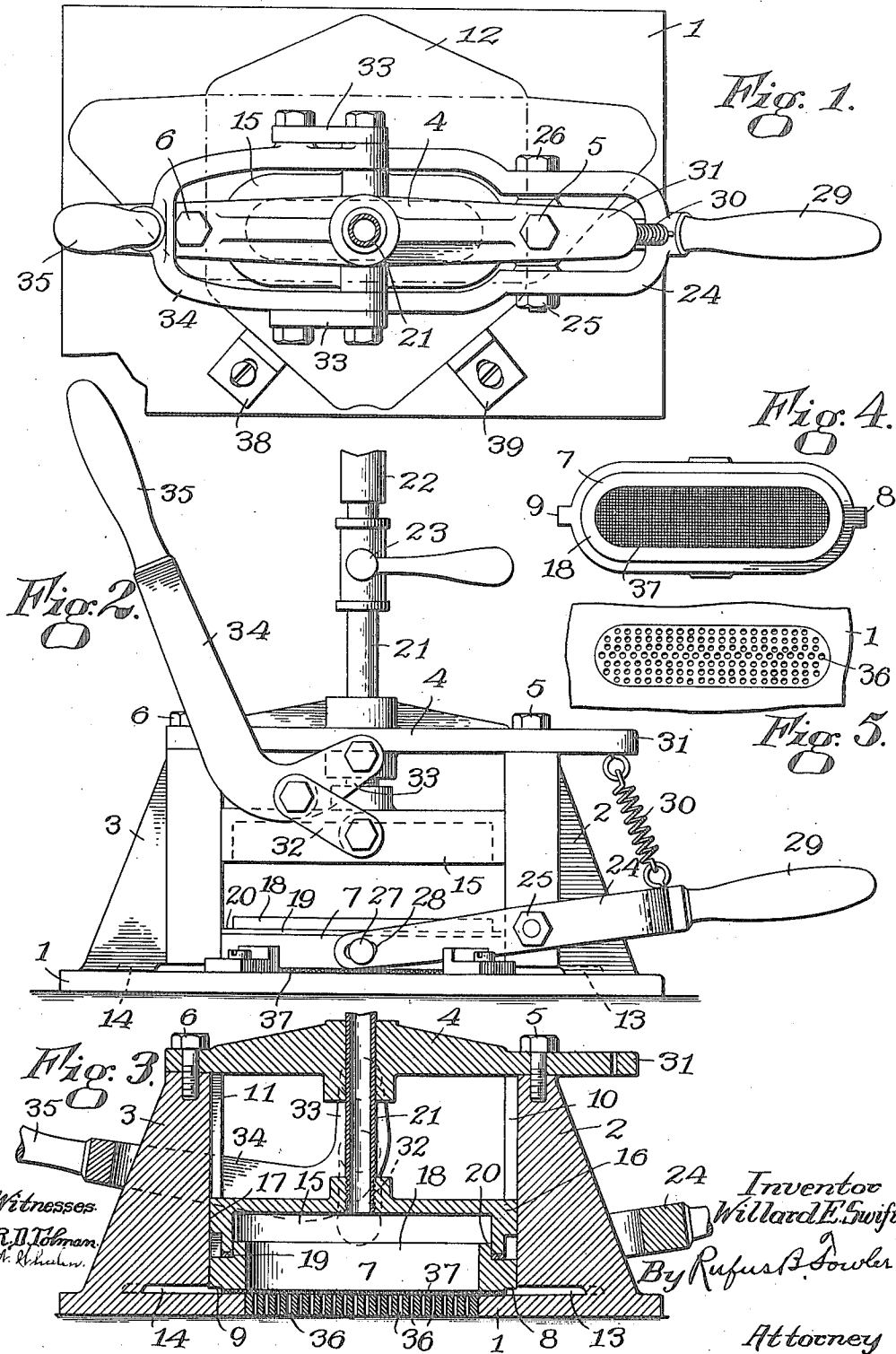


W. E. SWIFT.
METHOD FOR PRODUCING A TRANSPARENT PANEL IN PAPER AND THE LIKE.
APPLICATION FILED JULY 28, 1913.

1,123,422.

Patented Jan. 5, 1915.



UNITED STATES PATENT OFFICE.

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METHOD FOR PRODUCING A TRANSPARENT PANEL IN PAPER AND THE LIKE.

1,123,422.

Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, WILLARD E. SWIFT, a citizen of the United States, residing at Worcester, in the county of Worcester and Commonwealth of Massachusetts, have invented a new and useful Improvement in Methods for Producing Transparent Panels in Paper and the like, of which the following, together with the accompanying drawing, is a specification.

My invention resides in a method for producing a transparent area or panel in sheet material, such as paper, and it has more particular reference to a method for producing an area or panel of definite shape and location in an envelop blank so that, after the envelop has been completed, an address appearing upon the contents of the envelop will be visible through the panel. Transparent panels in envelops have been produced either by cutting an opening in the face of the envelop, by covering such an opening with a transparent sheet of paper or the like, or by applying suitable substances, such as oily mixtures, to a definite area of the envelop blank, the action of these substances being such as to cause the treated area to become transparent.

My invention is of that class in which the desired area is treated with a suitable substance to render it transparent. The substance applied to the paper has previously been merely applied to one surface thereof so as to soak into the body of the paper sufficiently to act thereon. I have found, however, that by thoroughly forcing the substance through the pores and between the fibers of the paper by fluid pressure, its action is more complete and the transparency of the treated area is increased.

One object of the present invention, therefore, is to devise a method for treating a sheet of material, such as paper, with a substance suitable for rendering it transparent and for applying the substance to the sheet material in such manner that the transparency of the treated area will be greater than would be the case were the substance merely coated upon the surface of the sheet material and allowed to soak in. After the substance has been applied to a portion of a sheet of paper or the like for the purpose of

producing a transparent area, it has been found that the substance would creep more or less into surrounding portions of the sheet so as to cause the transparent area to have an irregular and unsightly edge or boundary. It has been attempted to overcome this objection by printing a line around the predetermined area, the ink applied to the sheet serving to confine the substance to the prescribed area or to conceal the irregular boundary of the transparent area in case the substance should creep into the printed line. The objection referred to is most pronounced in the case of paper which is thick, porous and absorbent.

Another object of the present invention is to apply the substance to the area or panel to be treated in such manner as to prevent creeping or spreading of the applied substance, the resulting transparent area or panel, therefore, being of definite and predetermined shape and size and having a sharp and well defined boundary line.

Further objects and advantages will appear from the following description taken in connection with the accompanying drawing, in which—

Figure 1 is a plan view of one form of machine adapted to produce a transparent area or panel in a sheet of paper or the like in accordance with the present invention, an envelop blank being shown in position to be treated by the machine; Fig. 2 is a side elevation of the machine shown in Fig. 1; Fig. 3 is a central vertical sectional view of the machine; Fig. 4 is a plan view of a portion of the machine used for compressing the sheet being treated; and Fig. 5 is a plan view of a section of the base of the machine.

Like reference characters refer to similar parts in the different figures.

The principles of the invention will be revealed by describing one form of machine adapted to operate in accordance therewith, the construction of the machine being illustrated in the accompanying drawing. This form of machine includes a base 1 provided with a pair of upright rigid spaced posts 2 and 3, the upper ends of the posts being joined by a brace 4 secured to the posts by bolts 5 and 6. A die 7 slides vertically be-

tween the posts 2 and 3, the ends of the die being provided with tongues 8 and 9 fitting slidably in vertical grooves 10 and 11 respectively formed in the adjacent faces of the posts 2 and 3. The die has a vertical opening, the lower end of which conforms in shape and size to the area which is to be rendered transparent in the envelop blank 12. By removing the brace 4, the die may be replaced by another having an opening of any desired size and shape to correspond with the size and shape of the transparent panel which it is desired to produce in the envelop blank. The envelop blank to be treated is inserted between the posts 2 and 3 and beneath the die 7 in the position indicated in Fig. 1, the upper free surface of the base 1 being extended beneath the posts 2 and 3 by forming horizontal recesses or slits 13 and 14 in the bases of the posts and in the plane that the envelop blank occupies while being treated. A cap or seal 15 moves vertically above the die 7, the cap having tongues 16 and 17 fitting slidably in the grooves or ways 10 and 11. An upwardly projecting rim 18 surrounds the upper end of the opening in the die 7 and projects into the space within the cap 15. The lower edge of the cap fits about the rim 18 so as to rest upon a gasket 19 on the shoulder 20 surrounding the rim 18 of the die so as to form a hermetically sealed joint between the cap and the die.

