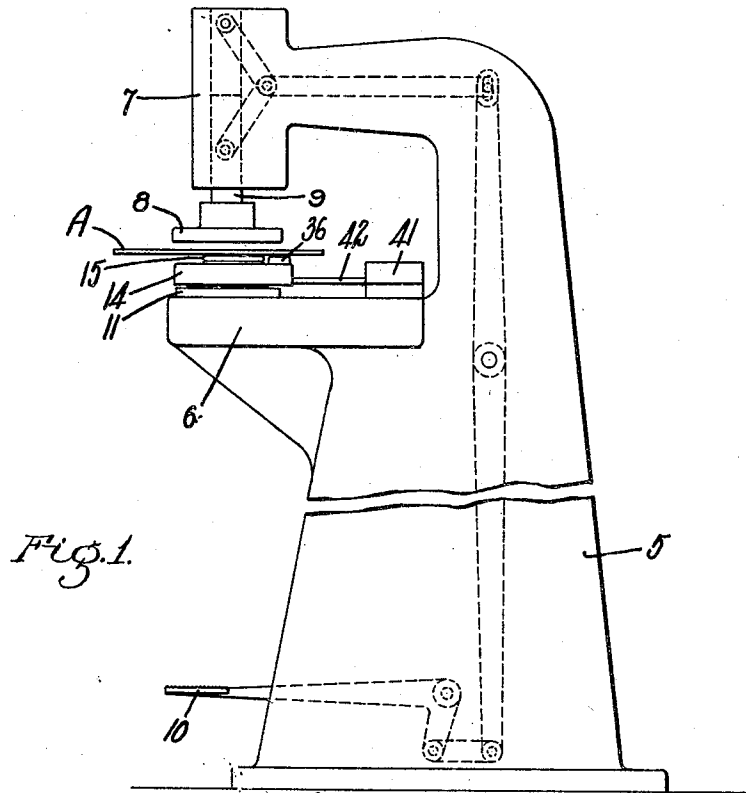
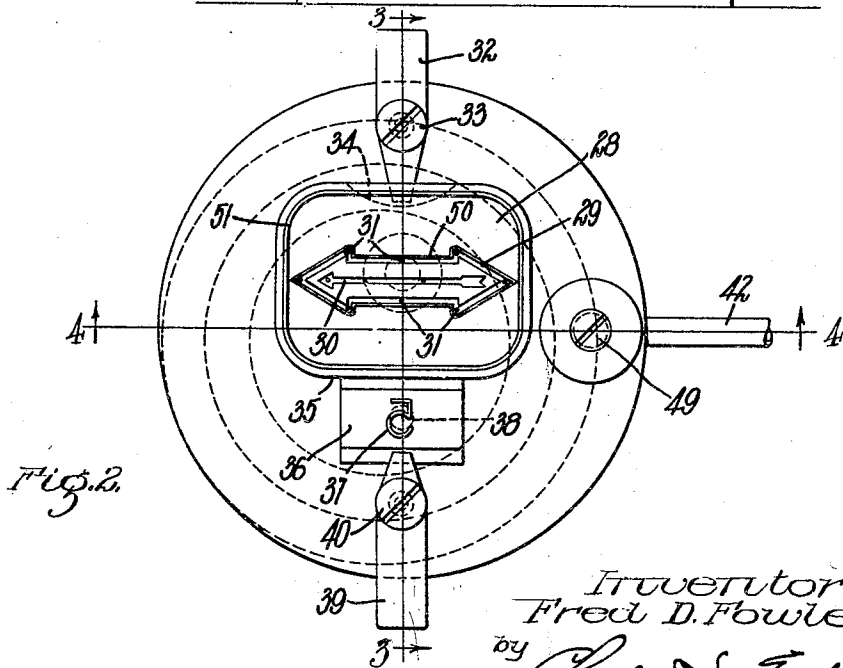


Jan. 27, 1931.

F. D. FOWLER
METHOD OF AND APPARATUS FOR EMBOSsing MATERIAL
AND COLORING EMBOSSED SURFACES
Filed May 3, 1929

1,790,233

2 Sheets-Sheet 1



Inventor:
Fred D. Fowler
by *Charles S. Gooding*
Att'y.

Jan. 27, 1931.

