

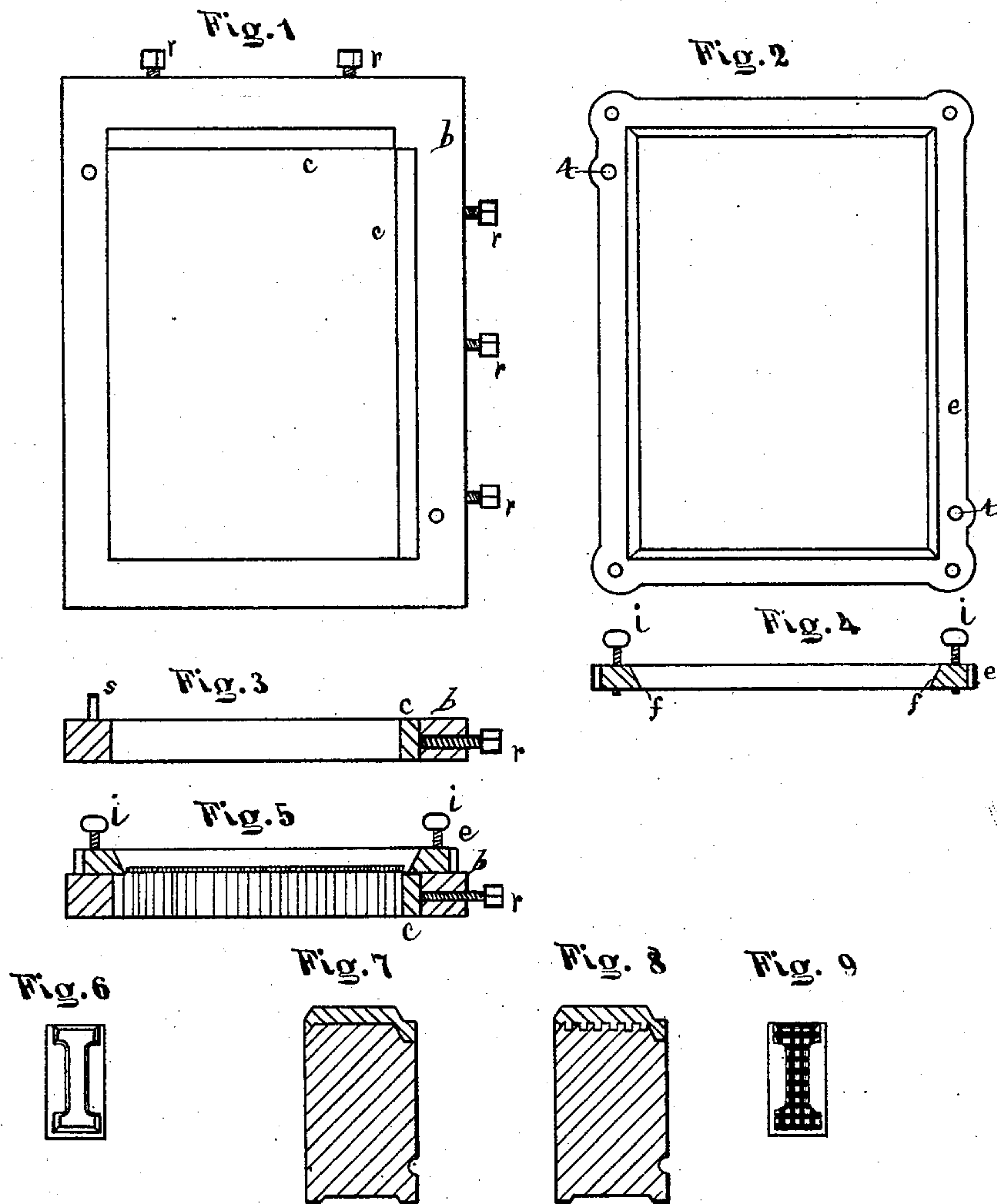
(No Model.)

R. H. SMITH.

PROCESS OF MANUFACTURING ELASTIC FACED PRINTING TYPE.

No. 324,423.

Patented Aug. 18, 1885.



Witnesses;  
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# UNITED STATES PATENT OFFICE.

R. HALE SMITH, OF SPRINGFIELD, MASSACHUSETTS.

PROCESS OF MANUFACTURING ELASTIC-FACED PRINTING-TYPES.

SPECIFICATION forming part of Letters Patent No. 324,423, dated August 18, 1885.

