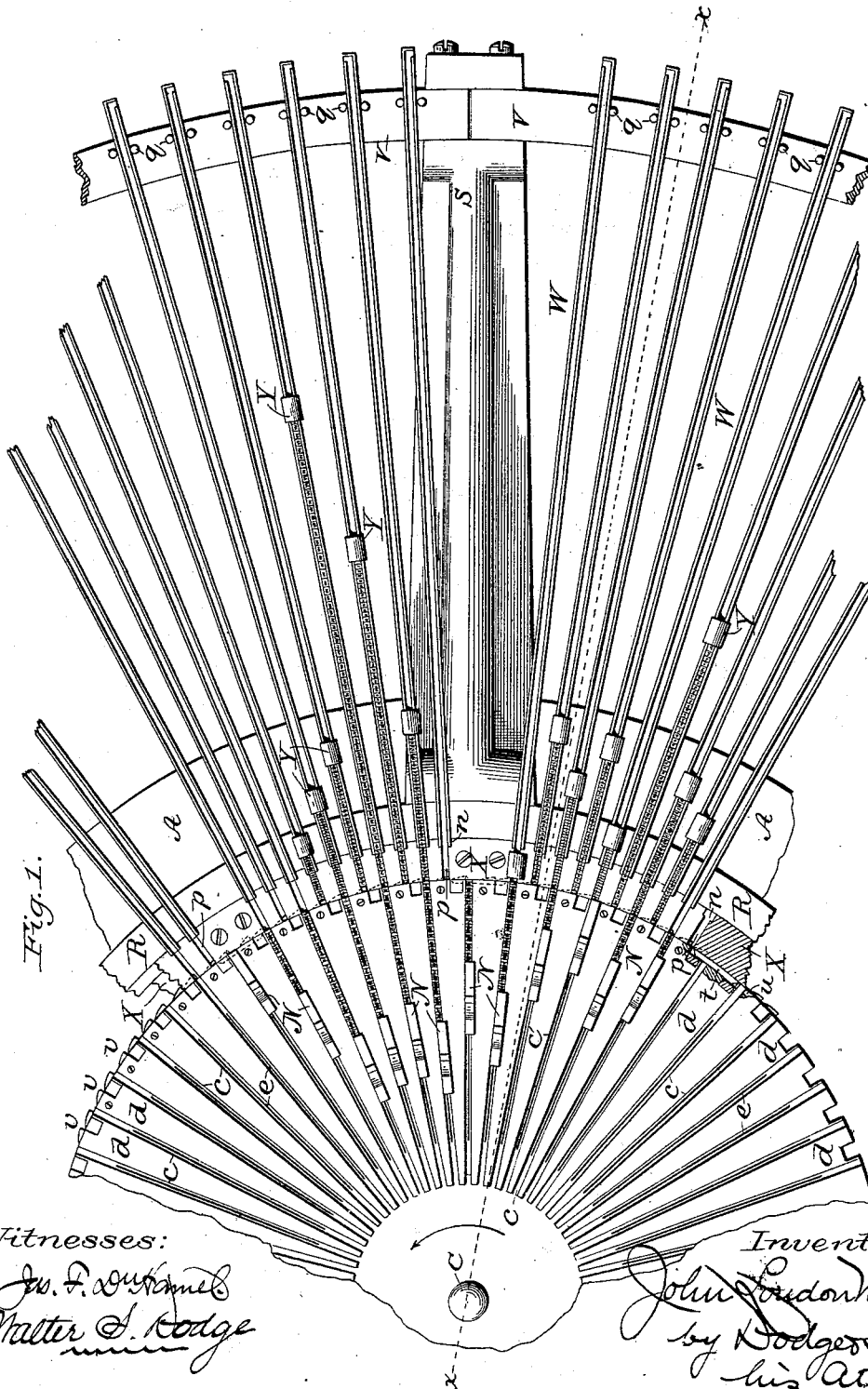
4 Sheets—Sheet 1.

J. L. McMILLAN.

TYPE DISTRIBUTING MACHINE.

No. 347,627.

Patented Aug. 17, 1886.



Witnesses:

Walter S. Dodge

Inventor:

John Gordon Williams  
by Wodgeson,  
his Attys.

(No Model.)

