

No. 656,444.

Patented Aug. 21, 1900.

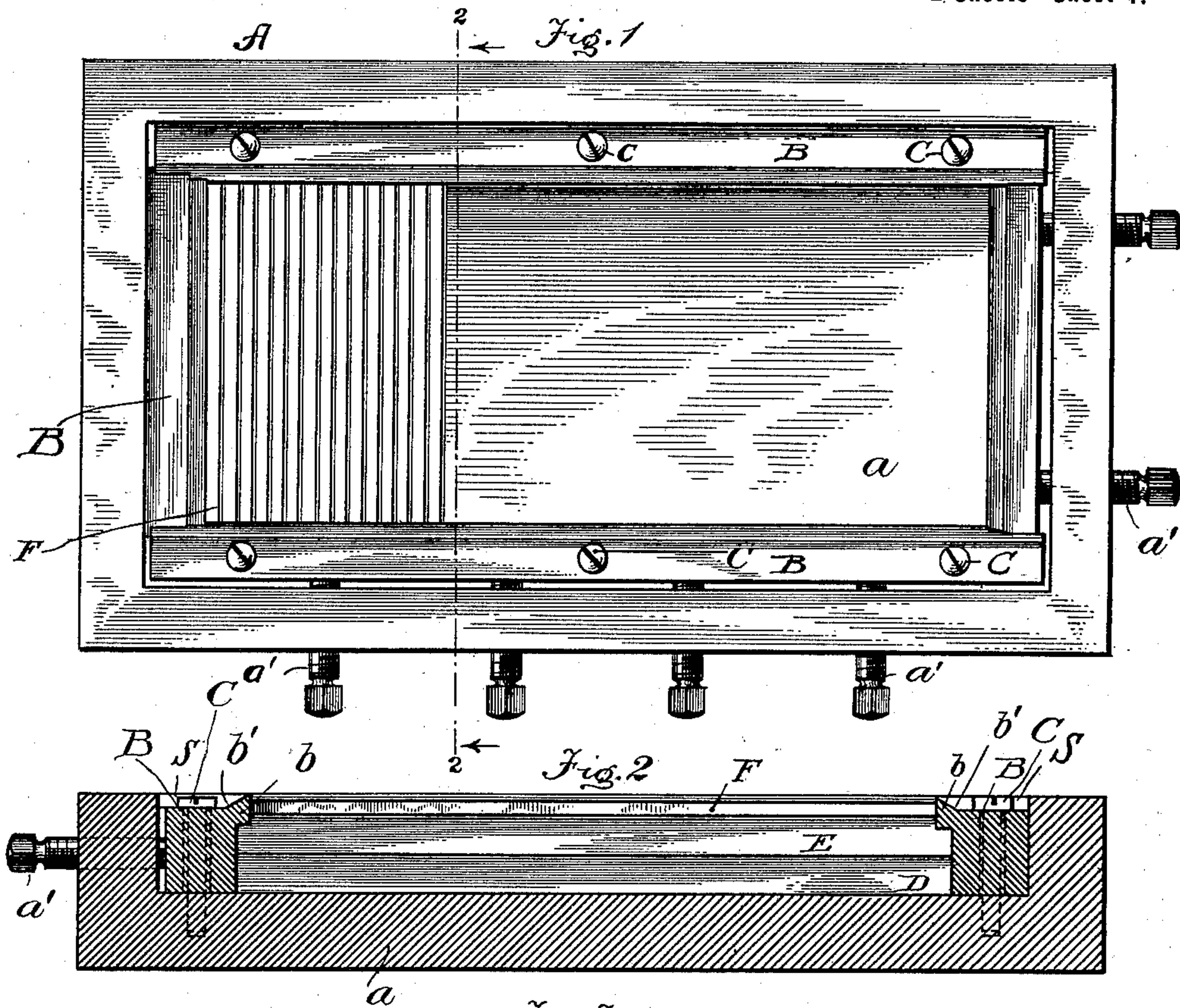
J. S. DUNCAN.

MOLD FOR MAKING RUBBER TYPE.

(Application filed Mar. 12, 1900.)

(No Model.)

2 Sheets—Sheet 1.



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2 Sheets—Sheet 2.