F. D. FOWLER
METHOD OF AND APPARATUS FOR EMBOSSED MATERIAL
AND COLORING EMBOSSED SURFACES
Filed May 3, 1929

1,790,233

2 Sheets-Sheet 2

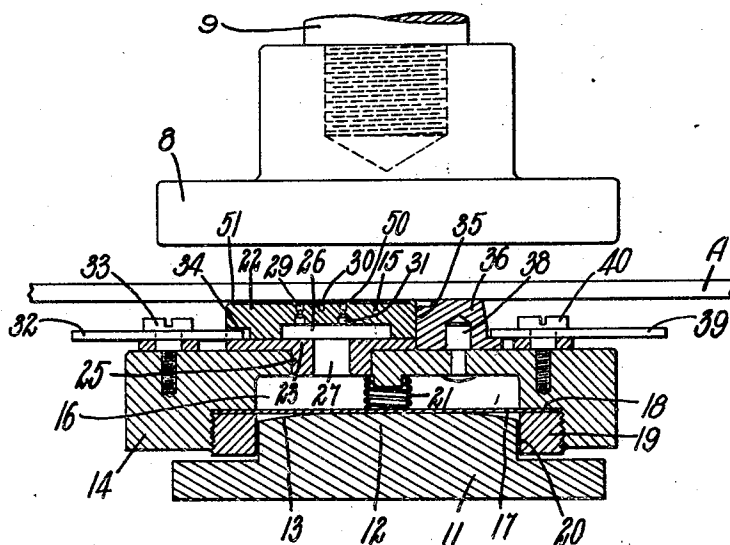


Fig. 3.

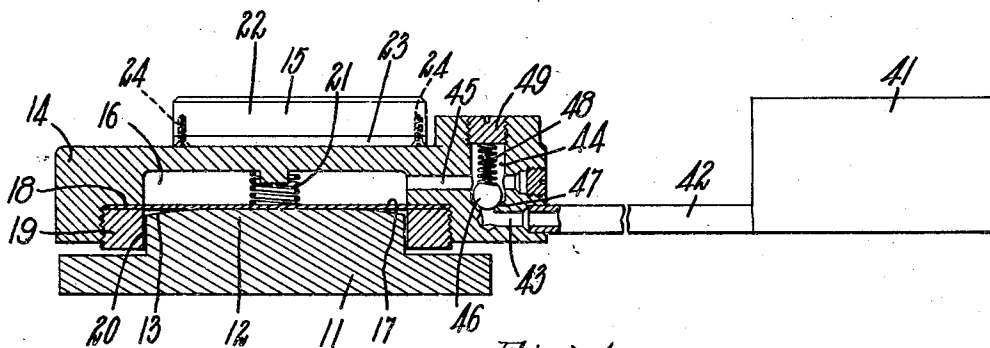


Fig. 4.

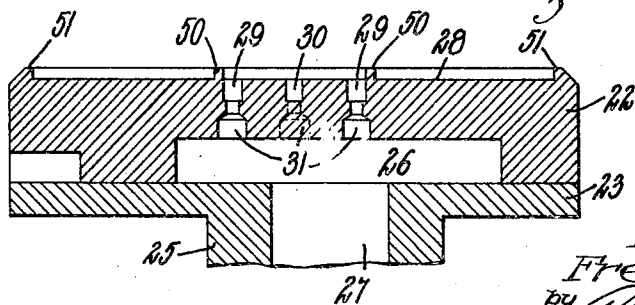


Fig. 5.

Inventor:
Fred D. Fowler
by *Charles S. Gooding*,
Att'y.

UNITED STATES PATENT OFFICE

FRED D. FOWLER, OF NEWTON, MASSACHUSETTS, ASSIGNOR, BY MESNE ASSIGNMENTS, TO HOOD RUBBER COMPANY, INC., OF WILMINGTON, DELAWARE, A CORPORATION OF DELAWARE

METHOD OF AND APPARATUS FOR EMBOSSEING MATERIAL AND COLORING EMBOSSED SURFACES

Application filed May 3, 1929. Serial No. 360,232.

This invention relates to a method of and apparatus for embossing material and coloring embossed surfaces, and has for its object to provide an improved device for embossing material and in the same operation coloring the surface of the material embossed.

The invention consists in a method of and apparatus for embossing material and coloring embossed surfaces as set forth in the following specification and particularly as pointed out in the claims thereof.