4 Sheets—Sheet 2.

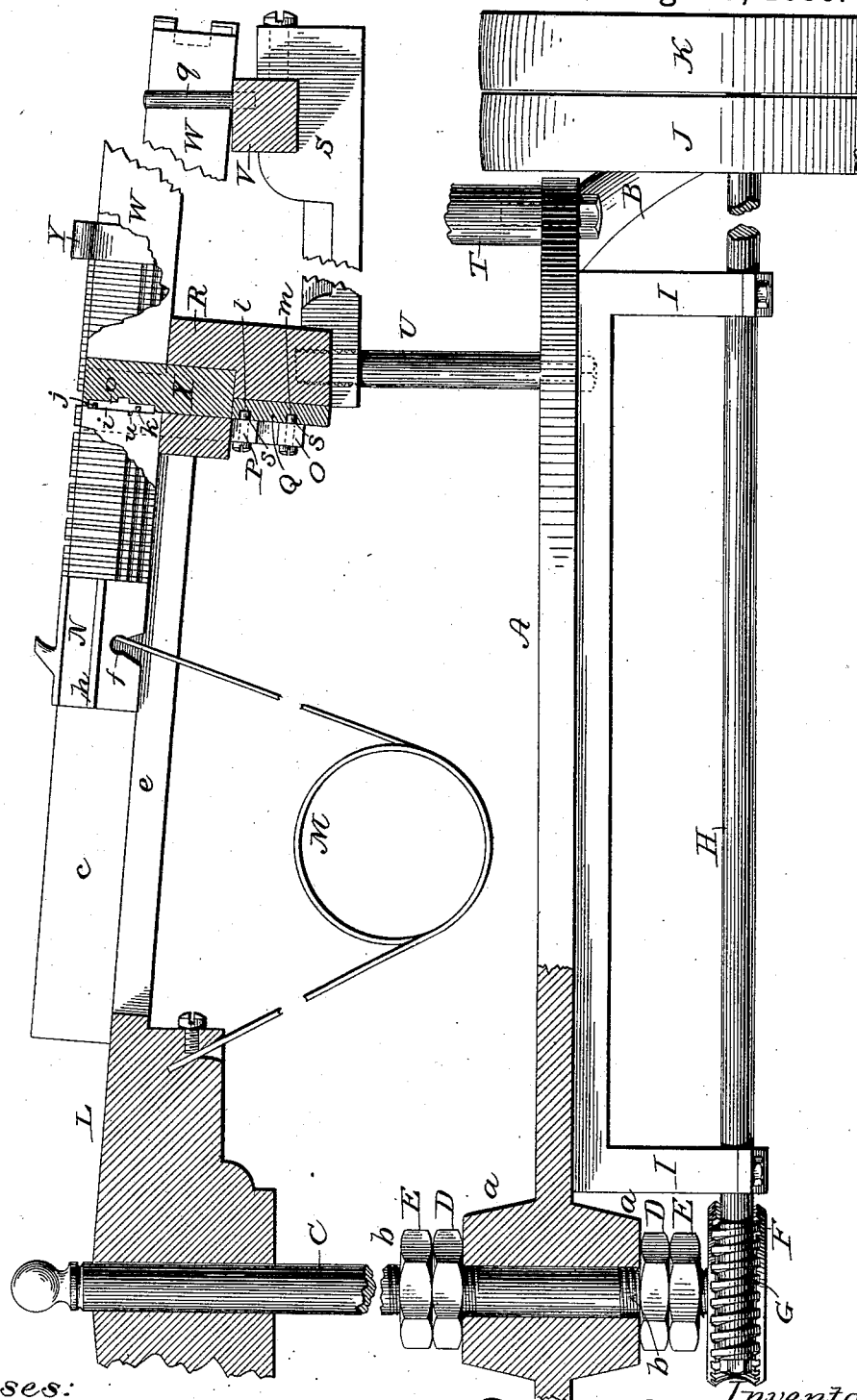
J. L. McMILLAN.

TYPE DISTRIBUTING MACHINE.

No. 347,627.

Patented Aug. 17, 1886.

Fig. 2.



Witnesses:

Jas. P. O'Hanlon  
Walter S. Dodge

Inventor:

John L. McMILLAN,  
by Rodgerman,  
his Atty.

J. L. McMILLAN.

TYPE DISTRIBUTING MACHINE.

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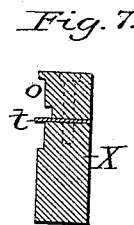
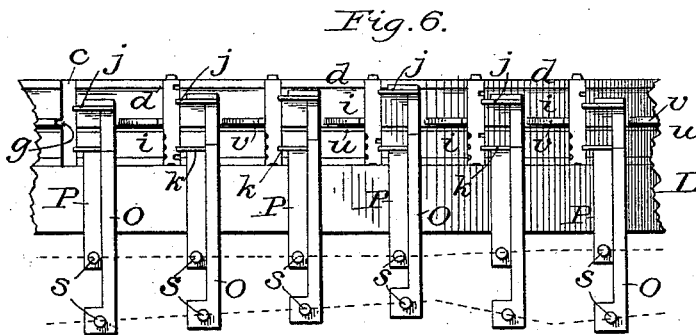
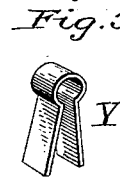
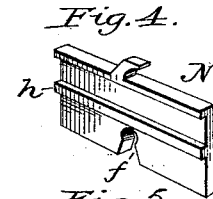
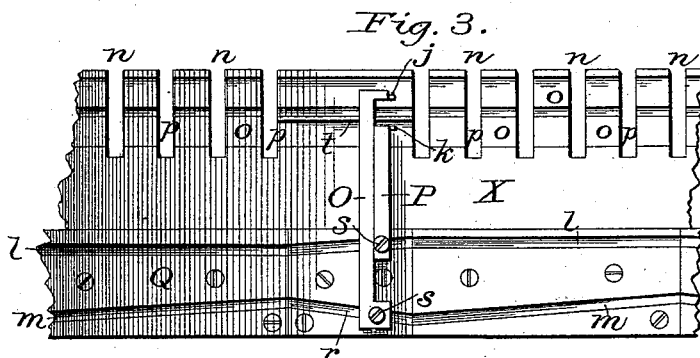


Fig. 8.

