W. F. MARRESFORD.

PERFORATING MECHANISM.

APPLICATION FILED AUG. 11, 1913.

1,260,694.

Patented Mar. 26, 1918.

3 SHEETS—SHEET 1.

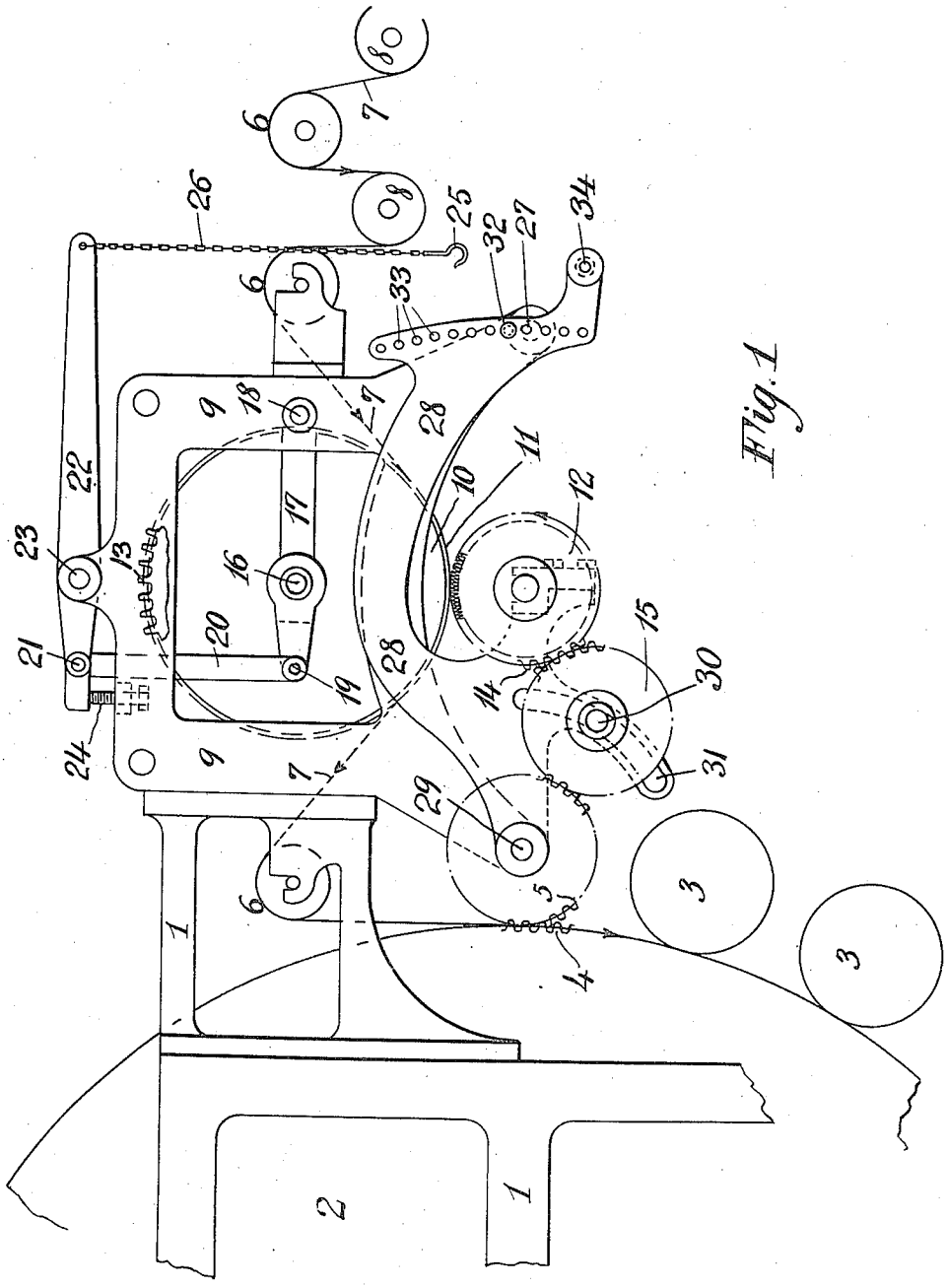


Fig. 1

Witnesses:
Peter A. Roe
Joseph D. Connolly.