A vertical pipe 21 leads from the cap 15 through an opening in the brace 4, the pipe fitting loosely in the opening in the brace so as to slide therethrough as it moves vertically with the cap 15. The pipe is connected in any suitable way, as by a flexible rubber tube 22, with a source of supply of air under pressure, and a valve 23 controls the admission of air through the pipe 21 to the space inclosed by the cap 15 and die 7. A U-shaped or bifurcated lever 24, mounted on the post 2 by the pivots 25 and 26, engages the opposite sides of the die 7, each side of the die carrying a pin 27 received in a slot 28 in the corresponding arm of the lever. The lever 24 is provided with a handle 29. The die 7 is normally forced downwardly toward the base 1 by the spring 30 connecting the lever 24 and the extension 31 of the brace 4.

Each side of the cap or seal 15 is connected with the corresponding side of the brace 4 by a toggle-joint composed of the links 32 and 33, the two links 33 at the opposite sides of the cap being extended and joined together by an integral U-shaped or bifurcated lever 34 provided with a handle 35. The portion of the base 1 which underlies the lower end of the opening in the die 7 is perforated by a large number of small openings 36, the upper face of this portion of the base being covered by a fine wire

screen or mesh 37, the edges of this screen or mesh extending under the die to its outer face in all directions. A pair of stops or gages 38 and 39 are secured adjustably to the base 1 to position the envelop blank 12 properly under the die 7. In treating certain sizes of envelop blanks, however, the use of these gages may be dispensed with, the converging extremities of the recesses or slits 13 and 14 serving the same purpose.

In practising my invention the die 7 is raised by depressing the handle 29 of the lever 24 and an envelop blank is inserted beneath the die into proper position as determined by the gages 38 and 39 or the extremities of the recesses 13 and 14. The handle 29 is then released and the spring 30 forces the die 7 downwardly so as to pinch and compress the envelop blank between the lower edge of the die and the upper surface of the screen or mesh 37. The restricted area of the upper surface of the envelop blank, determined by the lower end of the opening in the die 7, is then coated with some suitable substance adapted to render the material of the envelop blank transparent. Such substances are well known to those familiar with the art and consist generally of a mixture of oils, resins and the like. The substance may be applied to the restricted area of the blank in any desired manner as by a brush or a spraying nozzle. The cap 15 is then depressed against the die 7 by depressing the lever 34 so as to straighten the toggle-joints, the coated surface of the envelop blank being thus covered by the hermetically sealed space within the die and cap. The valve 23 is next opened to admit air under pressure to the space within the cap and die, the pressure of the air serving to force the coated substance thoroughly into and through the restricted area of the envelop blank defined by the lower end of the opening in the die. The fine screen or mesh 37 is provided for the blank to rest upon in order that the area of contact of the blank with the supporting surface may be as small as possible, the coated substance being thus allowed to permeate the blank more thoroughly and uniformly. The pressure of the air is allowed to act until the coated substance has passed entirely through the blank, any excess after passing through the blank being free to drain off through the screen 37 and the perforations 36 of the base.

The tension of the spring 30 is sufficiently great to pinch or compress the envelop blank firmly between the upper face of the screen 37 and the lower edge of the die 7, the fibers of the paper or other material of which the blank is composed being compacted to prevent or limit the tendency of the coated material to creep or spread beyond the desired area defined by the die.

The pressure of the die upon the blank thus greatly increases the sharpness and regularity of the line of demarcation between the finished transparent panel and the surrounding portions of the treated blank.

While I have shown and described the details of one form of machine which may be used in practising my invention, I do not wish to be limited to the use of such machine as it is obvious other machines may be used in the practice of the invention; but

Having thus described my invention, what I claim as new and desire to secure by Letters Patent is:

1. A process for treating sheet material with a substance suitable to render it transparent, including the compression of a portion of the sheet material, and forcing the substance into an adjacent portion of the sheet material by fluid pressure.

2. A process for treating sheet material with a substance suitable to render it transparent, including the compression of the sheet material about a restricted portion thereof, and forcing the substance into the

restricted portion of the sheet material by fluid pressure.

3. A process for treating sheet material with a substance suitable to render it transparent, including the compression of an uncoated portion of the sheet material, coating an adjacent portion of the sheet material with the substance, and forcing the substance into the sheet material by fluid pressure.

4. A process for treating sheet material with a substance suitable to render it transparent, including the exposure of a portion of the sheet material of predetermined size and shape, compressing the surrounding portion of the sheet material, coating the exposed portion of the sheet material with the substance, and forcing the substance into the sheet material by fluid pressure.

Dated this 24th day of July 1913.

WILLARD E. SWIFT.

Witnesses:

PENELOPE COMBERBACH,
NELLIE WHALEN.

Witnesses