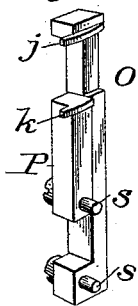


Fig. 10.

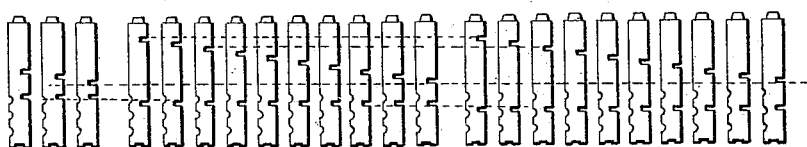
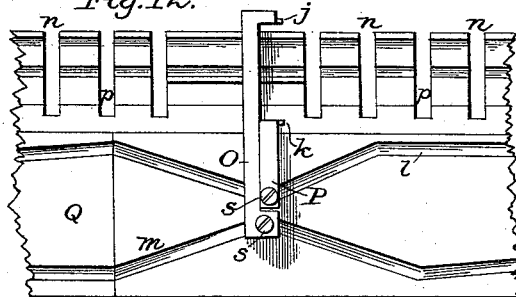


Fig. 12.



Witnesses:

Geo. F. Outland  
Walter S. Dodge

Inventor:

John L. McMillan,  
by Rodger Son,  
his Attys.

(No Model.)

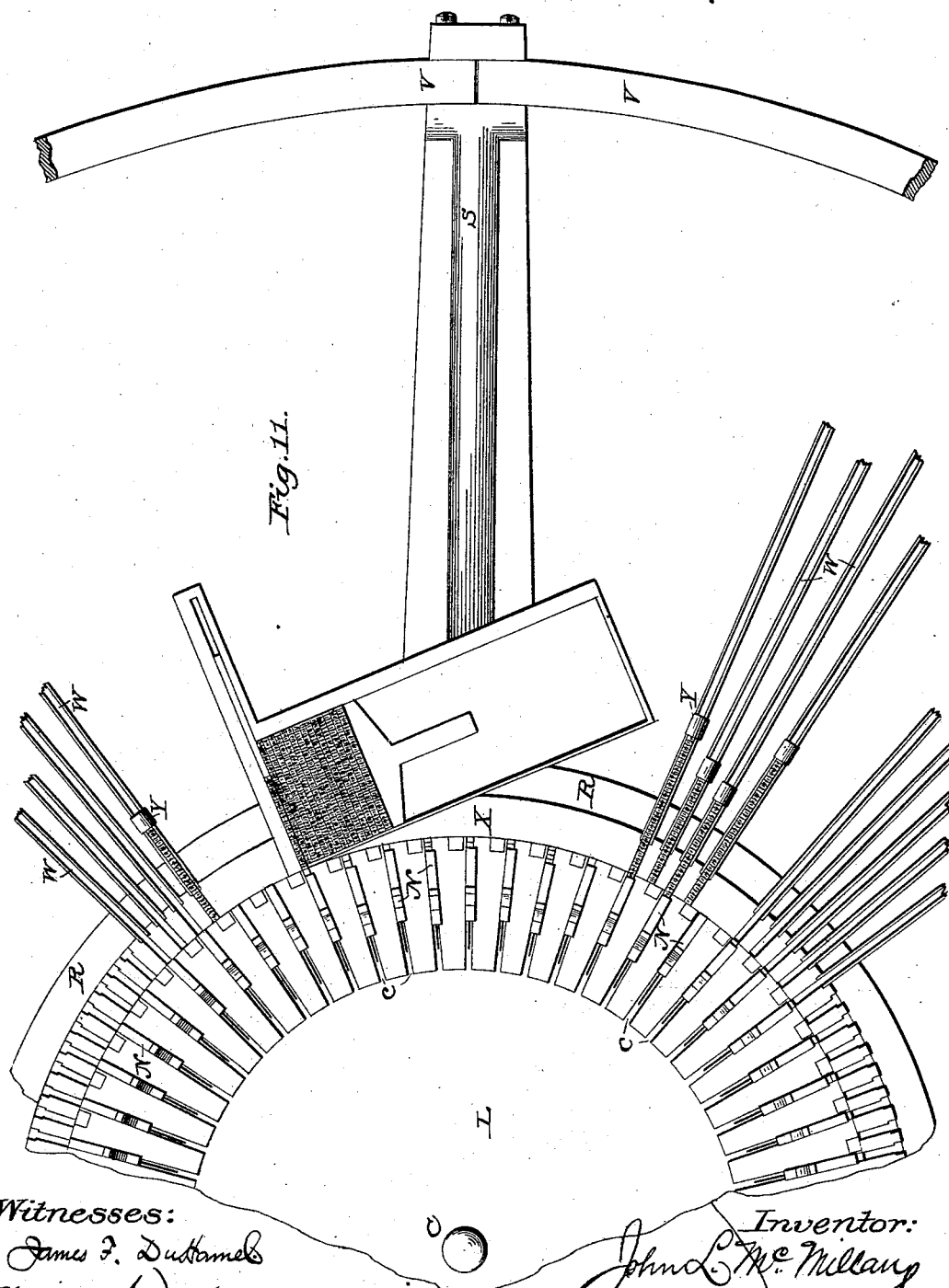
4 Sheets—Sheet 4.

