No. 886,585.

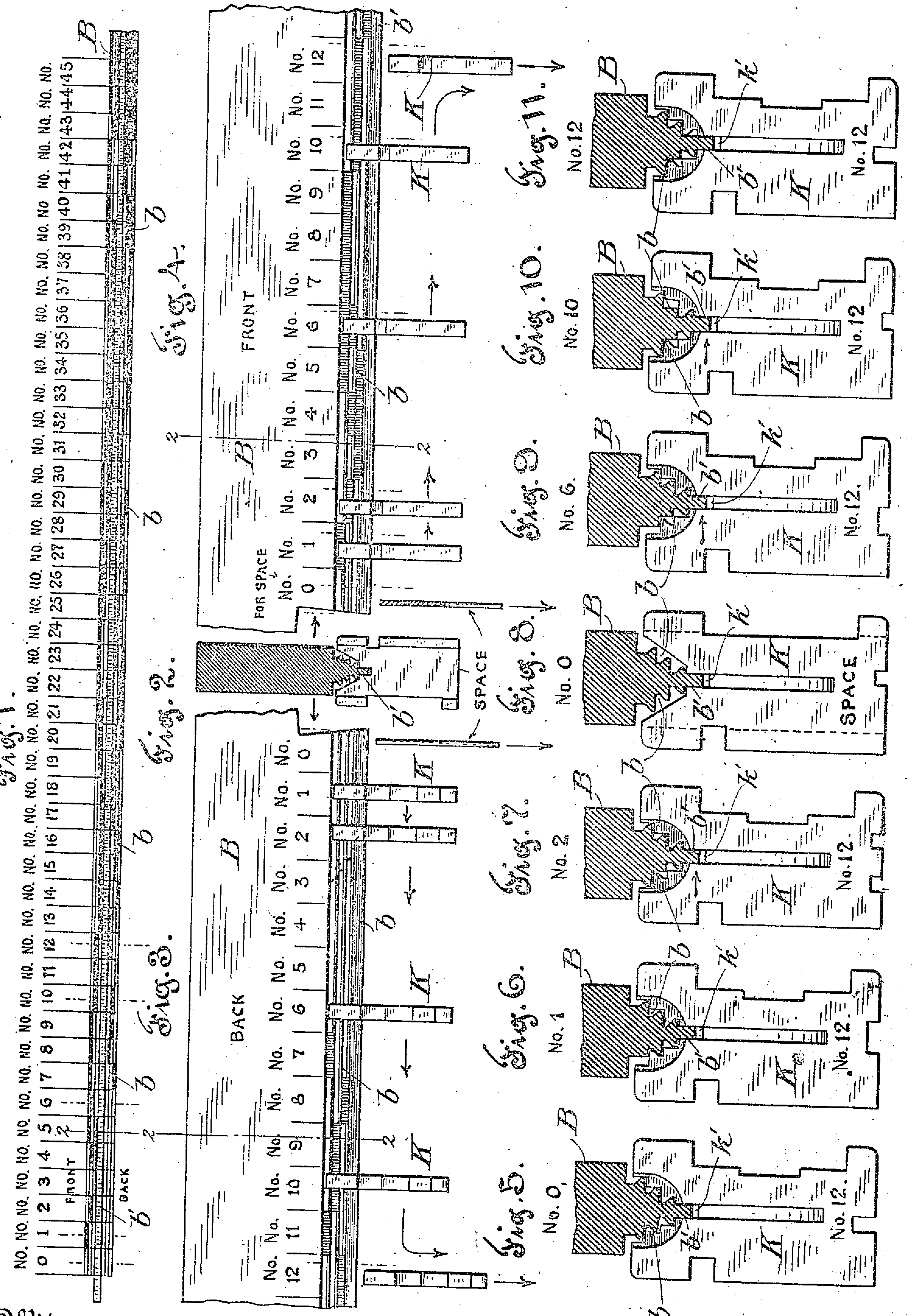
PATENTED MAY 5, 1908.

A. DOW.

LINOTYPE MACHINE.

APPLICATION FILED JUNE 28, 1907.

4 SHEETS—SHEET 1.



Witnesses:
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M. E. Smoot

Inventor
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By his Attorney P. T. Dodge

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4 SHEETS—SHEET 2.

Fig. 12.