Referring to the drawings:

Figure 1 represents a side elevation of a toggle press of well known form, an embossing and coloring device embodying my invention being illustrated associated therewith.

Fig. 2 is an enlarged plan view of the die, die holder and associated parts.

Fig. 3 is a vertical sectional elevation taken on the line 3—3 of Fig. 2.

Fig. 4 is a vertical sectional elevation taken on the line 4—4 of Fig. 2.

Fig. 5 is an enlarged detail sectional view through the die, as taken on the line 3—3 of Fig. 2.

Like numerals refer to like parts throughout the several views of the drawings.

In the drawings, 5 represents a treadle operated toggle press of well known form embodying therein a bed 6 and a head 7, the latter having a head plate or pressure member 8 mounted to slide therein upon a vertical shaft 9 which has a reciprocatory movement imparted thereto by means of a foot pedal 10 which is operatively connected in any suitable manner to the vertical shaft 9.

Secured to the bed 6 in any suitable manner is a member 11 which, in effect, constitutes a plunger and is provided with an upwardly projecting shouldered portion 12 which is provided with a convex upper surface 13. Loosely mounted upon the plunger 11 is a holder 14 for a die 15. The die holder 14 is recessed upon its under side to form a chamber 16, and the latter is rendered water tight upon its lower side by means of a diaphragm 17 which is clamped against a shouldered portion 18 of the die holder 14 by means of a ring nut 19.

The diaphragm 17 is preferably constructed of soft steel and is sufficiently thin to be resilient. The ring nut 19 has an opening 20 extending therethrough and the upper portion of the plunger 11 projects through the opening 20 and convex surface 13 engages the under surface of the diaphragm 17, thereby yieldingly supporting the die holder 14, die 15 and associated parts.

A spring 21 is furthermore interposed between the upper surface of the chamber 16 and the upper surface of the diaphragm 17 and aids in yieldingly supporting the die holder and die upon the plunger 11.

The die 15 embodies therein an embossing member 22 and a positioning plate 23, the latter being secured to the under side of the embossing member 22 by means of screws 24. The positioning plate 23 is shouldered at 25, and said shouldered portion is located within an opening provided therefor in the die holder 14. A chamber 26 is provided upon the interior of the die 15 and the chamber 26 is connected with the chamber 16 by means of a passage 27 which extends through the positioning plate 23. An upper surface 28 of the embossing member 22 is provided with channels 29 and 30 which are arranged to form a suitable design, and said channels are connected to the chamber 26 by a plurality of holes 31.

The die 15 is detachably secured to the upper surface of the die holder 14 by means of a latch 32 which is pivoted at 33 to the upper surface of the die holder, and in securing the die to the die holder, the latch 32 enters a notch 34 that is provided in an edge of the die. A flat side 35 of the die 15 engages the flat side of a die block 36 upon the upper surface of which is a character 37 which is to be impressed into the material that is to be embossed. The die block 36 is detachably mounted upon the die holder 14 and is positioned upon a pin 38 which projects upwardly from the upper surface of the die holder. The die block 36 is secured to the upper surface of the die holder by means of a latch 39 which is pivotally attached to the die holder at 40.

A reservoir 41 for a colored liquid rubber

cement which constitutes a coloring material, is mounted upon the bed 6 of the press 5 and is connected by means of a tube 42 with the die holder 14. From the tube 42 the coloring material flows through a passage 43 provided in the die holder 14 into a valve chamber 44, and from thence through a passage 45 into the chamber 16.

A spherical check valve 46 is located within the valve chamber 44 and is yieldingly held upon a seat 47 located at the bottom of the chamber 44 by means of a spring 48 which is interposed between the periphery of the valve 46 and the under side of a screw plug 49, which is provided for the purpose of closing the upper end of the valve chamber 44.

As a means of sealing the chambers 16 and 26 together with the channels 29 and 30 in the upper face of the die 15 for a purpose hereinafter to be fully explained, a ridge 50 is provided extending around the outer edge of the channel 29 and another ridge 51 extends around the upper surface of the die 15 adjacent to the edge of said die, and during the downward stroke of the pressure member 8 the material A which is to be embossed is forced against the ridges 50 and 51, and the latter are forced into the surface of said material, penetrating the latter a sufficient amount to render the chambers 16 and 26 air tight and their ridges 50 and 51 will continue to remain impressed in the surface of the material A during the first part of the upward movement of the die holder 14 and until the pressure member 8 is withdrawn from the material A.