J. L. McMILLAN.

TYPE DISTRIBUTING MACHINE.

No. 347,627.

Patented Aug. 17, 1886.



Witnesses:

James F. Dutton  
Matter Dodge

Inventor:

John L. McMillan  
by Kodger Son  
his Atty.

# UNITED STATES PATENT OFFICE.

JOHN LOUDON McMILLAN, OF ILION, ASSIGNOR OF ONE-HALF TO JOSEPH FOWLER, T. S. COOLIDGE, J. W. BUSH, AND D. L. ROBERTSON, ALL OF GLENS FALLS, NEW YORK.

## TYPE-DISTRIBUTING MACHINE.

SPECIFICATION forming part of Letters Patent No. 347,627, dated August 17, 1886.

Application filed May 6, 1885. Serial No. 164,584. (No model.)

*To all whom it may concern:*

Be it known that I, JOHN LOUDON McMILLAN, of Ilion, in the county of Herkimer and State of New York, have invented certain new and useful Improvements in Type-Distributing Machines, of which the following is a specification.

My invention relates to type-distributing machines; and it consists, essentially, in a disk or wheel and an encircling ring, each provided with type-channels, and one arranged to rotate while the other remains at rest, and a series of intermediate removable wards or guards, which hold the type in the channels of one of said paths until the wards or guards are brought to register exactly with the nicks or notches of the type, (each letter or character of the type being differently nicked,) whereupon the type is ejected, by spring or otherwise, from the distributing-channel into the receiving-channel.

Figure 1 of the accompanying drawings is a top plan view of a portion or section of my machine. Fig. 2 is a vertical section on the line *x x* of Fig. 1; Fig. 3, a view of the cams or inclined grooves which control the position of the "wards," "guards," or "selecting-pins," as they are variously called, developed in a plane; Figs. 4 to 10, inclusive, views illustrating details; Fig. 11, a plan view illustrating a modification; Fig. 12, a view illustrating a detail of the modified construction.

Prior to this invention, and dating back many years, type-distributing machines have been proposed, and have from time to time been constructed and operated with more or less success. Perhaps up to the present time no machine for the purpose has been more successful in operation or simple in construction than that of Sørensen, of Denmark, exhibited at the London World's Fair in 1851, and at the Paris Exhibition in 1855. In said machine the type were each nicked in a peculiar way and arranged in grooves on the inside of a hollow cone or basin. This was inverted on the edge of a cylinder, on the inside of which were grooves so constructed that each letter could only slide into a particular groove. The lower cylinder was kept stationary, while the upper

one was turned round slowly in a horizontal direction by means of a treadle. As each letter reached its own groove it slid down the inside of the lower cylinder, and in this way each groove was filled with one kind of letter. Certain difficulties have, however, presented themselves in all machines of this general construction known to me; and the present invention is designed to obviate such difficulties, and still retain the valuable features of the Sørensen machine. These difficulties embrace, among other things, the occasional twisting or canting of the type in passing from the distributing to the receiving channel, great wear and injury of the type, and stoppage of the machine, or mutilation of the type through their failure to pass fully into the receiving-channels. I not only avoid these defects, but I materially increase the efficiency and durability of the machine and cheapen and simplify it by the construction which I will now explain.

A indicates a bed or table, mounted upon legs B, and formed or provided with a central boss, *a*, having a vertical opening to receive a shaft or spindle, C, which has threaded portions *b b* above and below the boss, upon which are screwed nuts D and jam-nuts E. By means of these nuts the spindle may be raised or lowered, as required, and secured firmly at any desired height, the upper nut D resting upon the boss *a*, and forming a supporting-collar for the spindle. The lower end of the shaft or spindle C is furnished with a worm-wheel, F, meshing with and receiving a slow rotary motion from a worm, G, carried by a shaft, H, supported in hangers I beneath the bed or table A, and furnished with fast and loose pulleys J, K, to receive a driving-belt from any convenient motor. In practice I so proportion the driving-gear as to produce a slow but regular rotation of the spindle C, commonly about one turn in a minute and a half, though the speed may be varied as found expedient. The spindle C carries at its upper end, or above the table A, a wheel or disk, L, the upper face of which inclines downward slightly from the center to the periphery, for a purpose hereinafter explained. The wheel L is