Fig. 6

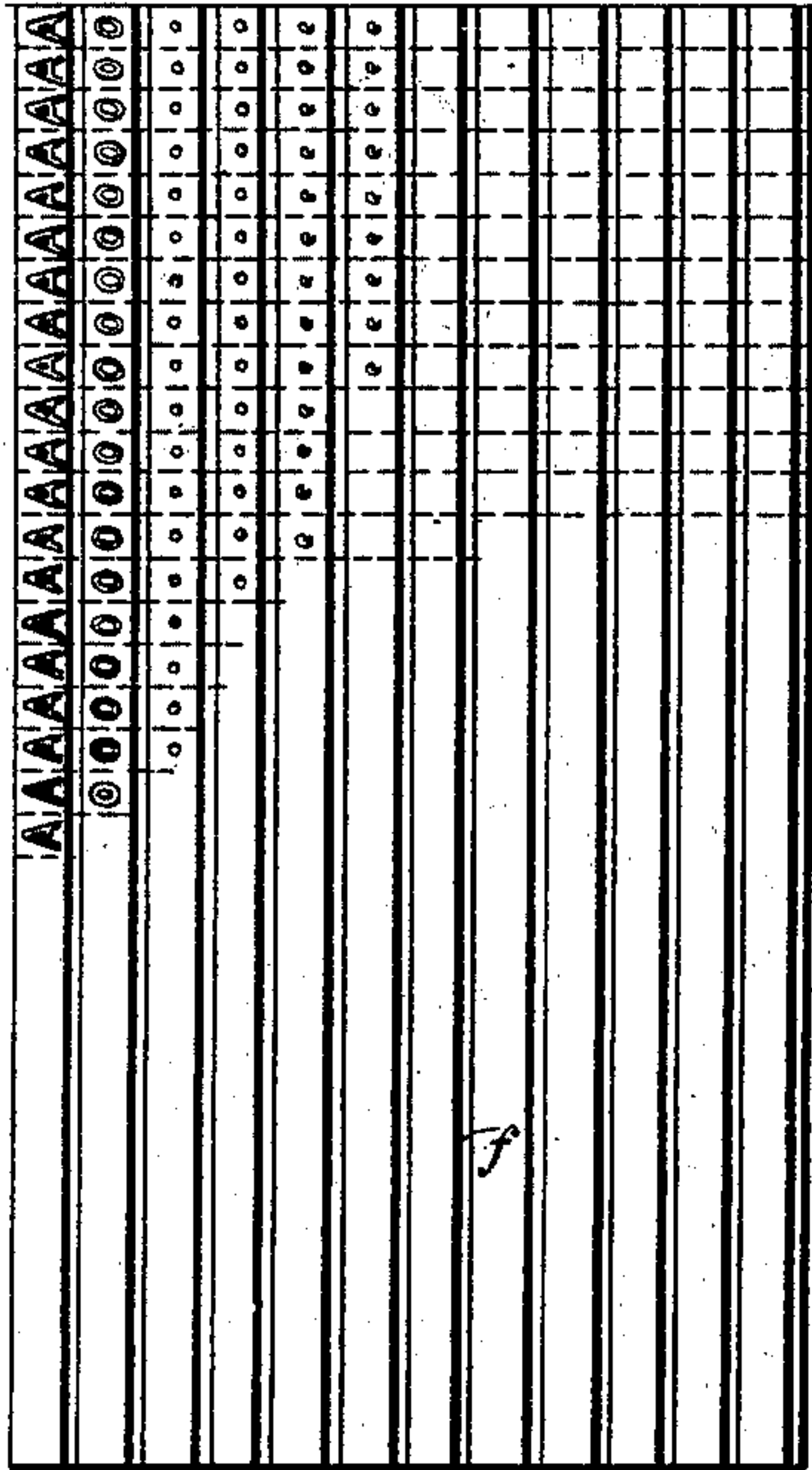


Fig. 8

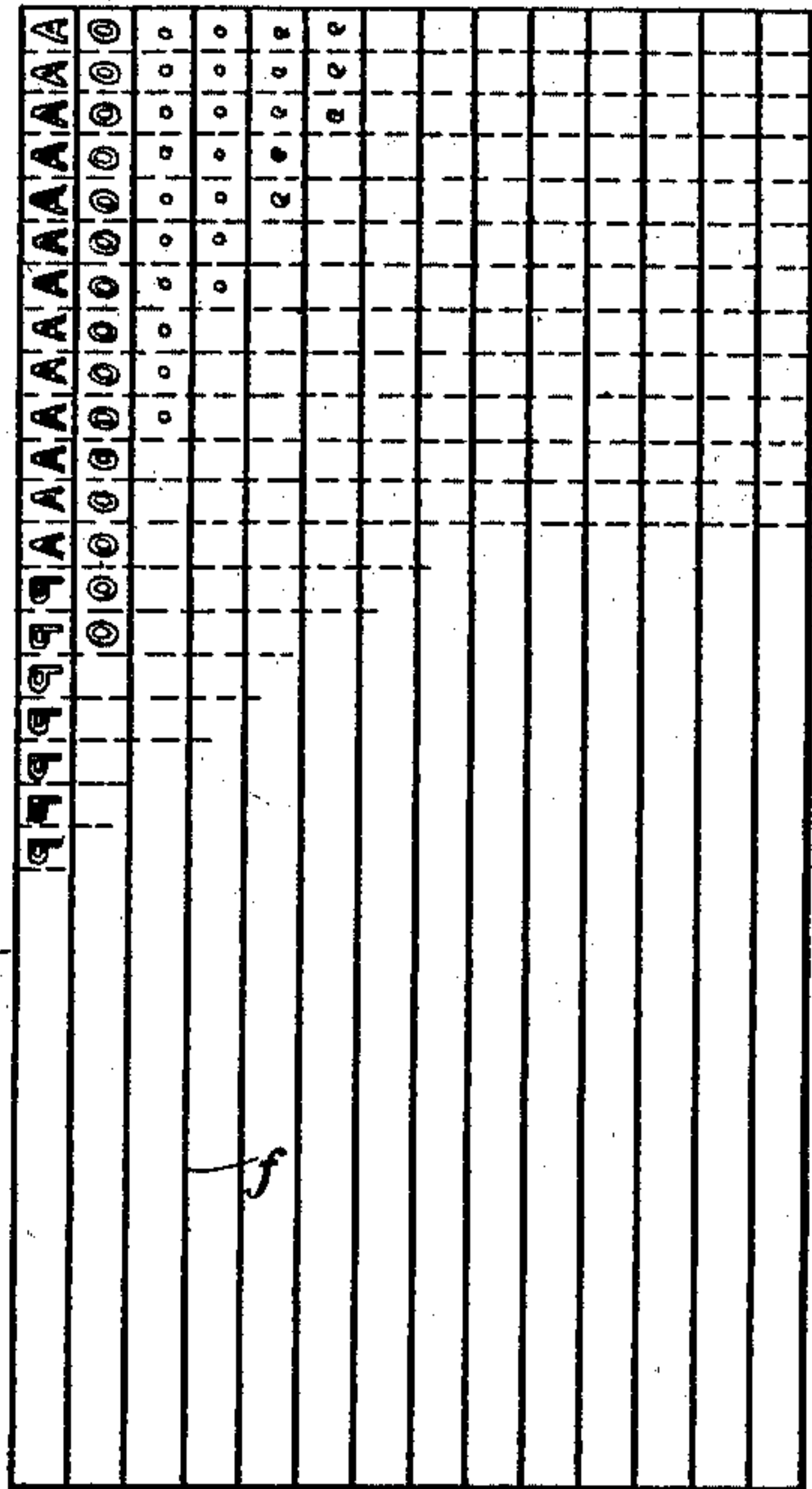


Fig. 7

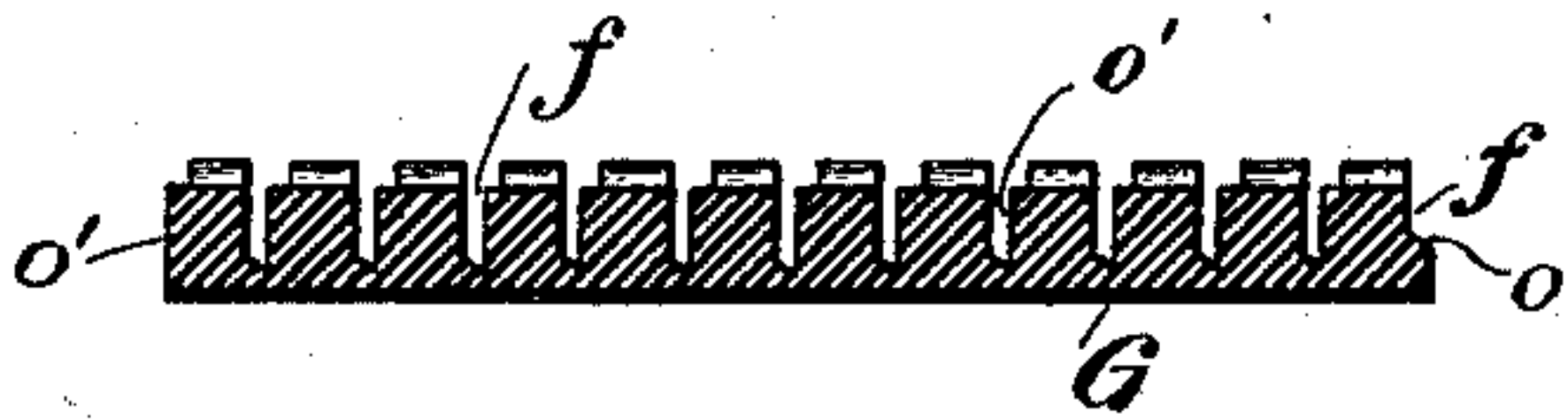


Fig. 9

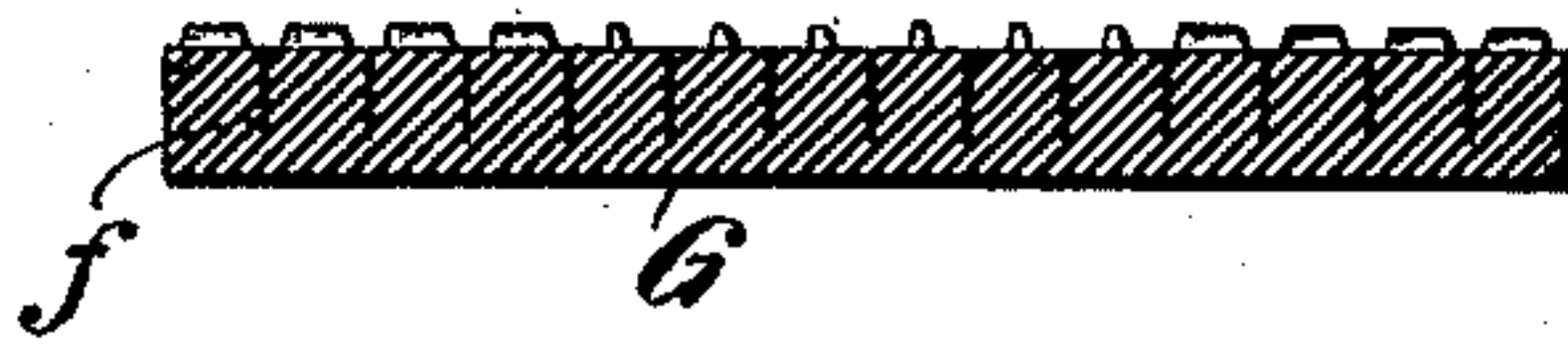


Fig. 11

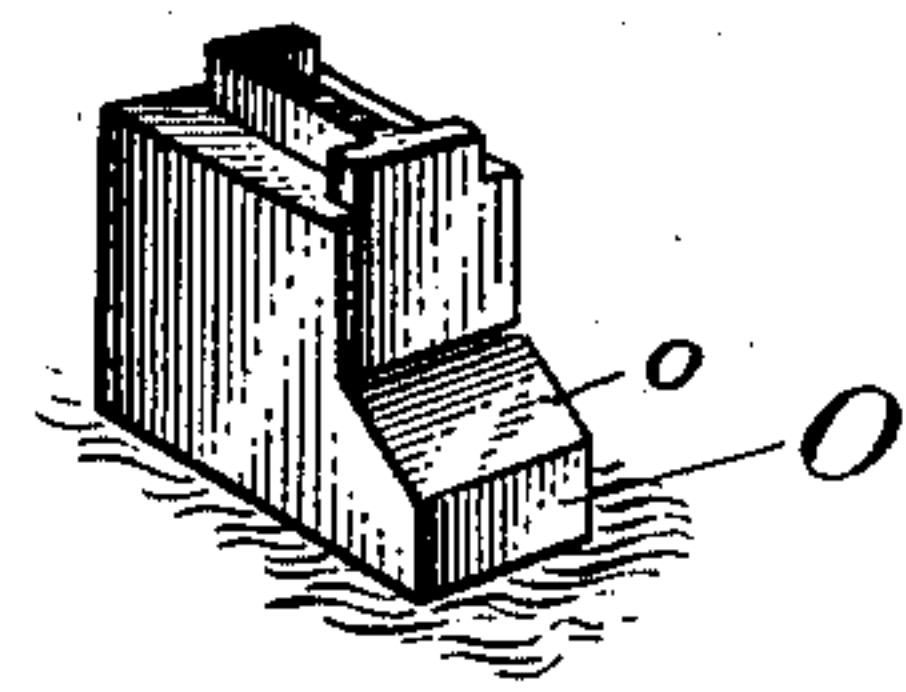


Fig. 12

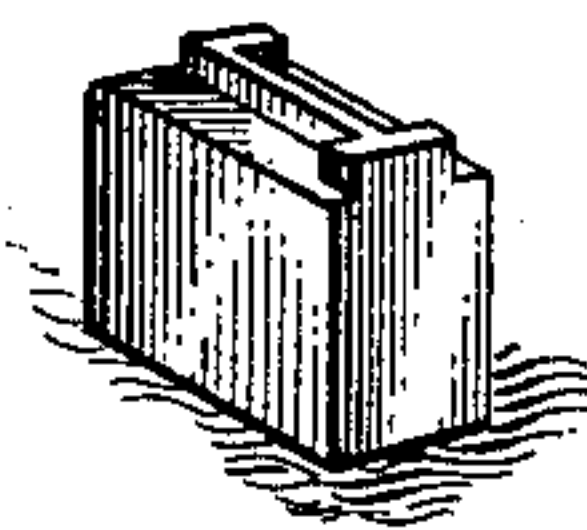