Inventor
William F. Marresford
By his Attorneys
Edwards, Sager & Wooster

W. F. MARRESFORD.

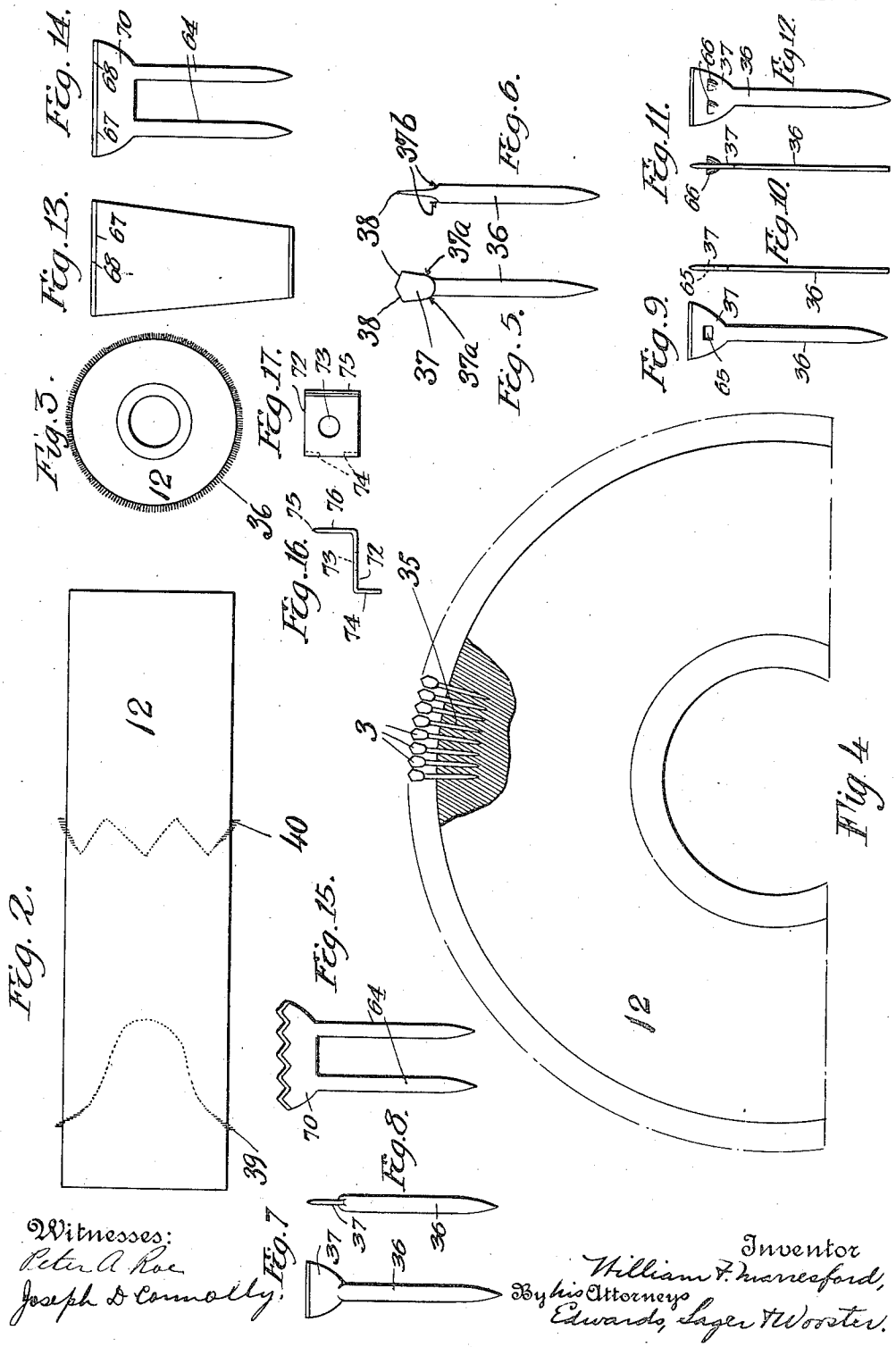
PERFORATING MECHANISM.