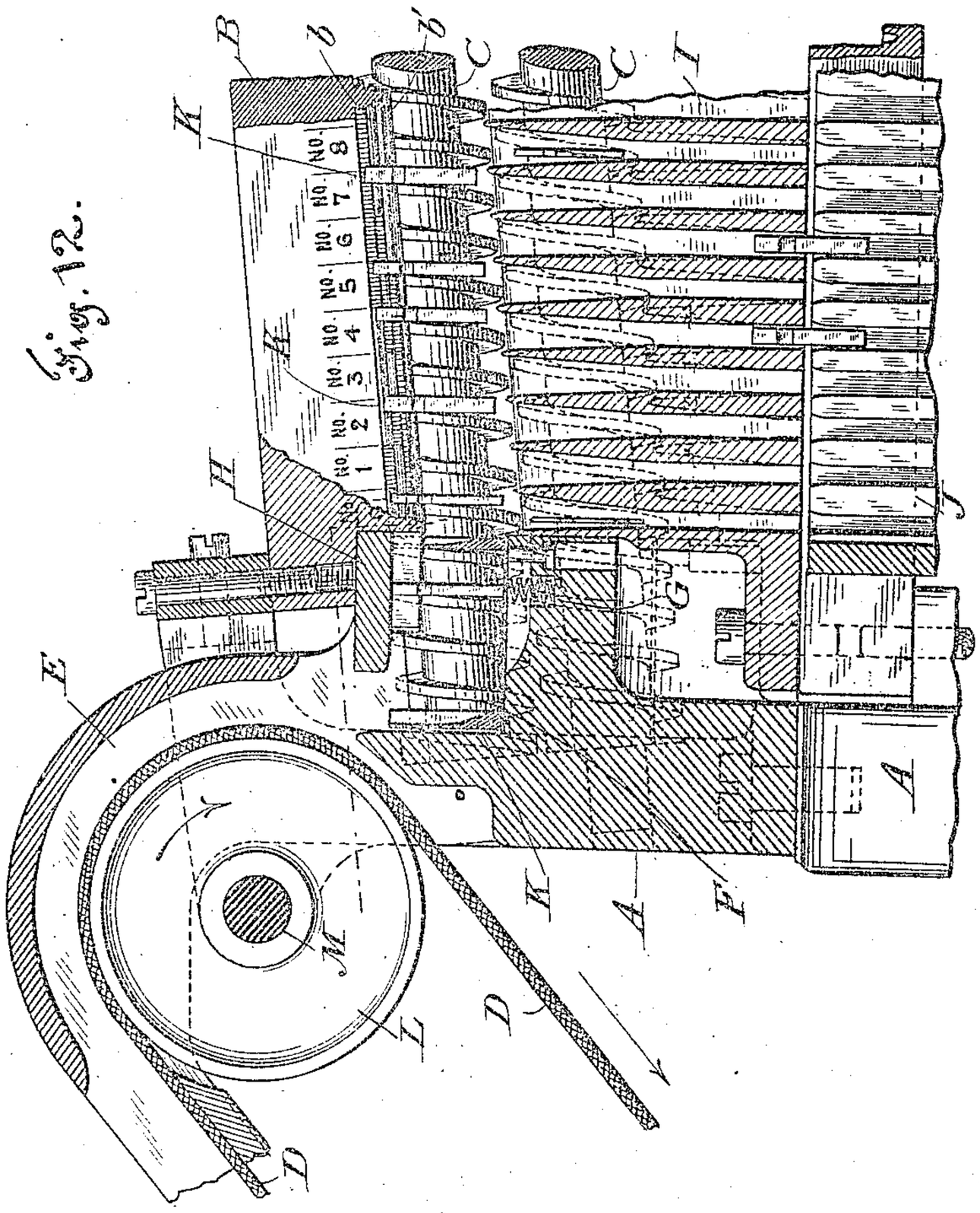


Fig. 1a.

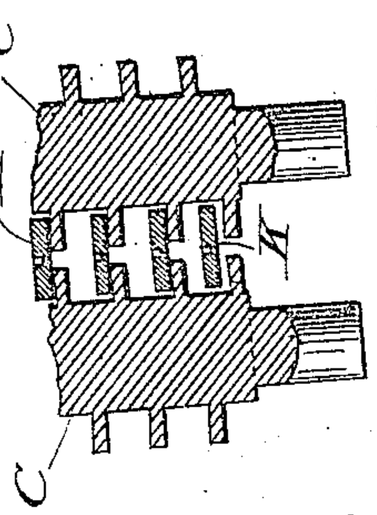
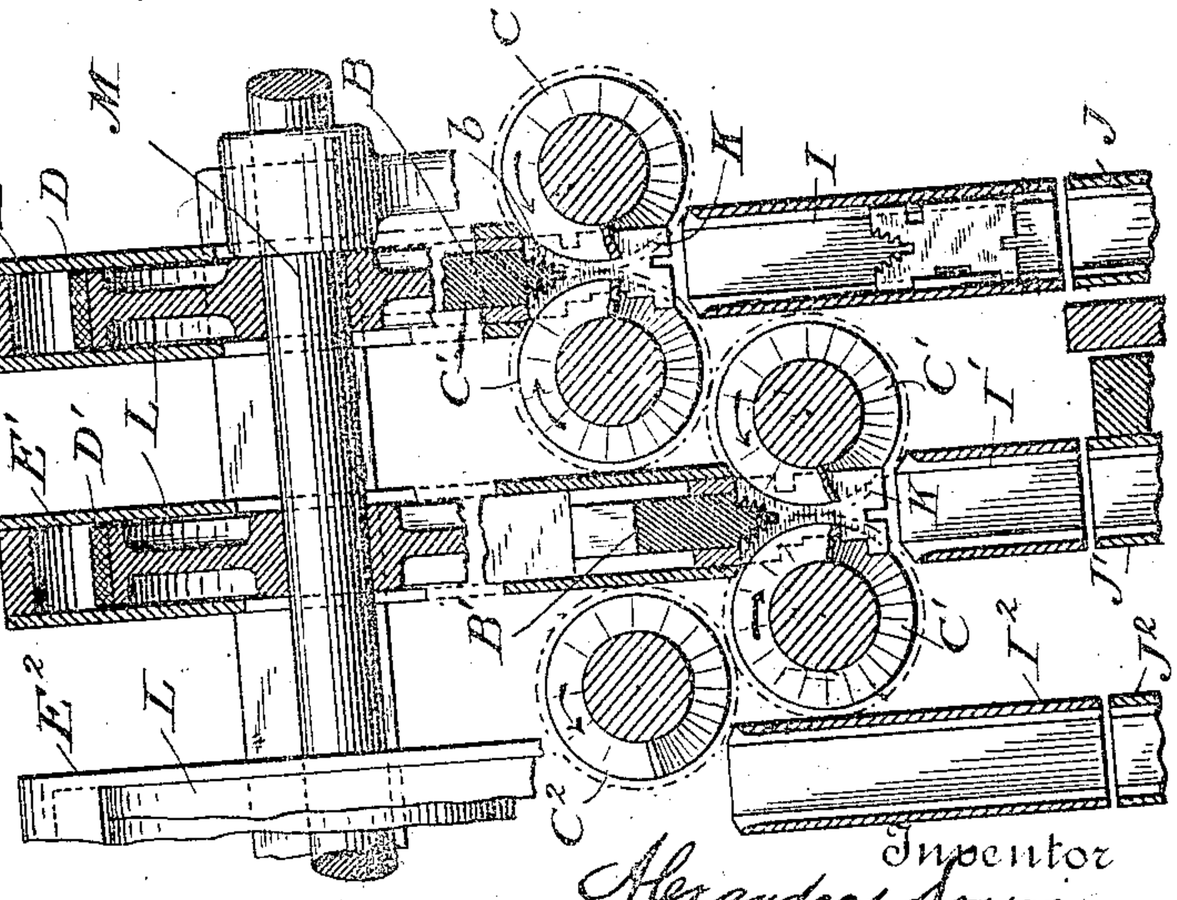