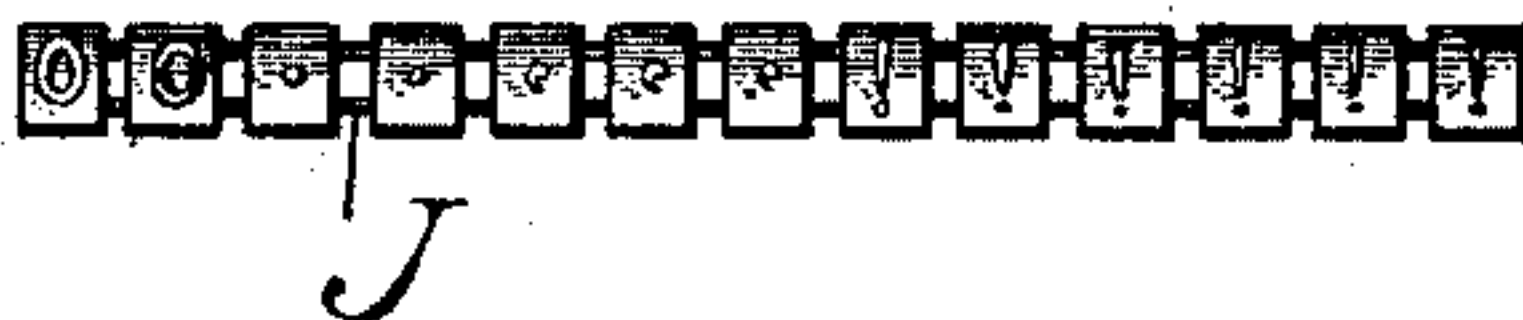


Fig. 10



Witnesses.

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UNITED STATES PATENT OFFICE.

JOSEPH S. DUNCAN, OF CHICAGO, ILLINOIS, ASSIGNOR TO THE ADDRESSOGRAPH COMPANY, OF SAME PLACE.

MOLD FOR MAKING RUBBER TYPE.

SPECIFICATION forming part of Letters Patent No. 656,444, dated August 21, 1900.

Application filed March 12, 1900. Serial No. 8,293. (No model.)

To all whom it may concern:

Be it known that I, JOSEPH S. DUNCAN, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Molds for Making Rubber Type, of which the following is a specification.

My invention relates to certain new and useful improvements in molds, and it is particularly adapted for the purpose of making rubber type in sheets, from which the individual type are afterward separated and used in various ways.