APPLICATION FILED AUG. 11, 1913.

1,260,694.

Patented Mar. 26, 1918.

3 SHEETS—SHEET 2.




Witnesses:
Peter A. Roe
Joseph D. Connolly.

Inventor
William F. Marresford,
By his Attorneys
Edwards, Sager & Wooster.

W. F. MARRESFORD.

PERFORATING MECHANISM.

APPLICATION FILED AUG. 11, 1913.

1,260,694.

Patented Mar. 26, 1918.

3 SHEETS—SHEET 3.

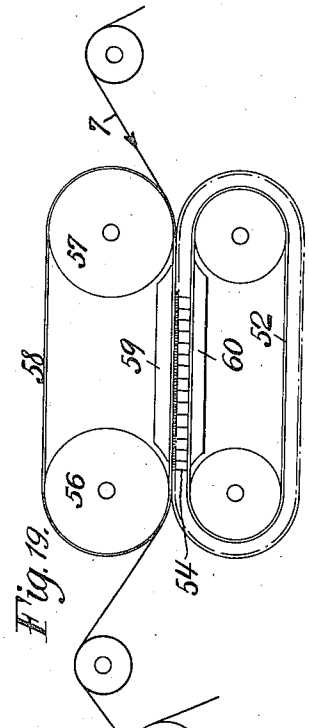



Fig. 19.

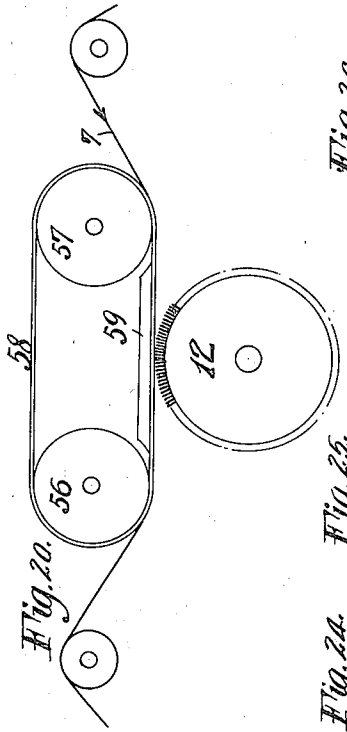



Fig. 20.

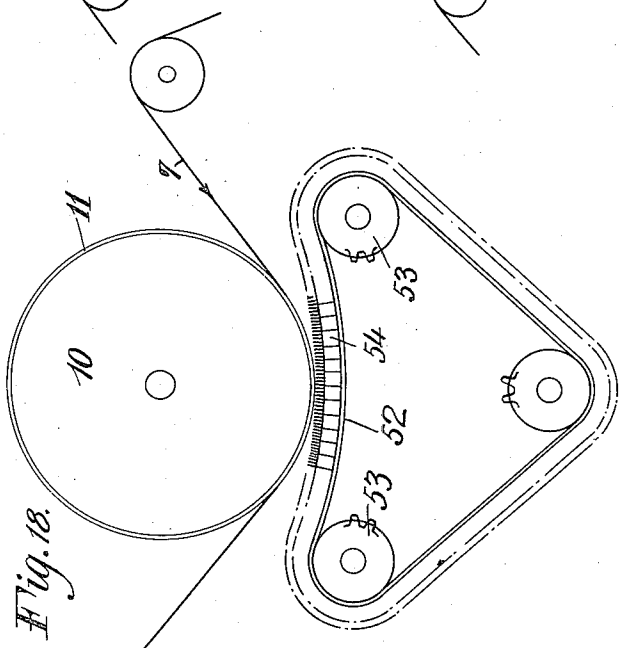



Fig. 18.