Fig. 13.



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4 SHEETS—SHEET 3.

Fig. 16.

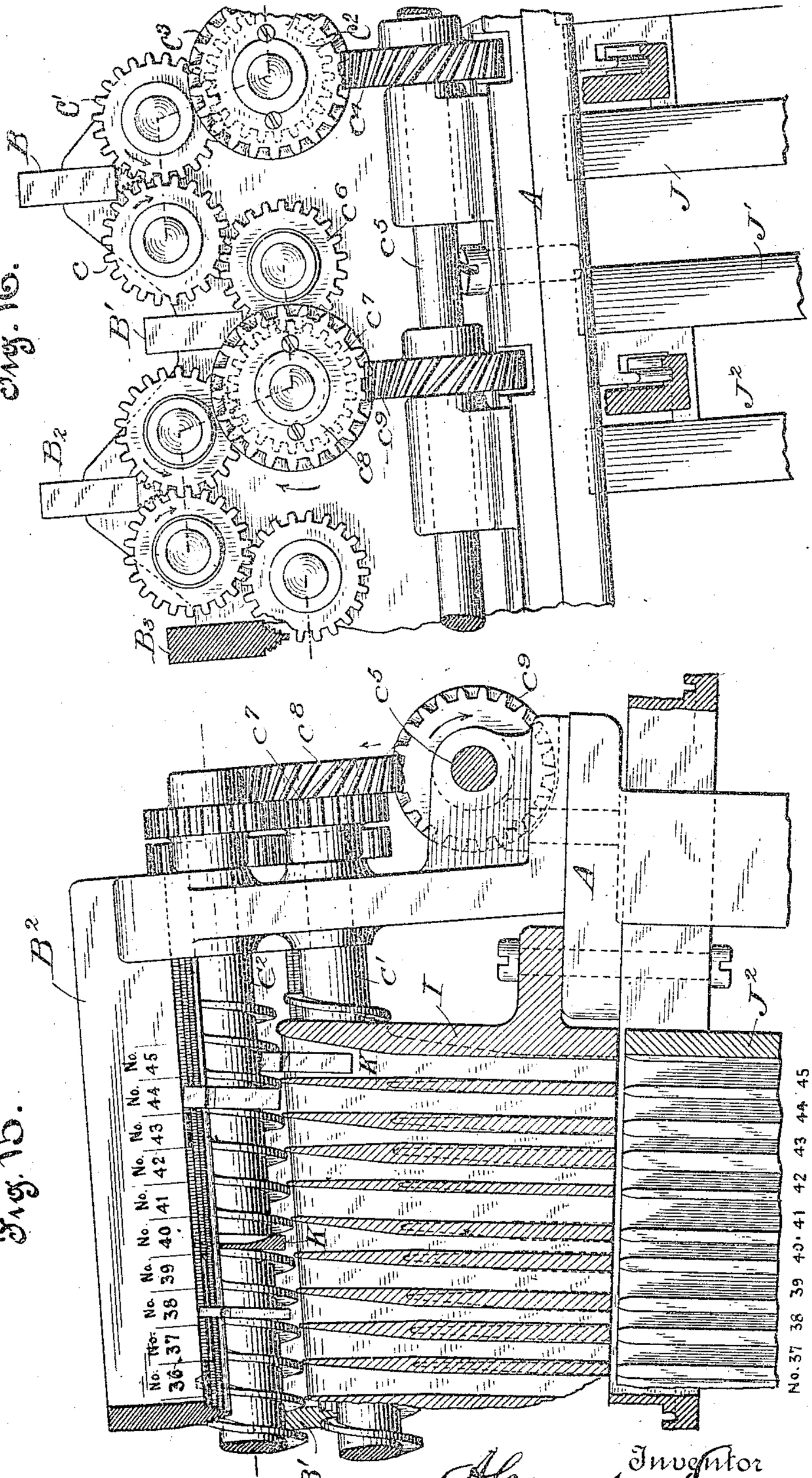

Fig. 15.