furnished with a series of radial channels, *c*, of a width corresponding to the width of a type, or its measurement in the direction of the height of the letter or character thereon, and preferably of a depth equal to the height of the type to the shoulder. These channels are best formed by means of separate strips or sections *d*, screwed or bolted upon the upper face of the wheel or disk *L*, but may be formed by planing grooves directly in the face of the disk. Each channel is designed to contain a line of reading-matter to be distributed, and is formed with a narrow slot, *e*, in its lower side, through which extends one end of a bent wire spring, *M*, the other end of which is inserted into a hole or socket in the hub or boss of wheel *L*, and secured therein by a set-screw or equivalent means. The free end of each spring projects through the slot *e* of the particular channel to which it belongs, and enters a notch or recess, *f*, in the lower side of a sliding block or follower, *N*, with which each channel is supplied. The office of the follower and spring is to press the line of type outward toward the periphery of the wheel or disk *L*, and as the follower is liable to tip or rise under the pressure of the spring unless prevented, I form each channel with a longitudinal groove, *g*, in one wall, as shown in Fig. 6, and each follower with a rib or feather, *h*, to enter and traverse said groove, thus effectually preventing any except a direct forward and outward movement. The periphery of the upper part of the wheel or disk *L*, or that portion between the channel *c*, is slightly recessed or grooved from near the top to near the bottom of the channels, forming a circumferential depression or space, *i*, which in practice is made about one-hundredth of an inch in depth. Close by the side of each channel there is formed in the periphery of the wheel or disk *L* a vertical groove or seat to receive two sliding blocks, *O* and *P*, respectively provided with laterally-projecting pins or fingers *j* and *k*, which I term "feeding-pins" or "selecting-fingers," said grooves being plainly shown in the top plan view, Fig. 1. These pins or fingers *j* and *k* are formed at the outer side or face of the blocks or slides *O* and *P*, and work in the depression *i*, formed in the periphery of the wheel *L*, their ends projecting laterally a short distance across the mouths of the type-channels, as best shown in Fig. 6, and serving to prevent the escape of type, except when both of said pins register exactly with the arbitrarily-located nicks or notches formed in the type and differently arranged in each letter and character of the font. They also hold the forward type back a short distance within the periphery of the disk. The pins or fingers are caused to move vertically as the disk or wheel rotates, and at different points in each revolution to come exactly into line with the nicks or notches of each separate type or character. At each of such points there is placed a receptacle for

the particular character or type with which the pins register at that point, and whenever such type is at the outer end of one of the channels *c* and the pins reach such point the ejecting-spring *M* will force the line of type forward in the channel and eject said forward type. In this way all type of a certain letter or character will be ejected at one point, those of another character at another point, and so on throughout the series; or provision may be made for bringing the fingers to given adjustments and permitting the escape of certain types at two or more points in the revolution of the disk or wheel *L*.

The necessary rise and fall of the blocks or slides *O* and *P* is produced by means of cam guides or inclines extending around the wheel or disk and below the same. These guides are most conveniently produced by forming grooves *l* and *m* in the inner face of a ring or band, *Q*, concentric with the wheel or disk *B*, as illustrated in Figs. 2 and 3. The ring or band *Q* is advisably made in sections, and is screwed or otherwise secured to a heavier ring, *R*, encircling the wheel *L*, and mounted upon arms *S*, which are supported at suitable intervals by posts *T* and *U*, rising from the bed or table *A*, the upper ends of the posts *U* being threaded and passed through holes in the arms and into sockets in the ring to secure the latter firmly in place, as shown in Fig. 2.

This machine is more particularly designed to distribute type for use in connection with a type-setting machine invented by me, and to place the types of each different letter or character side by side in a single line in a type case or slide. I therefore adapt the machine to receive the type cases or slides of the setting-machine, and to hold the same with their open ends in position to receive the type ejected from the channels of the wheel or disk *L*. To do this the arms *S* are extended outward a suitable distance and support an outer hoop or ring, *V*, to sustain the outer ends of the type cases or slides *W*, the inner ends of which enter seats *n*, formed in the periphery of an inner hoop, *X*, resting upon and held in place by the ring *R*, as shown in Fig. 2. The hoop *X* extends in a vertical direction from the lower face of wheel or disk *L* to the upper line of the type-channel bars or strips *d*, and its inner face is provided with a recess or depression, *o*, corresponding with the recess *i* in the periphery of the wheel or disk *L*, but considerably deeper, being in practice about six-hundredths of an inch in depth. The two recesses or depressions *i* and *o* jointly form a space of proper width to permit the free but close vertical play of the fingers *j* and *k*, and their travel about the axis of the wheel or disk *L*. At each point where the pins register with the notches or nicks of a type a passage, *p*, is cut through hoop or ring *X*, slightly wider than the width of a type, so that when any one of the channels *c* comes into coinci-

dence therewith said passage forms a continuation of the channel. The outer side or end of each passage *p* is widened sufficiently to receive the end of one of the type-cases *W*, which is inserted into said enlargement, the channel or groove of the type-case forming a further continuation of the channel *c* of the disk or wheel, as shown in Fig. 1. The outer end of each case is held between two pins or studs, *g*, on the hoop *V*.