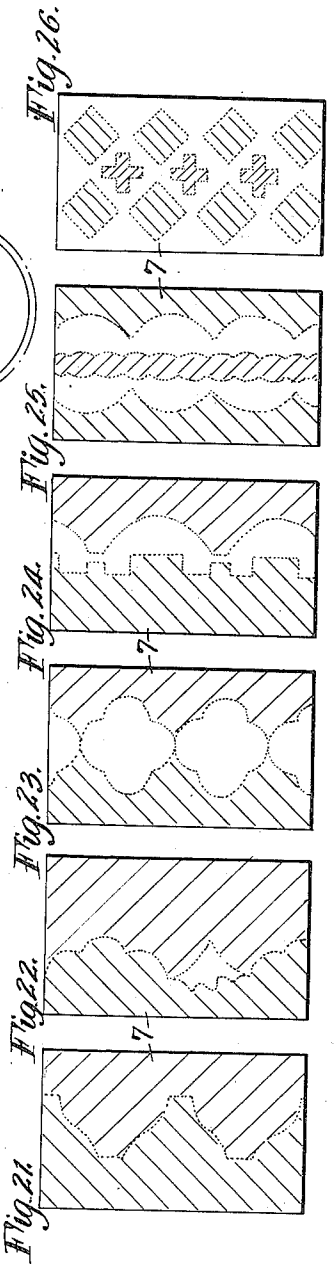



Fig. 26. Fig. 25. Fig. 24. Fig. 23. Fig. 22. Fig. 21.

Witnesses:
Peter A. Roe
Joseph D. Connolly.

Inventor
William F. Marresford,
By his Attorneys
Edwards, Lager & Wooster.

# UNITED STATES PATENT OFFICE.

WILLIAM F. MARRESFORD, OF BROOKLYN, NEW YORK.

## PERFORATING MECHANISM.

1,260,694. Specification of Letters Patent. Patented Mar. 26, 1918.

Continuation in part of application Serial No. 714,432, filed August 10, 1912. This application filed August 11, 1913. Serial No. 784,078.

*To all whom it may concern:*

Be it known that I, WILLIAM F. MARRESFORD, a citizen of the United States, residing at Brooklyn, in the county of Kings and State of New York, have invented certain new and useful Improvements in Perforating Mechanism, of which the following is a full, clear, and exact specification.

This invention relates to perforating and cutting mechanism, and has particular reference to the manufacture of cutout wall paper, such as borders, friezes, crowns, binders, rosettes, corners, etc., which are applied to walls in conjunction with the body finish for the purpose of increased decoration. These "cutouts" are largely used at the present time for decorating purposes, and as heretofore made and sold to the trade, have been printed, dried, cut and then wound in rolls with a filling paper ready for use. When used by the paper hanger the filling paper is thrown away.

The object of the present invention is to provide a web perforating and cutting mechanism especially intended for use in connection with a multi-color web printing machine, the perforating and cutting mechanism of this invention being preferably arranged so as to perforate and cut the web in advance of printing.

A particular feature of this invention resides in the specific construction and arrangement of perforating and cutting mechanism which is applicable for general use, wherein it is capable of adjustment for different patterns, and mounted so that it can be easily thrown out of operation without disarrangement when not desired for use and without interfering with the ordinary feed of the web. As shown herein, the perforating mechanism comprises an attachment adapted to the standard forms of multicolor printing presses.