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4 SHEETS—SHEET 4.

Fig. 17.

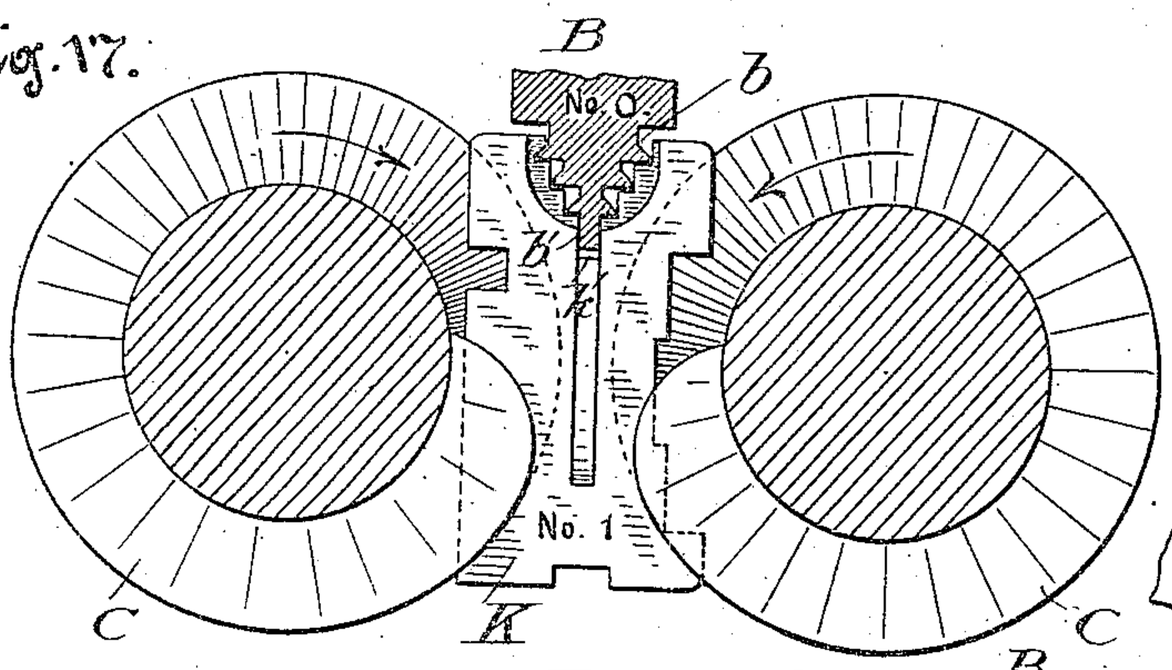


Fig. 21.

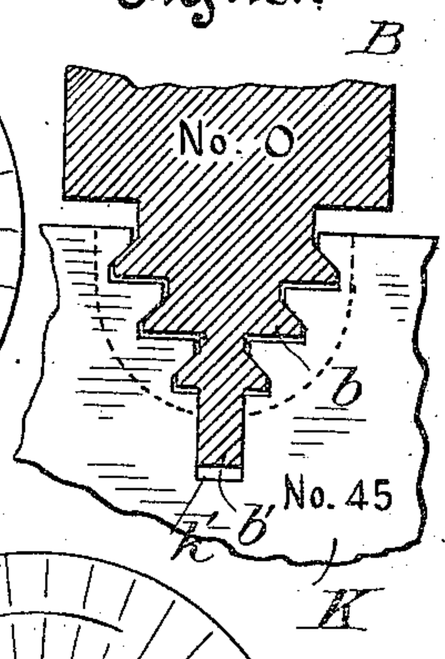
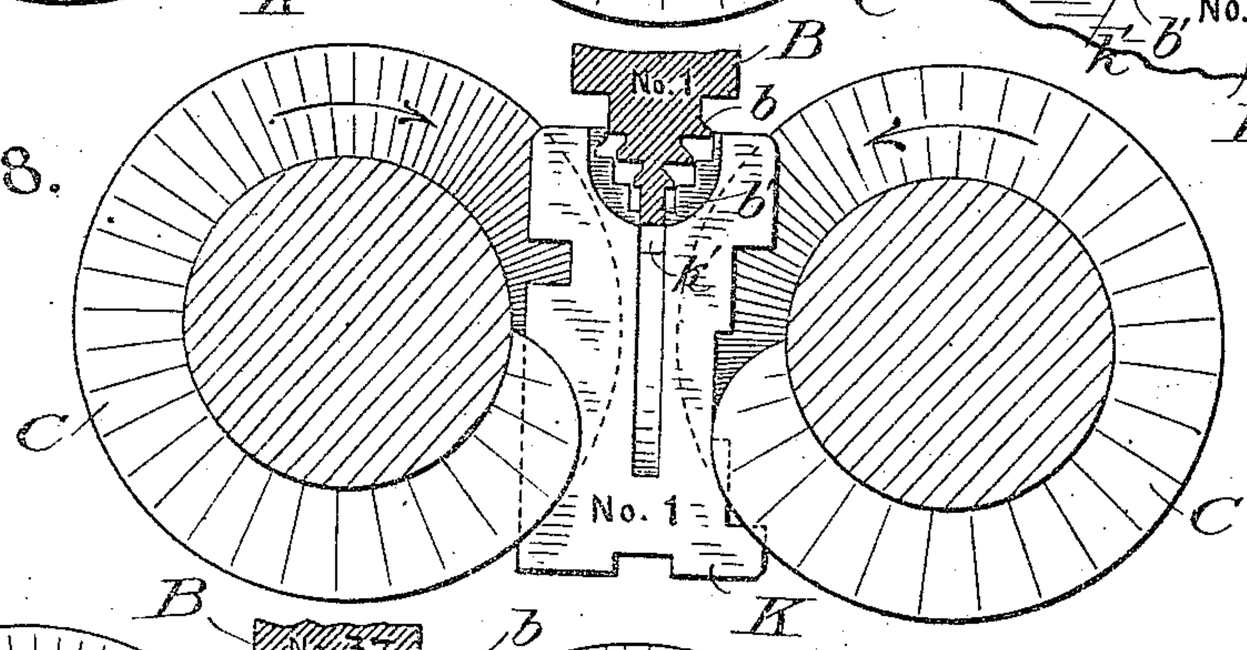