In the manufacture of type it is of the utmost importance that the body of every type should have a regular and uniform size, so that when the types are set up in a holder and a print is taken therefrom the line or lines of print will be perfectly straight and the letters properly spaced. Rubber type are largely used by merchants, gas and telephone companies, and many others who send out circulars, bills, and notices to the same persons frequently and keep their names and addresses set up at all times. In supplying these merchants and others with type it is customary to furnish a certain number of type bearing one character, a certain number bearing another character, and so on, the number or quantity of each type character varying according to the frequency of its use, as found by practical experience and known to the trade. In making the type, therefore, it is not usual to prepare an entire set of type whenever a few types of the set are desired; but, on the contrary, it is customary to make in one or more sheets as many types bearing a certain character as may be needed, and so on in this way until the required quantity of type is prepared, and in supplying additional orders the desired number of types bearing each character are made together, substantially in the manner indicated in Figure 6 of the drawings. It will therefore be observed that type bearing different characters may be and generally are made at different times and in different sheets, and therefore unless provision is carefully made to insure absolute accuracy and uniformity in the size and character of the type-body the line of type made up of individual types prepared

at different times will often produce a printed line in which the characters do not align properly and are not properly spaced. This bad result may be due to imperfect alinement of the matrices from which the types are formed and also in a large measure to the elastic material of which the types are made, which renders it more or less difficult to separate them properly, and to the degree of care with which the separating operation is performed.

The prime object of my invention therefore is to make rubber type in quantities and in such a manner that when separated the bodies of the type will be regular and even and uniform in character, with smooth and finished sides, so that a line of type will be perfectly straight and accurately spaced.

Another object of the invention is to provide for making a sheet of rubber type marked in such a way that the types can be easily separated on regular and fixed lines without the exercise of any particular or special skill and so that the bodies of the type will be uniform throughout.

A further object of the invention is to provide suitable devices for maintaining the matrix-bars in proper position at all times for producing lines of type of uniform height and with bodies of uniform size and regular outlines; and a further object is to provide for disposing of surplus rubber during the vulcanizing operation, so that the sheet of type and the types thereon will be perfectly formed with clean sharp characters.

My invention also has other objects in view which will be fully pointed out and described hereinafter.

In the accompanying drawings, Fig. 1 is a top plan view of my improved mold, showing part of a form arranged therein. Fig. 2 is a transverse sectional view on the line 2 2 of Fig. 1. Fig. 3 illustrates a base-bar, a matrix-bar, and a strip arranged together in proper relation. Fig. 4 is a sectional view of one end of the mold and showing comparatively-thick strips F with beveled upper edges. Fig. 5 is a similar view showing comparatively-thin metal strips. Fig. 6 illustrates a sheet of rubber type made in accordance with my invention and by employing the thick strips. Fig. 7 is a transverse sec-

tional view of the sheet shown in Fig. 6. Figs. 8 and 9 are views corresponding to Figs. 6 and 7, but showing a sheet provided with narrow slits made by the thin strips. Fig. 10 illustrates a line of type stretched to show how it is connected together and adapted to be pulled apart, as desired. Figs. 11 and 12 show single types produced from the sheets illustrated in Figs. 6 and 8, respectively.

Referring to the drawings, in which like letters of reference denote corresponding parts in all the figures, A designates a mold-frame of rectangular shape provided, preferably, with a bottom *a* and having a number of set-screws *a'* for the purpose of securing the form in place in the mold-frame. Spacing-bars B are arranged within the sides of the frame to surround the form, and these spacing-bars are provided with inclined upper faces, which make the inner edges of the bars higher than the outer edge. I have found it sufficient to provide a short incline *b'* on the upper face of the spacing-bars, as shown in the drawings, although the size of the incline and the depression or recess or space formed thereby may be varied, as desired. The incline is formed on the end spacing-bars, preferably as shown in Fig. 4, and the side spacing-bars are provided with ribs *b*, which fit in recesses *c* at the ends of the matrix-bars to maintain them in perfect alinement with each other. The rib may be dispensed with, although I prefer to use it, and when it is used the incline is formed on the upper side or face thereof and terminates where the rib merges into the body proper of the side spacing-bars. The inner edge of the spacing-bars, therefore, which bounds the form, is higher than the rest of the upper face of the spacing-bars, and this forms a recess or depression or space on the top of the spacing-bars and beneath the plunger of the press during the vulcanizing operation to receive surplus rubber which runs over the high inner edge of the spacing-bars and down into the depression, where it cools and solidifies. The spacing-bars are held in place in the mold-frame by means of screws C, the screw-holes in said bars being of large size to permit of the required adjustment of the bars. A number of metal base-bars D, of uniform size, are arranged within the mold-frame to receive a corresponding number of matrix-bars E. The particular method and means of making these matrix-bars does not form an essential part of this invention; but I have found it desirable to make them by bringing steel type against an aluminium bar under sufficient pressure to produce a clear and perfect impression of the type in the face of the bar. The bar is then shaved down to the desired size, if this step is found necessary, after the impression operation and is then placed in the mold-frame upon one of the base-bars.