The invention, with reference to its details and advantages, will be more fully understood in connection with the accompanying drawings, wherein—

Figure 1 is an elevation of a portion of a multi-color printing machine having the perforating apparatus of this invention combined therewith;

Fig. 2 is an elevation of the perforating roller provided with a design;

Fig. 3 is an end view;

Fig. 4 is an elevation on an enlarged scale showing the perforating knives;

Figs. 5 and 6 are details on an enlarged scale of one of the perforating knives;

Figs. 7 to 17 show various modifications in the form of cutters;

Figs. 18, 19 and 20 are views showing modifications of the perforating mechanism shown in Fig. 1; and

Figs. 21 to 26 illustrate various designs of cutouts which can be made with the apparatus of this invention.

Referring to Fig. 1, 1 represents a portion of the frame of a multicolor web printing machine having the printing roller 2, and color rolls 3, 3, all of which are constructed in a well understood manner so that each roll 3 prints a different color and all are driven in synchronism with the roll 2 by means of a large gear 4 meshing with driving gears on the shafts of rolls 3, and with driving gear 5. 6, 6, 6 are idler rolls over which the web 7 runs and 8, 8 are tension rolls or bars. 9 represents an auxiliary frame for the perforating mechanism which is herein shown as attached to an extension of the main frame 1, but which may be otherwise supported, if desired. 10 is a counter or platen roller provided with a resilient surface 11 between which and the perforating roller 12 the web 7 runs, and is at the same time fed thereby. In order to properly effect the perforation of the web, it will be seen in all forms of platen devices herein illustrated, that the web is bent around the platen, so that it is under tension and at the same time flattened and firmly held on the yielding platen surface while in contact with the perforators or knife pins.

The counter or platen roll 10 and the perforating roll 12 are provided with intermeshing gears 13, 14, the latter meshing with gear 15 which gears with gear 5 above described, so that the perforating roller 12 and the counter roller 10 will be positively driven in exact synchronism with the printing rolls 3, and each other, so that the web is simultaneously fed and perforated exactly in synchronism with the printing design rolls 3. The perforating roller 12 is provided with a peripheral adjustment (not shown) with relation to its gear 14 and axial adjustment (not shown) for the pur-

pose of accurately positioning the pattern on the perforating roller 12 with relation to the pattern on the printing roller or rollers 3.

The platen or counter roller 10 is provided with a shaft 16 which is carried by levers 17 journaled at one end 18 in the auxiliary frame 9 and having at the opposite end 19 a link 20 pivoted at 21 to a lever 22 journaled at 23 on the frame 9. By pressing down on lever 22 the counter roller 10 will be lifted from engagement with the perforating roller 12. To control the contact between the resilient surface 11 of counter roller 10 and the perforating roller 12, a set screw stop 24 is provided which can be adjusted up or down to support the short end of lever 22. When it is desired to remove the perforating mechanism, a hook 25 on chain 26 is engaged with a transverse bar 27 connecting the lower ends of side frames 9, thereby holding the counter platen clear of the perforating means. The platen roller 10 is preferably made wider than the web, so that it can be shifted axially on the shaft to change the cutting surface, and it is also driven by an uneven gear, so that it will not coincide with the design, thereby prolonging the life of the resilient covering.

The movable frame 28 consists of two side frames connected by a tie rod 34 and each mounted at 29 on the shaft of the gear 5, thus permitting the perforating roller 12 to be swung toward and from the platen roller 10 without changing the meshing of gears 5, 14, 15. The bearings of roller 12 are thus adjustable toward and from the platen, to allow for various sizes of perforating or platen rollers. The intermediate idler gear 15 is carried on a shaft 30 which is adjustable in a slot 31 of the swinging side frame 28, so that when perforating roll 12 is changed in diameter, gear 14 will be likewise changed to correspond, and still be driven synchronously with the printing rollers 3.