Application filed July 22, 1881. (No model.)

*To all whom it may concern:*

Be it known that I, R. HALE SMITH, of Springfield, in the county of Hampden and State of Massachusetts, have invented a new and useful Improvement in the Process of Manufacturing Elastic-Faced Printing-Types, of which the following is a specification and description.

The object of my invention is to produce accurate printing-type whose printing characters are provided or cushioned with an elastic material around and upon their printing-faces, and which type are adapted to be set up singly in an ordinary stamp or form in the same manner as common metallic printing-type are used to print any desired matter; and I accomplish this by the process substantially as hereinafter described, reference being had to the accompanying drawings, making a part of this specification, in which—

Figure I is a plan view of a chase or frame ready to receive the type. Fig. II is a plan view of a flask to be used in connection with the chase or frame. Fig. III is a sectional view of the chase or frame. Fig. IV is a sectional view of the flask. Fig. V is a sectional view of the chase or frame with the type secured therein and with the flask in position to make a matrix. Fig. VI is an enlarged plan view of a printing-type of the letter "I" before the rubber is vulcanized to its printing character. Fig. VII is a sectional view of the same, showing the rubber as vulcanized to the printing character thereon. Fig. VIII is an enlarged sectional view of the same printing-type with the rubber as vulcanized thereon, and also showing the scoring or roughening of the face of the hard printing character; and Fig. IX is a plan view of the same printing-type illustrating the scoring or roughening of its printing-face.

I use any desired number or a series of printing-type, which may be made especially for this purpose, of any suitably-hard material, or they may be the ordinary printing-type, (I prefer the latter for the smaller sizes); but in any case each consists of a hard body with a printing character at one end made integral with the body and forming a completed printing-type. I place a series of these type within a metallic frame similar to a printer's chase,

and there secure them by locking in any suitable manner, preferably by means of a side stick or steel shoe at one end and a similar one at one side, against which are turned tightening-screws, all substantially as shown in Fig. I, this frame being of suitable size to contain the desired number of type. After the metallic type are firmly and securely locked in the frame—which I make of iron or steel, which expands much less than type-metal under a given degree of heat—I subject the frame and the type secured therein to a heating process by any convenient means, for the purpose of expanding the metal of which the type and the frame are composed, after which heating they are allowed to cool, the type still remaining within the frame while cooling. As the type are all firmly locked while being heated, as above mentioned, they cannot of course expand to the size which they would were they not confined, consequently the metal of which they are composed is compressed and compacted, and when the type become cool they will have shrunk to a size a little less than their original size, and thereby become loose within the frame. The tightening-screws are then turned in firmly against the stick or steel shoe at the side and end of the frame, which again securely locks the series of type within the frame, and the frame and the type secured therein are again heated as nearly as possible to that degree which will produce the same amount of expansion of the metal as when the series of type are subjected to the final process of vulcanization. The object of this compacting process is that when the series of type are finally subjected to the vulcanizing process by placing the matrix made therefrom back upon the type, with the sheet of rubber to be vulcanized to the type placed between, there may be as little variation as possible in the expansion of the metal of the type, and consequently little variation between the position of each separate type in the series and that of its own impression in the matrix. The more accurate the relative positions of these are the more accurately will each metallic type, including its printing character, coincide or register with its impression in the matrix, and the more accurately will the rubber be vulcanized to the type, and the elastic printing-face of each



character stand central with the body of the type itself. When the frame and the series of type secured therein are heated a second time, a matrix is made from the printing characters upon the type by either of the well-known processes, as practiced in stereotyping, except that by using the expanded type to form the matrix I lessen the liability of variation in register or coincidence between the printing characters of the type and their respective impressions in the matrix, when both are afterward placed together with the rubber sheet between to be vulcanized. Should a plaster or clay matrix made from cold type which were not previously compacted be used with the series of printing-type in the process of vulcanizing, the matrix would not expand by the application of the required degree of heat so much as the metallic type would, and the printing characters of the type and their impressions in the matrix would not coincide or register during the process of vulcanizing, and consequently the elastic faces of the printing characters vulcanized thereto would not stand central with the body of the type itself, and the result would be very uneven and defective printing when the type were used.