Fig. 18.



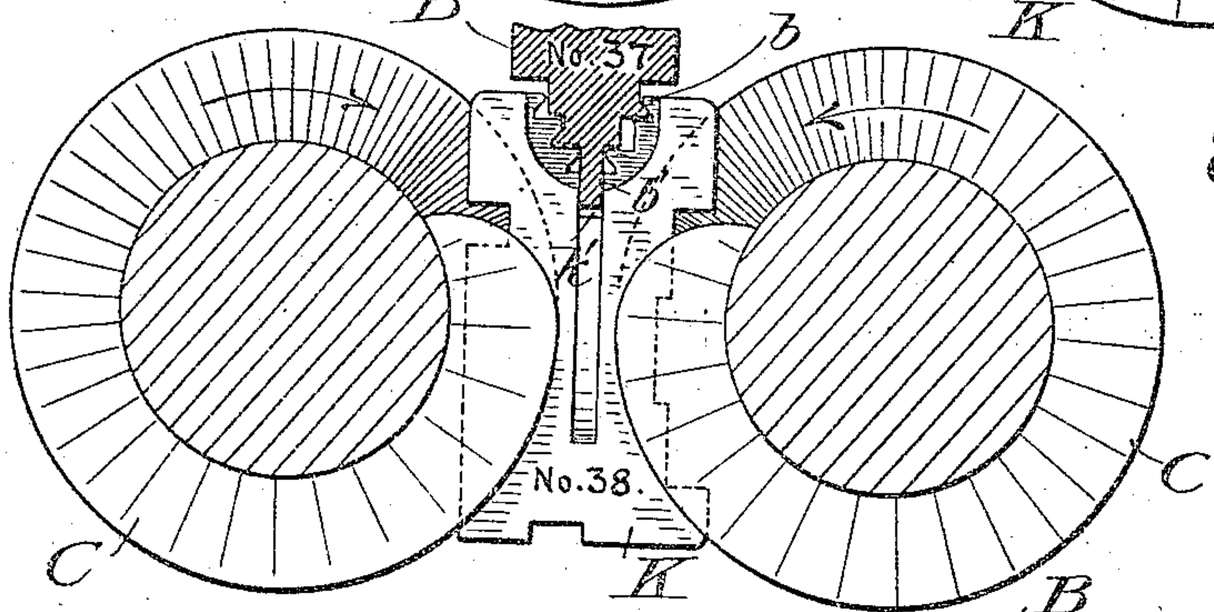
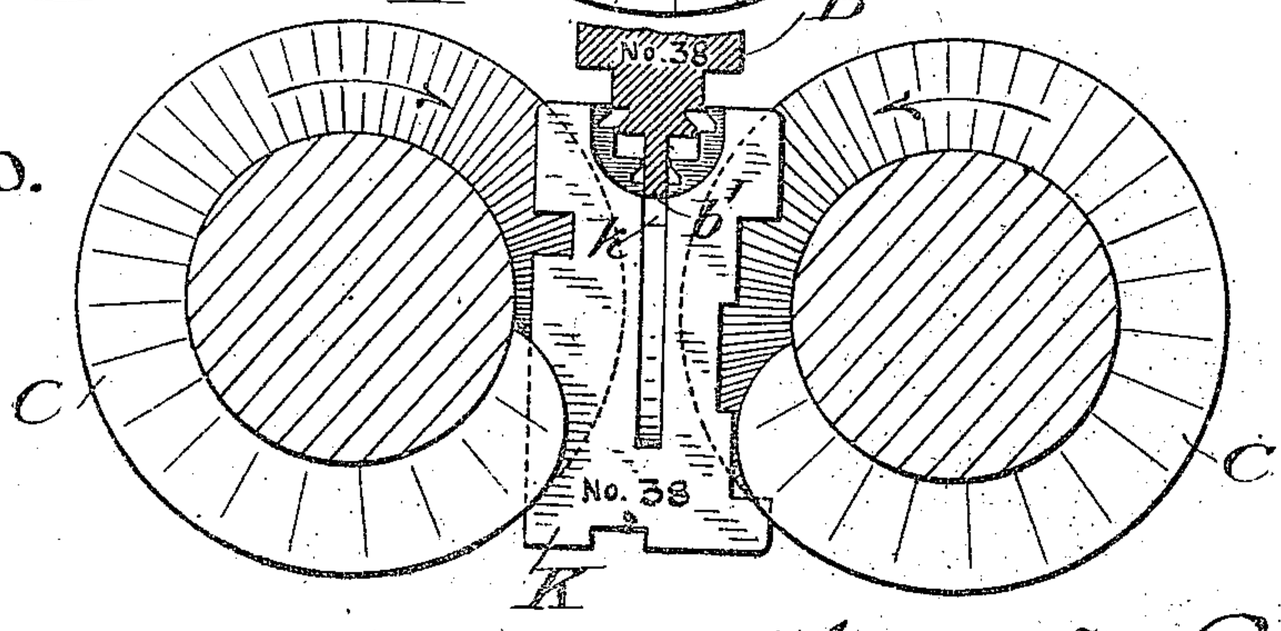


Fig. 19.