Inasmuch as color printing machines are arranged so that various diameters of printing rolls are to be used according to the patterns to be printed, it is desirable in the operation of this machine that the perforating roll be of the same circumference as the printing rolls, which is provided for by first adjusting the frames 28 relatively to frame 9 by pins 32 passed through holes 33, the holes 33 being spaced in accordance with standard circumferences of perforating rolls, which latter will be made in circumferences corresponding to the standard diameters of printing rolls 3, or multiples thereof if a pattern is repeated. The perforating roller 12 is preferably mounted in open bearings so that upon lifting the counter roller 10, it can be lifted in and out, it being seen that the side frames 9 and 28 are curved to facilitate this operation.

Figs. 2 to 6 show the details of the perforating roll 12. It comprises a body or center of suitable material with a periphery 35 of wood or similar material into which the knife pins 36 can be driven. These cutters 36, as shown in Figs. 5 and 6, and also in Figs. 7 to 17, are provided with knife edged heads 37 with sharpened cutting edges 38 which readily sever the fiber of the paper without tearing. It will be seen in Figs. 5, 6, 7 and 8 that the flattened blade portion 37 is of less thickness than the shank portion 36, thus providing driving and depth gaging shoulders $37^b$, and the designs 39, 40 are formed on the surface of roller 12 in Fig. 2 by driving into the surface the requisite number of knives to form the outline to be cut or perforated in the paper. A practical requirement of this perforating roller is that the cutting edges must all be on practically the same diameter or exactly the length when developed, of the pattern which will be printed on the wall paper, as otherwise the perforations would not register with the printing, which result is facilitated by suitable pin setting mechanism. In order to make sharp curves in the line of perforations so as to form angles, etc., the shanks 36 are preferably made round in cross-section so that they can be readily turned or angularly adjusted after having been driven into the body of the roller 12, and the sides $37^a$ of the flat portions 37 taper toward the base so that the knife pins can be set on radii of the roll 12 and with their outer edges in contact. This also enables the knife pins to be initially set with a slight space between them as shown in Fig. 4, and subsequently to be driven farther in without displacement, as may be necessary when the printing rollers are re-surfaced.

Cutters of other forms are shown in Figs. 9 to 15, such as may be made from flat or sheet metal. Fig. 9 shows an opening 65 in the blade portion 36 serving as a driving shoulder. In the cutter shown in Figs. 11 and 12, the projecting or bent metal portions 66 serve as driving shoulders. The cutter illustrated in Fig. 13 is trapezoidal in shape, and is provided with the beveled sides 67 adjacent the cutting edge 68, the sides 67 serving as driving shoulders. Figs. 14 and 15 show cutters each provided with a plurality of shanks 64 attached to the body portion 70. In Figs. 14 and 15 the beveled sides 67 serve as the driving shoulders. The modified form of cutter as shown in Figs. 16 and 17 comprises a main body portion 72 having an opening 73 whereby it may be held in position on the roller 12 (Fig. 1) by means of a screw or the like; the short shanks 74 project transversely to the main body portion 72, and are adapted for inser-

tion into the surface of roller 12 to initially locate and preserve the position of the cutter. Any form of setting tool, such as a hammer, may be employed to apply the cutter. The cutting edge 75 is formed on a body portion 76 extending transversely to the main body portion 72.