Between each pair of matrix and base bars is a metal strip F, preferably of steel, which projects above the matrix-bars, as shown in

Figs. 4 and 5, a sufficient distance to form a slit *f* partially through the rubber sheet G, as shown in Figs. 7 and 9. I do not restrict myself to a strip of any particular height, because the slit formed thereby may be of any depth and come within the purview of my invention, it being necessary only to have a definite line or impression or slit to form a guide for the severing-tool. If it is desired to produce the type with a shoulder or offset O, as shown in Fig. 11, I employ the thick strips illustrated in Fig. 4, and the upper face of the shoulder or offset may be made flat by providing a square-edged strip, or it may be inclined, as indicated by *o* in Fig. 11, by employing the beveled-edged strip shown in Fig. 4. To provide type with plane sides, as shown in Fig. 12, I use the thin strips illustrated in Fig. 5. Other changes in the character of the strips may be made without departing from my invention.

The method of making type with my improved mold is as follows: When the desired number of matrix-bars have been arranged in the mold-frame in the manner just described and the form is complete, the screws *a'* are tightened and a sheet of unvulcanized rubber placed on the form and then subjected to heat and pressure in a press of any suitable construction capable of exerting sufficient pressure for the purpose of producing the vulcanized rubber-type sheet G. Whatever surplus rubber there may be in the sheet runs over the sharp inner edges of the spacing-bars and then down the inclined upper faces on the bars and finds a place to accumulate and solidify in the recess or depression, the plunger of the press reaching the limit of its stroke when it engages the upper face of the mold-frame, which is on a level with the inner edge of the spacing-bars, as shown in Fig. 2. It will therefore be observed that the surplus rubber cannot accumulate in any place where it will interfere with the plunger of the press completing its stroke, and therefore a type-sheet of substantially the same thickness throughout and with perfectly-formed type thereon is produced. Were it not for the fact that a depression were provided for the surplus rubber below the inner edge of the spacing-bars by reason of the inclined faces *b'* this surplus rubber would accumulate in places and make the pressure of the plunger of the press uneven and irregular; but the inclined faces permit the surplus rubber to run out of the way immediately and the pressure of the press is exerted uniformly on all parts of the sheet.

I prefer to make the base-bars of brass, the matrix-bars of aluminium, and the strips of steel, but do not limit myself to the use of these particular materials. The base-bars are of a constant and standard size and never vary in shape, and therefore form a substantial backing or foundation for the matrix-bars. The base-bars also maintain the strips in proper position at all times.

The slits are all made in the type-sheet in a perfectly-straight line equidistant from the types in the adjacent type-lines, so that every type in the line and every line in the sheet will be precisely the same size throughout. The slit constitutes the guide for the cutting-tool, and if followed properly there is no possibility of having some type of one thickness and some of another from the same sheet or from different sheets, as the base-bars preserve the uniformity of the mold and the sheets are alike. After the type-sheet has been prepared it is first cut on lines between the types across the slits *f* in a well-known manner (indicated in dotted lines in Figs. 6 and 8) without effecting an actual separation. The sheet is then cut on the lines of the slits *f* and separated into strips, Fig. 10, each containing a line of type, the types being so far severed by the first cutting operation (although preferably still connected by a slender thread *J* at the bottom) that they can be easily separated by pulling them apart. The sheet is not separated into strips at the first cutting operation in order that the character of the sheet may be preserved and so that it can be more easily cut in the second operation and also that the lines of type when separated may be preserved in a convenient form, Fig. 10, the types, however, being easily separable from each other. The slits form absolutely-correct lines of severance for the lines of type, and no particular care is required in cutting except to make the cutting-tool follow or fit in the slit properly, and the body of the type will be regular and uniform and have smooth sides.