Fig. 20.



Witnesses.
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M. E. Smoot

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By his Attorney
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UNITED STATES PATENT OFFICE.

ALEXANDER DOW, OF NEW YORK, N. Y., ASSIGNOR TO MERGENTHALER LINOTYPE COMPANY, A CORPORATION OF NEW YORK.

LINOTYPE-MACHINE.

No. 886,585. Specification of Letters Patent. Patented May 5, 1908.

Application filed June 28, 1907. Serial No. 381,276.

To all whom it may concern:

Be it known that I, ALEXANDER DOW, of New York city, county of New York, and State of New York, have invented a new and useful Improvement in Linotype-Machines, of which the following is a specification.

This invention relates to mechanism for distributing matrices to their appropriate channels in a magazine or holder.

It is intended more particularly for use in linotype machines, but is applicable wherever matrices, dies or type of sufficient size are to be assorted or distributed.

My distributer resembles in appearance that described in the U. S. patents of Ottmar Mergenthaler, Nos. 347,629 and 436,531, the matrices being provided in their upper ends with distributing-teeth in various combinations, whereby they are suspended from the lower edge of a distributer-bar having longitudinal teeth in various combinations, so that each matrix is sustained until it arrives over its appropriate channel, and then released by the disengagemnt of all its teeth so that it may fall to its place in the magazine.

In the Mergenthaler distributer, each matrix was provided in opposite sides of the notch in its upper end, with two like combinations of teeth, or in other words, the teeth were symmetrically arranged and the opposing combinations on opposite sides of the distributer-bar were also symmetrical.

In commercial machines, it is impracticable to reduce the distributer-teeth below a certain size, and it is necessary to allow a certain clearance between the teeth of the distributer and those of the matrices. For these reasons it was necessary to make the distributer-bars and the matrices of the Mergenthaler machines of larger size than was desired.

One of the principal aims of my invention is to so arrange the distributing-teeth that a small number of large teeth may be arranged in a limited space without decreasing the number of combinations.

To this end it consists broadly in a distributer having opposed unsymmetrical combinations of teeth, that is to say, combinations which are unlike or dissimilar as to the number or relations of the teeth, or both. In other words, I differentiate the opposing combinations of teeth both in the matrices and on the distributer-bar. In this manner I am enabled to secure, by a small number of longitudinal teeth on the bar, the same results that are obtained by double the number of teeth in the Mergenthaler system.

Another feature of my invention resides in the peculiar arrangement of screws for advancing the matrices along the bar, the screws being so inclined and so arranged in relation to the matrices that the thread of a single screw on each side will bear upon the matrix for the greater portion of its length, so that it is unnecessary to use, as in the Mergenthaler machines, two screws for feeding the upper end of the matrices, and a third screw for feeding the lower end.

My invention also embraces improved devices for delivering the matrices in a downward instead of an upward direction between the feed-screws preparatory to their transfer to the distributing-bar.

My invention also includes a special arrangement of pairs of distributing-screws at different levels in such manner as to admit of several magazines being brought together in close order.

As my improvements are applicable not only to Mergenthaler machines but to analogous typographic machines, I have restricted the drawings to those parts which are immediately associated with the distribution of the matrices. All other parts of the machine being foreign to the invention, may be of any ordinary or suitable construction.

In the drawings,—Figure 1 is a side elevation of a distributer-bar constructed in accordance with my invention. Fig. 2 is a cross-section of the same on the line 2—2, Figs. 1, 3 and 4. Figs. 3 and 4 are side elevations of the receiving end of the distributer-bar as viewed from opposite sides. Figs. 5, 6, 7, 8, 9, 10 and 11 are cross-sections on the correspondingly numbered lines of the preceding figures. Fig. 12 is a longitudinal vertical section through the lower receiving end of the distributer and magazine. Fig. 13 is a vertical section on the line 13—13 of Fig. 12, three magazines being shown side by side. Fig. 14 is a cross-section on the correspondingly numbered lines of Figs. 12 and 13. Fig. 15 is a longitudinal vertical section through the upper end of the distributer and magazine. Fig. 16 is an end elevation of the parts shown in the preceding figure. Figs. 17, 18, 19, 20 and 21 are cross-sections on an enlarged scale through the distributer and adjacent screws, illustrating

the manner in which the matrices are suspended and released.

In the drawings, I have shown my invention incorporated in a machine having three magazines, each of which may be adapted to receive the matrices for a font or for an alphabet, as desired, and each having its individual distributer; but it will of course be understood that so far as the distributing devices are concerned, they may be used in connection with a single magazine.

Referring to the drawings, A represents a portion of the main-frame, which may be of any design and construction desired, provided it is adapted to sustain the operative parts.

B, B′, &c., represent the stationary distributer-bars having an upward inclination from their receiving ends.

C, C′, &c., represent the carrier-screws arranged in pairs along opposite sides of the distributer-bars and mounted at their ends in the main-frame.