Figs. 21 to 26 illustrate various forms of designs for cut-outs and decorations which can be made in the above manner. Fig. 21 represents a symmetrical design where the entire web would be perforated at once into duplicate cutouts, it being seen that the borders are symmetrical so that duplicates can be made. In Fig. 22 two cutouts of different outlines can be made at once with a small waste portion which the paperhanger can separate and throw away. In Fig. 23 a somewhat different form is shown wherein two borders would be made at once of the same outline with waste pieces perforated ready for separation. In Fig. 24 two borders of different outlines would be made at once by proper rows of knife pins with a continuous waste strip between. In Fig. 25 is represented two borders with a binder strip formed in between without extra expense save in the setting of the knife pins, and with minimum waste of paper. In Fig. 26 is shown a method by which independent cutout ornaments can be made on a web. In all of these figures it is to be observed that the perforated designs on the web will bear a predetermined relation to the printed designs, which will work out in practice, because there is no opportunity for stretching of the web between the time it is perforated and the time it is printed, it being well known that even slight dampening of a web causes it to stretch and warp and renders it necessary that the perforating and printing devices be very closely disposed relatively to each other and that they operate as nearly simultaneously as possible. It is therefore more advantageous to perforate the web before it is printed than after, because after the web is printed, especially where a number of colors are printed, it becomes damp and liable to stretch, and the amount of stretch varies with the particular web in many instances so that exact registering is more easily obtained by the specific arrangement of the parts herein shown. When dampened by paste, the design is readily separated along the perforations by tearing, and the paper cuts more smoothly when dry. Moreover, it will be observed that the perforating devices act on the face of the web, so that any roughened edges will appear on the back, thereby not affecting the lay of the color.

In Fig. 18 a somewhat modified arrangement is shown for mounting the knife pins, wherein 52 represents a chain rotating over sprockets 53, one of the sprockets 53 being geared to the printing machine as through a gear similar to 5 before described, so that the chain will rotate in synchronism therewith. 54 represents wooden blocks carried on the chain links in which the pins are driven by the same mechanism as before described, or any suitable modification thereof not necessary to be described. Suitable tension devices will be provided for maintaining a certain tension on the chain 52, it being seen that at the time the pins act to perforate the web 7 they are closely pressed together with the blocks in contact forming a practically rigid surface.

In Fig. 19 the platen roller 10 is replaced by driven platen rollers 56, 57, carrying a rubber or other yielding belt 58 which runs under a fixed table 59, the chain 52 carrying the blocks 54 running over a table or support 60, and the web being perforated as it is carried along between the belt 58 and the knife pins carried by the blocks 54, which will be geared to move at the same linear speed and also in predetermined relation to the printing devices before described.

In Fig. 20 the chain 52 and blocks 54 are replaced by the roller 12 before described, the platen devices being otherwise unchanged.

In addition to cutouts for wall paper, shelf papers and ornamental papers of various kinds can be cheaply produced, especially wherein it is desired to associate perforations with printed or applied surface designs or ornamentations.

This application is a continuation of my application Serial No. 714,432, filed August 10, 1912, as to all matters common to the two applications.

Various modifications and changes in the specific devices herein described for producing the cutout, and in the cutout itself, may be made without departing from the scope of the invention.

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

1. In web perforating mechanism, the combination with perforating means movable in the direction of the web and comprising a series of separate knives having cutting edges adapted to cut a succession of narrow slits in the web and alined to form a desired design of irregular contour, of a coöperating movable platen having a smooth periphery contacting with said cutting edges passing through the web.

2. In a web perforating mechanism, the combination with a movable platen, of means for guiding said web to and from the platen and holding said web against the surface of said platen, and perforating means coöperating with said platen to perforate the web in an irregular line and comprising a series of knife pins having peripheral cut-

ting edges alined to form the desired design.

3. In a web perforating mechanism, the combination with a movable platen, of means for guiding said web to and from the platen and holding said web against the surface of said platen, perforating means coöperating with said platen to perforate the web in an irregular line and comprising a series of knife pins having peripheral cutting edges alined to form the desired design, and means for driving said platen and perforating means to feed said web.

4. The combination with a frame, of a design cutting device mounted therein, a platen roller coöperating with said cutting device, a frame carrying levers, journals for said platen roller carried by said levers, an adjustable stop for limiting movement of said platen toward the perforating means, and means connected with said levers for lifting said platen out of coöperation with said design cutting device.

5. In a web perforating mechanism, the combination with a movable platen, of perforating means coöperating with said platen to perforate the web in an irregular line and comprising a movable support and a series of cutting edges individually adjustable to different positions upon the periphery of said support and alined to form the desired design.