It will be seen from the foregoing that a type ejected from any one of the channels *c* will pass through one of the passages *p* and into one of the type-cases *W*.

To prevent the type from falling down in the cases *W*, each case is furnished with a spring-quoin, *Y*, which may conveniently be made of sheet metal, bent into shape, as shown in Fig. 5, and inserted into the slot or channel of the case, as in Figs. 1 and 2.

By referring to Fig. 2 it will be seen that the upper face of disk or wheel *L*, which face forms the bottoms of the type-channels *c*, is inclined downward toward the periphery, and that the periphery of the wheel and of the ends of the bars *d*, forming the type-channels, together with the inner face of hoop or ring *X*, are all perpendicular to said upper face of the disk or wheel. The object of this arrangement is to prevent thin type from turning edgewise in the channels, or when passing therefrom into or through the passages *p*, the inclination or tipping of the type causing each to fall forward and to lie flat against the one previously ejected. This is a very important provision, and effectually overcomes a serious difficulty of prior machines of this class. The wheel *L* revolves slowly but continuously, the rate of movement being such that no difficulty is experienced in properly ejecting the type whenever they come to the proper outlet-point.

Referring now to Fig. 10, the arrangement of the nicks in the type will be more fully explained, it being distinctly understood, however, that I do not restrict myself to the measurements here given, nor to the division into series as stated. A type measured from heel to face is .92 of an inch, and from the heel to the shoulder is .87. Allowing .08 above the recess *i o* for the meeting of the disk *L* and hoop or ring *X* at top, we find that the feeling pin or finger *j* at its highest point reaches a point .79 of an inch from the heel of the type. The pins are .04 of an inch thick; therefore the highest nick is between points .75 and .79 of an inch above the heel of the type.

To secure a sufficient number of combinations of nicks to distinguish each type from all others of the font, or, in other words, to insure a different nicking of each type, so that when the feeling-pins or selecting-fingers are in a given relation and position they shall register with only one type of the entire font, I classify the type in groups, each group containing a definite number of characters, and

throughout each group one of the nicks retains a given position, while each successive type of the group has its second nick lowered a definite distance below the corresponding nick of the preceding type. This will be readily understood upon referring to Fig. 10.

In passing from each group to the next, the first nick of the type of the latter group is dropped a certain distance below the first nick of the type of the former group, as shown in Fig. 10, and retains such position throughout the group or series, while the second nick of each type in each group corresponds in position with the second nick of each corresponding type of all the other groups, as also indicated in Fig. 10.

In the machines which I have built and operated I have separated the type into six groups or series, four groups containing ten characters or type each, and the other two containing thirteen each, making a total of sixty-six. In the groups containing ten characters or types each I drop the upper nick .04 of an inch from channel to channel, while, as stated, the lower nick remains unchanged throughout the group. In passing from one group to the next I drop the lower nick .04 of an inch and maintain such location throughout the group, and beginning with the first upper nick between the points .79 and .75 of an inch from the foot or heel of the type, as in the preceding series, I again drop said upper nick .04 of an inch from channel to channel, so that the nicking of the first type of one series differs from that of the first type of the next series only in that the lower nick of one is .04 of an inch out of line with the lower nick of the other, and the same is true with corresponding type throughout any two adjoining series. In the groups containing thirteen characters or type each the drop of the upper nick from channel to channel in each series is made only .03 of an inch, making a total of .39 of an inch as the outside limits of the nicks of the upper series, instead of .40, as in the ten-character groups. This is rendered necessary by the fact that the vertical movement of the pins or fingers is limited, and that such movement must be divided up between the type or characters of each group. As already mentioned, the upper line of the highest nick of the upper series is .79 of an inch from the foot, and the lower line of the lowest nick of the upper series is .40 of an inch below, or .39 of an inch from the foot or heel of the type. Between the lower line of the upper series of nicks and the upper line of the lower series of nicks a space of .06 of an inch is left for a purpose presently explained, and this brings the upper line of the lower series of nicks .33 of an inch above the heel, and as the nick is dropped .04 of an inch from series to series, and as there are six series, the lower line of said lower nicks will be .24 of an inch below the upper line, or .09 of an inch above the foot or heel of the type, which .09 represents the meeting faces of the periphery of disk or