D, D′, &c., represent carrier-belts by which the matrices are elevated at delivery one after another through curved channels or guides E, E′, &c., in a downward direction between the carrier-screws.

F, F′, &c., are friction-plates underlying the receiving ends of the feed-screws for the purpose of receiving and sustaining the matrices as they are delivered from the belt, and maintaining them in position between the screws so that they may be advanced thereby toward the distributer-bar. The screws and the plates F are extended beyond the receiving end of the distributer-bar, as shown, and the plates F are urged upward by underlying springs G.

H, H′, &c., are plates fixed in position over the receiving ends of the screws and over the plate F. The plate H is shorter than the underlying plate F, and the incoming matrices fall past the plate H and upon the plate F whereon they are supported between the threads of the screws. The screws are constantly driven and serve to carry the matrices forward in upright positions between the plates H and F, which bear with light frictional effect on the upper and lower ends of the matrices. The matrices thus held and guided, are carried forward by the screws until they successively engage the teeth of the distributer-bar, from which they are suspended after passing beyond the plate F.

The distributer-bar is of V-form at its lower edge, and is provided with longitudinal teeth adapted to engage corresponding teeth in the upper end of the matrices which are notched or recessed to straddle the bar, the construction and operation of the parts in this respect being analogous to those in the well known Mergenthaler system.

I, I′, &c., represent channeled throats or entrances fixed in position below the distributer-bar, the channels being spaced to correspond with the distances between the points at which the distributer-bar releases the matrices, so that the falling matrices will enter the respective channels.

J, J′, &c., represent the vertically channeled magazines removably seated in the machine beneath the throats I, I′, &c., with their channels in position to receive the falling matrices.

The distributer-bar has its longitudinal distributing teeth *b* divided into short groups or combinations each differing from the others as to the number or relative arrangement of the teeth, or both, and the matrices containing the different characters have their teeth permuted or arranged to correspond, so that each matrix, carried along the bar, will be held in suspension by the teeth until it arrives over the appropriate channel in the magazine, when, for the first time, all of the matrix teeth will disengage from the bar and the matrix be permitted to fall.

In the Mergenthaler distributer, each group or combination of teeth is symmetrical; or in other words, it consists of a given combination duplicated on opposite sides of the bar, one side of the bar being a counterpart of the other. The matrices are of course constructed with symmetrical combinations of teeth. It follows, as a consequence, that the number of combinations allowable on the bar are those which may be obtained on either side. In order, therefore, to obtain the requisite combinations, it is customary in the Mergenthaler machine to provide the distributer-bar with seven teeth on each side, and in order to admit of these teeth being made of a practical size and of the requisite clearance being given them in the matrices, both the bar and the matrices must be made of relatively large size. My construction differs from that of Mergenthaler in that I use the bar with opposing unsymmetrical combinations of teeth. In other words, I use on one side of the bar one series of combinations, and on the opposite side a different series of combinations, so that at most points the bar will present in cross-section unlike forms on opposite sides, as shown for example in Figs. 2, 6, 7, 9, 10 and 11.

The matrices K have a V-shaped notch in their upper ends with teeth in its two edges, so that they may straddle the lower edge of the bar and their teeth engage those of the bar, as shown in the various figures. The matrices, or most of them, are also made with unsymmetrical combinations of teeth and a central notch *k′* in the upper end below the lowermost teeth.

The distributer-bar is provided with a central unbroken rib *b′* along the lower edge and below the lowermost teeth to enter the notch in the matrices, and this for the purpose of guiding them and maintaining them in the

vertical position when the teeth on one side disengage while those on the opposite side are still in engagement.

The combinations of teeth on the bar and in the matrices are so related that as each matrix is carried along the bar, the individual teeth of the matrices on either or both sides may be disengaged and reëngaged. The reëngagement is such, however, that the matrix is continually sustained from one or both sides by one or more teeth on either or both sides, until it arrives at the point where it is to be released, when, for the first time, all of the teeth on both sides will be disengaged.

It will be observed that by using opposed combinations which are unlike but which cooperate in sustaining the matrices, I am enabled to secure a very large variety of combinations in the length of the bar while using a small number of teeth on each side. Obviously the number of combinations possible is very much greater than it would be if they were alike on opposite sides of the bar. It is this fact which permits the use of a small number of teeth and which consequently permits the teeth in the allowable space to be made much larger than otherwise.

The combinations shown in the drawings are merely illustrative of my principle of construction. They may be varied and increased in number to any extent. As their development is a mere matter of mathematics within the limits of technical skill, it will be deemed unnecessary to describe them further herein.

It will of course be understood that a limited number of the matrices may have symmetrical combinations of teeth provided to coöperate with unsymmetrical combinations on the bar; and also that symmetrical combinations on the bar may coöperate with unsymmetrical combinations in the matrices. In a great majority of the combinations, however, they must be unsymmetrical as to both the bar and the matrices.

It is frequently desirable to adapt a machine to carry two, three or more sets or fonts of matrices, and for this purpose I propose to use, as shown in the drawings, a number of parallel magazines, preferably in a vertical position, a distributer and pair of feed-screws being arranged over each magazine.

In order to permit the magazines to be arranged near one another to keep the machine within reasonable size without causing interference between the different distributer-screws, I adopt the arrangement shown in Figs. 12, 13, 15 and 16, the alternate or successive magazines having their upper ends terminated at different heights so that the distributer and feed-screws of one magazine may be set above those of the adjoining magazine in order that the feed-screws of one pair may overlap or lie above those of the adjoining pair. It will be observed that this admits of the parts being brought together in a very compact arrangement without causing interference.