In severing the type-lines (shown in Figs. 6 and 7) the cutting-tool is made to work close to the plane side *o'* of the type and in the angular corner formed by said plane side and the inclined face *o*; but the strips may be made so thin as to produce slits, as shown in Fig. 9, just wide enough to admit the cutting-tool. It is important that the first cutting operation between the types should be accurate to obtain a proper spacing of the type when set up in the frame or holder; but some slight variation in the spacing would not be near so important or noticeable as a variation in the line of type set up, and hence it is of the greatest importance to separate the lines of type of the sheet, so that the thickness of the type through from the upper side to the lower side shall be absolutely uniform, and this can be done by following the slits equidistant between the type-lines. When this is done, the types are necessarily of the same uniform size, and the character on each type-body is properly spaced in precisely the same position as the characters on all the other types made in accordance with this invention, and therefore all types made in accordance with my invention will be of the same standard and uniform size. As all types in each line of type are in perfect alinement

with those of all the other lines of type of the sheet, the first cutting operation between the types can be extended throughout the sheet instead of its being necessary to cut the sheet into sections first, as frequently happens with the old methods where a perfect alinement of all the types of a sheet is practically impossible. The sheets made in accordance with my invention, however, may be of any size and shape desired.

I have described the type made with my improved mold as being of uniform size, and this is the kind that I am now making extensively; but it will be understood that I may make logotypes and also other kinds of type in my improved mold with equally good results as to the character of the type. In making logotypes and types of the ordinary kind which vary in spacing, however, I would endeavor to follow the same method of alinement by arranging a number of matrices bearing the same type characters together, so that the sheet can be cut into sections, and then the same convenient method of separating the lines of type and the individual types heretofore described is practiced. It will also be understood that the mold may be used irrespective of whether the types of the form aline or are properly spaced or not, because the lines of type may then be first separated entirely and the individual types separated afterward; but the best results will be obtained by following the method of arranging the matrices and cutting the sheet, as heretofore described.

I do not claim in this application the process employed in making rubber type which I have described herein to some extent, as this invention forms the subject-matter of another application filed by me November 20, 1899, Serial No. 737,583.

Having thus fully described my invention, what I claim, and desire to secure by Letters Patent, is—

1. A mold for making rubber type in sheets comprising a frame having a bottom, matrix-bars arranged side by side in the frame, a metal strip between each pair of matrix-bars and projecting above the faces thereof to form slits in the type-sheet between the lines of type thereon and partially through the sheet, and means for securing the bars and strips rigidly in place in the frame, substantially as described.

2. A mold for making rubber type in sheets comprising a frame, matrix-bars arranged side by side in said frame, a metal strip secured between each pair of matrix-bars and projecting above the faces thereof to form slits partially through the type-sheet and between the lines of type thereon, and spacing-bars arranged around the matrix-bars and strips and having their upper faces in a plane above the matrix-bars, substantially as described.

3. The combination with a mold-frame, of matrix-bars arranged therein, and a metal

strip between each pair of matrix-bars provided with a beveled upper edge, substantially as and for the purpose described.

4. The combination with a mold-frame, of
5 base-bars arranged within the frame, a metal strip between each pair of base-bars, and matrix-bars on the base-bars, substantially as and for the purpose described.

5. The combination with a mold-frame, of
10 spacing-bars arranged within the frame and provided with inclines on their upper faces, substantially as and for the purpose described.

6. The combination with a mold-frame, of
15 spacing-bars arranged within the frame and provided on their upper faces with a depression to receive the surplus material during the molding operation, substantially as described.

7. The combination with a mold-frame, of
20 spacing-bars arranged within the frame, the inner edges of said bars being higher than the outer edges thereof, substantially as and for the purpose described.

8. The combination with a mold-frame, of
25 side spacing-bars arranged within the frame and provided with ribs on their inner sides, substantially as and for the purpose described.

9. The combination with a mold-frame, of

side spacing-bars arranged within the frame, 30
and ribs on the inner sides of the spacing-bars at the upper edge thereof and having inclined upper faces, substantially as and for the purpose described.

10. The combination with a mold-frame, of 35
spacing-bars arranged within the frame, base-bars between the spacing-bars, matrix-bars on the base-bars, and metal strips alternating with the base-bars and projecting above the matrix-bars, substantially as described. 40

11. The combination with a mold-frame, of
side spacing-bars arranged within the frame, ribs on said bars, and matrix-bars provided with recessed ends to fit under the ribs on the spacing-bars, substantially as described. 45

12. The combination with a mold-frame, of
side spacing-bars arranged within the frame, ribs on said bars, base-bars provided with recessed ends to fit under the ribs on the side spacing-bars, matrix-bars on the base-bars, 50
and a metal strip between each pair of base and matrix bars and projecting above the matrix-bars, substantially as and for the purpose described.

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Witnesses:

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