The general operation of the device hereinafter specifically described is as follows:—The material A, which is preferably of a flexible nature, is placed upon the die 15 and the foot pedal 10 is operated in a well known manner to force the pressure member 8 downwardly against the material A, forcing the under surface of the latter against the ridges 50 and 51 provided upon the upper surface of the embossing member 22.

Assuming that the chambers 16 and 26 and communicating passage 27 are filled with liquid coloring material, as soon as the pressure created by the downward movement of the pressure member 8 is sufficient to overcome the tension of the spring 21, together with the tension of the diaphragm 17, the die holder 14 will be forced downwardly upon the plunger 11, causing the upper convex surface 13 of the latter to deflect the diaphragm 17 upwardly, thereby forcing a small amount of liquid coloring material from the chamber 26 through the holes 31 into the channels 29 and 30. The continued downward movement of the die holder 14 will finally be arrested by the contact of the lower surface of the ring nut 19 with the adjacent surface of the plunger 11, after

which a further downward movement of the pressure member 8 will cause the material A to be compressed into the channels 29 and 30 until the material within said channels contacts with the coloring material that is likewise located within said channels, at which time the design upon the upper surface of the die will be properly transferred to the material.

During the impression stroke of the pressure member 8, the spherical check valve 46 prevents the coloring material within the die holder and die from being forced backwardly into the reservoir 41. As soon as the foot pedal 10 is released and the pressure member 8 starts to move upwardly to release the material A, the die holder 14 will be moved upwardly by the spring 21, and owing to the fact that the chambers 16 and 26 are sealed by the ridges 50 and 51 tightly engaging the under surface of the material A a suction will be created within said chambers and a small amount of coloring material will pass by the check valve 46 and enter the chambers, replenishing the coloring material that has just been used.

It is evident that any number of channels may be provided upon the upper face of the die 15 in order to provide the design that is desired, and furthermore the design may include certain numerals, letters or other characters that it may be desirable to have transferred to the material A but which need not necessarily be colored, in which event it is not necessary that they have communication with the chamber 26.

I claim:

1. An embossing and coloring device having, in combination, a die having depressions in a printing face thereof, means to feed coloring material from the interior of the die into said depressions and to force material to be embossed and colored against said face and into said depressions, and means to create a suction within the die to draw a supply of coloring material thereinto.

2. An embossing and coloring device having, in combination, a plunger, a die supported thereon having a chamber for liquid coloring material interposed between the plunger and die and communicating with a face of said die, and means to press material against the face of the die and also impart a relative movement between the die and plunger to feed said coloring material to said face.

3. An embossing and coloring device having, in combination, a plunger, a die supported thereon having a chamber for liquid coloring material interposed between the plunger and die and communicating with a face of said die, and means to press flexible material against the face of the die and also impart a reciprocatory movement to the

die upon the plunger to feed said coloring material to said face.

4. An embossing and coloring device having, in combination, a plunger, a die supported thereon having a chamber for liquid coloring material interposed between the plunger and die and communicating with a face of said die, and means to press flexible material against the face of the die and also impart a relative movement between the die and plunger to feed the coloring material from the interior of the die to said face and to create a suction within the die whereby coloring material is fed to the interior of the die.

5. An embossing and coloring device having, in combination, a plunger, a die yieldingly supported thereon and having a chamber interposed between the plunger and die and communicating with a face of the die, a reservoir for liquid coloring material communicating with said chamber, and means to press flexible material against the face of the die and also impart a reciprocatory movement to the die upon the plunger to feed coloring material to said face.*

6. An embossing and coloring device having, in combination, a plunger, a die holder yieldingly supported thereon, a die detachably mounted upon said holder and having a chamber for liquid coloring material interposed between the plunger and die and communicating with a face of the die, and means to press flexible material against the face of the die and also impart a reciprocatory movement to the die upon the plunger to feed coloring material to said face.

7. An embossing and coloring device having, in combination, a plunger, a die holder yieldingly supported thereon, a die detachably mounted upon said holder and having a chamber for liquid coloring material interposed between the plunger and die and communicating with a face of said die, a reservoir for coloring material communicating with said chamber, a check valve for the coloring material between the chamber and reservoir, and means to press flexible material against the face of the die and also impart a reciprocatory movement to the die upon the plunger to feed coloring material to said face.