The pulleys L which carry the feed-belts D, may all be mounted on a common shaft M, but the throats E, E′, through which the matrices are delivered, will be continued downward as the levels of the respective distributers may demand.

Reference has already been made to the fact that the distributer-bars and the feed-screws have an upward inclination from the receiving end; the inclination is such that the faces of the threads which act upon the matrices will stand in vertical planes. By using for each distributer two screws only, and by giving their threads a great depth and arranging the screws with their axes in a horizontal plane passing through the middle of the matrices, I give the screws a broad or extended bearing on the matrices, so that they are carried forward positively along the distributer-bar with little or no tendency to vibrate or chatter as they pass from one combination of teeth to another.

On reference to Fig. 13, it will be seen that the screws engage the matrices for the greater part of their length, or in other words, that they act upon both the upper and lower ends of the matrices. This arrangement, which I believe to be new, avoids the necessity for the third or bottom screw, which is necessary in the Mergenthaler machines, because the upper screws act only on the upper ends of the matrices.

While it is not necessary, I prefer to bevel or undercut the faces of the threads which act against the matrices, as shown in Fig. 14. In other words, I make the threads concave on their active faces. This not only reduces the extent of the bearing surface and the friction upon the matrices, but admits of the matrices lodging more firmly against them as they are being advanced.

While I prefer to make use of the screws, it will of course be understood that any other suitable means may be employed for carrying the matrices along the distributer-bar. It will also be understood that the number of teeth used on the distributer-bar and in the matrices, and the sectional form of these teeth, may be modified at will, provided only they are adapted to properly sustain and release the matrices.

The feed-screws may be driven in any suitable manner. In the drawings, I provide one pair of screws with intermeshing pinions c and c', the latter being in turn actuated by the pinion c^2 on a common axis with the spiral gear c^3, which receives motion from the spiral pinion c^4 on a driving shaft c^5. The pinion c in like manner receives motion through pinion c^6 from the pinion c^7 on a com-

mon axis with a spiral gear c^8, which also receives motion through a spiral pinion c^9 on the shaft c^5 before mentioned. The pinion c^7 will serve also to communicate motion to a pinion on a second pair of screws, and this arrangement may be repeated throughout the system.

By the expressions "unsymmetrical combinations," "unsymmetrical arrangements," and the like, used herein, is meant combinations which differ as to the number of teeth therein, or as to the relative positions of the teeth, or both.

The matrices herein shown will form the subject of a separate application for Letters Patent, and are not claimed as a part of the present invention.

Having described my invention, I claim and desire to secure by Letters Patent:—

1. A distributer having longitudinal teeth arranged in opposing dissimilar combinations.

2. A distributer-bar having opposed unlike combinations of teeth.

3. A distributer-bar having two dissimilar series of longitudinal teeth, in combination with matrices each having dissimilar arrangements of teeth.

4. A distributer-bar provided on opposite sides with unlike combinations of teeth and with a longitudinal rib below all the teeth, in combination with matrices having their upper ends notched to embrace said rib, and provided with unlike combinations of teeth, substantially as described.

5. A distributer-bar provided on opposite sides with dissimilar combinations of teeth, and also provided with means to prevent the matrices from swaying transversely of the bar.

6. In a distributing mechanism, an inclined longitudinally toothed distributer-bar and toothed matrices adapted for suspension from the bar, in combination with two adjacent inclined feed screws constructed and arranged to engage the matrices throughout the greater part of their length.

7. In a distributing mechanism, and in combination with the distributer-bar, the feed-screws having the active faces of their threads undercut, substantially as described.

8. The feed-screw for a distributing mechanism, having threads undercut or concave on one side, substantially as described.

9. In a distributing mechanism, the combination of a distributer-bar adapted to sustain and carry the matrices, and two opposed feed screws having their axes in a horizontal plane passing through the middle portion of the matrices.

10. In a distributing mechanism, the combination of the toothed distributer-bar, the feed-screws extended beyond the bar, the plate F underlying the extended end of the screws, and a belt D arranged to deliver the matrices successively upon said plate between the threads of the screws.

11. In a distributing mechanism, the combination of the distributer-bar, the adjacent feed-screws extended beyond the bar, means for delivering the matrices in a downward direction between the threads of the screws, means for sustaining the matrices between the screws during their advance toward the bar, and means for applying friction to the matrices during such advance.

12. In a distributing mechanism, the combination of the distributer, feed-screws extended beyond the bar, means for delivering the matrices between the threads of the screws, an underlying plate F to sustain the matrices, and an overlying plate H to act upon their upper ends.

13. In a distributing mechanism, the combination of the distributer-bar, the feed-screws extended beyond the bar, means for delivering the matrices between the threads of the screws, an overlying plate H and an underlying spring-supported plate F; whereby the matrices are sustained and guided steadily to the distributing-bar.

14. The combination of a distributer-bar, the feed-screws extending beyond the bar, means for sustaining the matrices between the screws and for exerting a frictional resistance upon them during their advance to the bar.

15. The combination of a distributer-bar, adjacent screws for delivering the matrices to the bar, and friction devices to resist and guide the matrices during their advance.

In testimony whereof I hereunto set my hand this twentieth day of June, 1907, in the presence of two attesting witnesses.

ALEXANDER DOW.

Witnesses:
G. W. Bird,
Frank C. Jones.