wheel B and hoop or ring X. Having thus determined the nicking of the type, and arranged them in groups or series, as explained, the ring Q has its grooves *l* and *m* made in sections corresponding to the required movements of the selecting pins or fingers, as illustrated in Fig. 2, and by dotted lines in Fig. 6. Between each series of type channels and the next it is necessary to raise the pin or finger *k* to its first or highest position, and between the first and last series, or at other suitable points, it is necessary to raise the pin or finger *j* to its first or highest point. While this is being done it is important that the type be held back out of contact with the feeling pins or fingers, to prevent the type from being lifted thereby. To elevate the pins the sections of the grooved ring Q are connected by inclines *r*, upon which the guiding studs or pins *s* of the sliding blocks O and P ride in passing from section to section or group to group. To hold the type back from the feeling pins or fingers during the elevation of the latter, I place above each incline *r* a thin plate or strip, *t*, of metal, Figs. 1 and 7, which is secured to ring X, extends across the space *i* *o*, and projects into a circumferential groove or recess, *n*, formed in the face or wall of the depression *i* above the lower block, P, the block O being cut away in its outer face, as shown in Fig. 8. The ends of this plate or strip being beveled, the type in passing it are forced and held back until they pass above the inclines *r* from end to end of the latter, when they resume their original position. When the type are ejected from the channels *c* of the wheel or disk, they enter the inner ends of the passages *p*, just clearing the periphery of the disk, from which position they are forced outward, as the disk rotates, by inclines *v*, formed upon or applied to the periphery of the disk or the ends of the channel-bars *d*. This arrangement relieves the springs M of the necessity of moving forward the line of type in the receiving channels or type-cases, and leaves in front of each channel *c* an open space to receive the next type or types ejected from said channel. As a consequence of this provision, the type are ejected quickly and with certainty, and the springs M are permitted to be light and very elastic. The studs *s* are simply screws with reduced ends, which, being withdrawn, permit the insertion and removal of the blocks O and P at will.

The foregoing explanation is given to make clear the general principle of construction and operation; but in order to distribute as large percentage of the type as possible during each revolution, I repeat the cases and cams or inclines for those letters which occur most frequently, and therefore it happens that the precise order and arrangement of inclines and of nicks above stated is not followed throughout.

The extent of movement of the pins, the

size of nicks and pins or fingers, and other like matters of detail may be varied as desired.

Where two type of a given letter occur together both are ejected at once.

The type to be distributed may be pushed into the chambers *c* from a galley one at a time, as the chambers pass a given point, and afterward forced outward by the ejecting-springs and followers as the chambers come into line with the proper cases, at which time the fingers *j k* will coincide with the notches of the type belonging to such case, just as under the foregoing construction. It is obvious that for such operation the chambers *c* need only be deep enough to hold two or three type, the follower, and its spring. To permit this to be done it is necessary that the guard-fingers be moved out of the way of the incoming type-line at the point where the openings of the wheel coincide therewith, in order that the type may all enter said recesses freely. This is accomplished by merely elevating the cam-groove *l* and depressing cam-groove *m* at that point sufficiently to carry the guard-finger *j* above and the guard-finger *k* below the type, as illustrated in Fig. 12. As the wheel rotates and carries the type to the different cases the grooves *l* and *m* bring the fingers again into operative position, and said fingers permit the type to escape from the wheel to the cases in precisely the same manner as above set forth.

The operation of the machine under the first-described construction is as follows: The attendant, taking a line of type on a rule, as for distributing by hand, places the line in one of the channels *c* of disk or wheel B, presses back the follower N with a finger of the hand next it, and this is repeated with all or any number of the channels, the motion of the disk being so slow as to cause no difficulty in placing the type in the channels. As the wheel rotates, the pins or fingers *j k* at some point or points in each revolution come exactly into line with both nicks of the forward type of the channel, which type is thereupon ejected, and the same operation is performed with the next, and so on. As the type are ejected they and the line ahead of them are forced outward by the inclines *v*, the selecting pins or fingers rising and falling as their studs or pins *s* traverse the grooves *l m* and inclines *r*.

The action of the machine is automatic, and all that is required of the attendant is to keep the channels *c* supplied with type, to remove the filled cases, and to supply empty ones.

It is obvious that either the disk L or the outer series of channels may be made to move, that the type may be made to move vertically instead of horizontally, that a reciprocating instead of a rotary motion may be adopted, and that straight instead of circular faces may be opposed, the principles of construction and operation being independent of these considerations. It will also be seen that the machine can be used to merely drop the type into sepa-

rate boxes or receptacles, instead of placing them on cases, and therefore I do not restrict myself to the use of such cases.

Weights connected by cords and guided by pulleys may obviously be substituted for springs M to advance the line of type, and a step-by-step movement may be used.

The outer ring, V, is made in separable sections, in order that any section and the cases supported by said section may be removed at will, to enable the attendant to stand in close to the distributing-wheel for adjusting or fixing any part. This is of very considerable practical importance.

I am aware that it is not broadly new to provide means for adjusting the type-wheel vertically, and I confine my claims in this particular to the special means of adjustment shown and described.

I am also aware that movable type cases or channels have been combined with a type-distributing wheel; but never, so far as I am aware, have they been arranged radially outside of the same and in position to receive the type direct without the intervention of lifters or like devices.

Having thus described my invention, what I claim is--

1. In a type-distributing machine, the combination of a body having spaces to contain types and movable blocks provided with pins or fingers extending partially across the mouths of said spaces, and adapted to permit or prevent the escape of type as they are moved into or out of line with the nicks of the type.

2. In a type-distributing machine, the combination of a body provided with channels to contain a line of type side by side, blocks having pins or fingers extending partially across the mouths of the channels and of a size to pass freely through nicks formed in the type, and means, substantially such as described and shown, for moving said blocks and bringing the pins into line with the nicks of the different type successively.