The flask which confines the matrix is retained in position upon the series of type by dowel-pins extending into corresponding holes in the frame, as shown in Fig. V, or by other suitable means in such manner that the matrix may be returned to its exact former position, after having been removed therefrom, to cause the printing characters of the metal type and their respective impressions in the matrix to exactly coincide or register. When the matrix, taken from the metal characters of the series of type, is set and has become hard, it may be removed and the type be allowed to cool again, and having shrunk a second time they are again locked within the frame by tightening the screws, as before. The reason for this cooling and tightening of the type within the frame is, first, that the matrix may be perfectly cured and set before vulcanizing without the water in the matrix being heated, as it would be at vulcanizing, to a degree which would convert it into steam, and thereby destroy the soundness of the matrix; second, to give ample time for the matrix to cure or set slowly and gradually during the cooling of the type—say, from twelve to fifteen hours—to obtain the best results; and, third, to have the type cool when their printing-faces are roughened or scored, although this scoring or roughening is not absolutely essential, but only an advantage.

Instead of removing the metallic printing-type from the chase or frame and substituting prepared blanks or bodies of identical size to exactly correspond with those removed, as is done in the old process of vulcanizing, I carefully draw a coarse file across the printing-faces of the characters of the type, which produces abrasions or roughens their printing-faces, or the printing-faces of the characters

on the type may be scored by feeding the whole form or series of type against a gang of thin circular saws spaced apart about one sixty-fourth of an inch, and also making similar cuts at a right angle to the first, which operation reduces the printing-face of the type to a series of small square points, as shown in Figs. VIII and IX of the drawings, these points and the recesses between forming a secure anchorage for the rubber facing. This abrasion of the faces of the printing-characters of the type, as before stated, however, is not an essential feature, but is preferable in carrying out the whole process.

I now subject the form or series of type, securely locked in the frame, to a temperature of about two hundred (200) degrees Fahrenheit, and lay on a sheet of properly-compounded raw rubber over the face of the form or series of prepared type, and then place the matrix, which is also heated to about the same degree of temperature, over and upon the rubber sheet, securing it so that the printing-characters of the type will perfectly coincide and register with their respective impressions in the matrix, by means of the dowel-pins, and then apply pressure to the matrix by screws or other convenient means until the sheet of rubber compound, which has become soft and plastic from contact with the heated surfaces, has completely filled the matrix, and also all the recesses in the printing characters of the type, and has also covered the faces of the printing characters, and the surplus rubber has been forced out around the edges until the desired thickness of rubber is attained, when it is ready for vulcanizing. This vulcanizing operation may be done by the ordinary wet or the dry process, during which a chemical union is effected of the metallic printing characters of the type and the rubber compound, uniting them firmly and permanently together.

After the vulcanizing process is accomplished the series of type are taken from the frame or chase, cleaned, dressed, and the rubber printing-faces cut apart by running them against a revolving knife, or by any other convenient means.

Elastic faced printing-type made by the process hereinbefore described have for their base a rigid printing character made integral with the body, and whose printing-face is only thinly covered with the elastic cushion, which is uniformly supported at all points by the hard backing of the printing character of the type itself, which projects into the elastic cushion.

When these type are set up to be used in printing, and the hand-pressure is applied to make the imprint, as the whole body of the printing character is not elastic, but only a thin coating on its face, the character is not so sensitive to pressure and does not flatten out and yield, and cannot bend to either side, as the elastic characters do, and only yields sufficiently to insure a good and perfect contact of all parts of the printing-face with the paper, and great uniformity of impression and a per-



fect imprint is the result, as well as a secure union of the two materials, and a great saving in the cost of production.

Having thus described my invention, what I claim as new, is—

1. The process of manufacturing elastic-faced printing-types, consisting of molding and vulcanizing a thin coating of elastic compound upon the printing characters of a series of hard printing-type by securing said compound between said type and a matrix in register therewith, and subjecting the whole to heat while firmly compressed together, and finally separating the type one from the other with the elastic printing-face vulcanized to each, substantially as described.

2. The method of manufacturing and producing elastic-faced printing-types, consisting of vulcanizing a sheet of elastic compound to

the printing characters of a series of hard type by securing said sheet between said type and a matrix made therefrom, and subjecting the same to heat while firmly compressed together after said type have been prepared and compacted by securing them in a frame and subjecting the type and frame to heat and allowing the same to cool, and again firmly clamping the type in the frame to take up the shrinkage caused by the greater contraction of the type in cooling, and afterward separating the type one from the other with the elastic printing-face vulcanized to each, substantially as described.

R. HALE SMITH.

Witnesses:

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