8. An embossing and coloring device having, in combination, a plunger, a die having a chamber therein for liquid coloring material interposed between the plunger and die and communicating with a face of said die, a resilient member mounted beneath the die and supporting the latter on the plunger and constituting a wall for said chamber, and means to press flexible material against the face of the die and move the latter upon the plunger to deflect the resilient member whereby the coloring material is fed from the chamber to the face of the die.

9. An embossing and coloring device having, in combination, a plunger, a die having a chamber therein and provided with openings leading from the chamber to a face of the die, a resilient member mounted beneath the die and supporting the latter on the plunger and constituting a wall for said chamber, a reservoir for liquid coloring material communicating with the chamber, and means to press flexible material against the face of the die and move the latter upon the plunger to deflect the resilient member whereby the coloring material is fed to the face of the die and a suction is created within the chamber to feed coloring material from the reservoir into the chamber.

10. An embossing and coloring device having, in combination, a plunger, a die having a chamber therein communicating with a face thereof, a resilient member mounted beneath the die and supporting the latter on the plunger and constituting a wall for said chamber, a reservoir for liquid coloring material communicating with the chamber, means to press flexible material against the face of the die and move the latter upon the plunger to deflect the resilient member whereby the coloring material is fed from the chamber to the face of the die and suction is created within the chamber to feed coloring material from the reservoir into the chamber, and means to check a return movement of the coloring material between the chamber and reservoir.

11. An embossing and coloring device having, in combination, a plunger, a die holder positioned upon the plunger, a diaphragm mounted upon the holder and yieldingly supporting the latter upon the plunger, a die mounted upon the holder and having a chamber therein communicating with a face thereof, a reservoir for liquid coloring material communicating with the holder and die chamber above the diaphragm, and means to press flexible material against the face of the die and also impart a reciprocatory movement to the die holder upon the plunger to deflect the diaphragm, whereby coloring material is forced from the chamber of the die to the face thereof.

12. An embossing and coloring device having, in combination, a plunger, a die holder positioned upon the plunger, a diaphragm mounted upon the holder and yieldingly supporting the latter upon the plunger, a die mounted upon the holder and having a chamber therein communicating with a face thereof, a reservoir for liquid coloring material communicating with the holder and die chamber above the diaphragm, and means to press flexible material against the face of the die, seal the chamber and also impart a reciprocatory movement to the die holder upon the plunger to deflect the diaphragm, whereby coloring material is forced from the interior

of the die to the face thereof and a suction is created within the die to feed the coloring material from the reservoir to the die chamber.

5 13. An embossing and coloring device having, in combination, a plunger, a die holder positioned upon the plunger, a diaphragm mounted upon the holder and yieldingly supporting the latter upon the plunger, a die
10 mounted upon the holder and provided with channels in a face thereof and having a chamber therein communicating with said channels, a reservoir for liquid coloring material communicating with the holder and die
15 chamber, and means to press flexible material against the face of the die, seal the channels in the face of the die and also impart a reciprocatory movement to the die holder upon the plunger to deflect the diaphragm, where-
20 by coloring material is forced from the chamber of the die into the channels upon the face thereof and a suction is created within the chamber of the die to feed coloring material from the reservoir into said chamber.

25 14. The method of embossing and coloring material which comprises feeding liquid coloring material into depressions in a die, forcing the material to be embossed and colored into the depressions and into contact with
30 said coloring material and creating a suction during each embossing and coloring operation to replenish the coloring material employed during said operation.

35 15. In an apparatus of the class described, in combination, a die having depressions in a face thereof and a chamber in communication with said depressions, a liquid supply, and means to alter the volume of said chamber for creating suction to draw liquid from said supply into the chamber and for creating pressure to force the same into said die depres-
40 sions.

45 16. In an apparatus of the class described, in combination, a die having depressions in a face thereof and a chamber in communication with said depressions, a liquid supply, means comprising a flexible diaphragm forming a wall of said chamber for creating suction to draw liquid from said supply into the cham-
50 ber and for creating pressure to force the same into said die depressions.

In testimony whereof I have hereunto set my hand.

FRED D. FOWLER.

55

60

65