3. In combination with a body formed with channels to contain a line of type side by side, movable blocks provided with pins or fingers extending partially across the mouths of the channels, and cams or inclines adapted and arranged to move the blocks and their fingers, and to bring the latter into line with nicks of the different type successively.

4. In combination with a body having a series of channels to contain a line of type side by side and a second series of channels or receptacles to receive and hold the type in a line as they are ejected from the first series, blocks carrying intermediate pins or fingers adapted to be moved into line with the nicks of the type, and cams or inclines serving to move the blocks, with their fingers, substantially as set forth.

5. In combination with a channeled body, as L, having a depression, *i*, across the ends

of the channels, cases adapted to receive type from said channels, the body or the cases being movable one in relation to the other, and intermediate blocks having pins or fingers extending partially across the mouths of the channels, working in the depression *i*, and adapted to be brought into line with the nicks of the respective types, all substantially as described and shown, the depression permitting the fingers to hold the type back from the meeting line of the channeled body and the cases, and thus to prevent the wear of the type.

6. In combination with a body channeled to contain single lines of type side by side, a series of receiving-channels, one set of channels being movable past the other set, intermediate movable blocks having fingers to permit or prevent the escape of the type from one set of channels to the other, cams or inclines for moving the blocks and their fingers downward, inclines for elevating the blocks and their fingers, and a blade or plate projecting from the body containing the receiving-channels into the space between the distributing-channels at points above the elevating-inclines, whereby the type are pressed and held back from the fingers during the rise of the latter.

7. In combination with a series of type-containing channels for type to be distributed and a second series of channels to receive the type discharged from the first series, blocks provided with wards or fingers to control the escape of type from the channels of one series to the channels of the other series, and inclines projecting from the space between the channels of the first series, and serving to force the type outward in the channels of the second series as one series is moved past the other.

8. The combination of a series of channels to contain type to be distributed, a second series of channels to receive the type from the channels of the first series, and guards or fingers to control the passage of type from one series to the other, said channels being inclined slightly downward in the direction of the travel of the type, substantially as and for the purpose explained.

9. The herein-described type-distributing machine, consisting of bed or support A, spindle C, provided with wheel or disk L, having channels *c*, springs M, and followers N in said channels, hoops or rings V and X, the latter closely encircling wheel L and formed with passages *p*, type-cases W, supported by said rings, sliding blocks O and P, provided with fingers *j* and *k*, inclines *v* between the channels *c*, ring Q, provided with grooves *l* and *m*, and inclines *r* between the grooved sections of the ring, all substantially as described and shown.

10. In a type-distributing machine, the combination of a bed or support, a spindle, C, passing through said support and having threaded sections *b b*, provided with nuts D E, by which the elevation of the spindle may be regulated, a channeled distributing-wheel, L, carried by

the spindle C, a ring or hoop, X, encircling said wheel and provided with passages *p*, and guards or fingers interposed between the periphery of the wheel and the passages *p*, to control the escape of the type from the channels of the disk to the passages *p*.

11. In combination with wheel L, provided with channels *c* and encircling ring or hoop X, provided with passages *p*, an intermediate annular space, *i* *o*, and sliding blocks O P, having fingers *j k*, arranged to move up and down within said space.

12. In combination with wheel L, provided with channels *c*, circumferential depression *i*, and groove *u*, ring X, encircling said disk and provided with passages *p* and depression *o*, sliding blocks O P, provided with fingers *j k* between the disk and ring, and with studs *s*, ring Q, provided with grooves *l m*, inclines *r* between the grooved sections of the ring Q, and plates *t*, extending from ring X into the groove *u* above the inclines *r*, substantially as and for the purpose set forth.

13. In combination with wheel L, having channels *c*, ring X, provided with passages *p*, and intermediate wards or guards, spindle C, carrying said wheel L, worm-wheel F, secured to said spindle, and shaft H, provided with worm G, meshing with the worm-wheel F, and serving to give motion to the wheel L.

14. The combination of wheel L, provided with channels *c* and means for advancing the

type therein, ring or hoop X, provided with passages *p*, intermediate fingers, *j k*, and inclines *v* between the channels *c*, substantially as and for the purpose set forth.

15. In combination with wheel L, having channels *c*, hoops X and V, the former provided with passages *p*, and the latter having studs or pins *g*, ring Q, provided with grooves *l m* and inclines *r*, and blocks O P, provided with fingers *j k* and studs *s*.

16. In a type-distributing-machine, the combination of a rotary distributing-wheel and a series of independent removable type-cases arranged radially outside of said wheel to receive the type therefrom.

17. In a type-distributing machine, the combination of a rotary distributing disk or wheel, a series of external radial receiving-channels, and supporting rings or hoops for said channels, substantially as shown.

18. In combination with a rotary distributing-disk and an external series of removable receiving-channels, an outer supporting-ring for said channels made in separable sections, whereby any section may be removed at will to give access to the distributing-disk.

JOHN LOUDON McMILLAN.

Witnesses:

WILLIAM W. DODGE,

WALTER S. DODGE.