6. In a web perforating mechanism, the combination with a movable platen, of perforating means coöperating with said platen to cut a succession of narrow slits in an irregular line on said web and comprising a support moving in the direction of the web and a series of knife pins having outward facing transverse edges and pointed shanks adapted to be driven into said support at any relative positions, said knife pins being individually adjustable around the axes of their respective shanks.

7. In web perforating mechanism, the combination with a movable perforator support, of perforating means thereon comprising a series of cutting edges alined to form a design of irregular contour, a platen holding the web in operative engagement with the perforating means and comprising a rotatable cylinder having a resilient periphery held by gravity against said perforating means.

8. In web perforating mechanism, the combination with a movable perforator support, of perforating means thereon comprising a series of cutting edges alined to form a design of irregular contour, a platen holding the web in operative engagement with the perforating means and comprising a rotatable cylinder having a resilient periphery held against said perforating means, means for driving said cylinder and perforating means to feed and perforate the web between them, and means guiding the web to and from said cylinder and holding it against the periphery thereof.

9. In web perforating mechanism, the combination with a platen, of a perforating roll pressed against said platen, a movable frame replaceably supporting said perforating roll, means for adjusting said frame to accommodate different sizes of rolls, and driving means rotating said roll irrespective of the adjustment of said frame and adjustable to control the rate of rotation of said roll.

10. In web perforating mechanism, the combination with a roll of soft material, of perforating means carried thereby and comprising a series of knife pins having pointed shanks driven into said roll and cutting edges alined to form a design of irregular contour, a platen bearing on said edges by gravity, a movable frame adapted to support said roll in position against said platen, and means for adjusting said frame to accommodate different sizes of rolls.

11. The combination of means for perforating a design in a traveling web, of a platen coöperating therewith, a swinging frame carrying said perforating means, means for adjusting said frame, and means for adjusting said platen, and means for adjusting the perforating means independently of said frame adjusting means.

12. A combination with a frame, of a design cutting device mounted therein, a platen roller coöperating with said cutting device, an adjustable stop for limiting the movement of said platen with relation to the cutting device, and means for moving said platen out of coöperation with said cutting device.

13. A knife pin for a web perforating device, comprising a shank portion adapted to be driven into a support, a flattened perforating head, a transverse cutting edge at the outer end of said head, and outward facing driving shoulders formed by the flattening of said head at the outer end of said shank portion to receive the thrust of a setting tool.

14. A knife pin for a web perforating device, comprising a shank portion adapted to be driven into a support, a widened, flattened perforating head, a transverse cutting edge at the outer end of said head, outward facing driving shoulders formed by the flattening of said head at the outer end of said shank portion to receive the thrust of a setting tool, and inward facing shoulders formed by the widening of said head to gage the depth to which the shank is inserted in its support.

15. A knife pin for a web perforating device, comprising a shank portion adapted to be driven into a support, a widened perforating head, a transverse cutting edge at the

outer end of said head, outward facing driving shoulders to receive the thrust of the setting tool, and inward facing shoulders formed by the widening of said head to gage the depth to which the shank is inserted in its support.

16. A knife pin for a web perforating device, comprising a shank portion adapted to be inserted in a support, and a flat head portion having a cutting edge at its outer end, and inward tapered edges between said cutting edge and said shank so that said cutting edge is at the widest part of the pin.

17. A knife pin for a web perforating device, comprising a shank portion adapted to be inserted in a support, a flat head portion having a cutting edge at its outer end, inward tapered edges between said cutting edge and said shank so that said cutting edge is at the widest part of the pin, and an inward facing shoulder formed by the tapering of said edges and gaging the insertion of said shank in said support.

18. A knife pin for a web perforating device, comprising a pointed shank portion of circular cross-section adapted to be inserted into a support, a head portion carrying an outward facing transverse cutting edge, and outward facing shoulders formed integrally on said pin and adapted to receive the thrust of an inserting tool.

19. A knife pin for a web perforating device, comprising a cutting head having an outward facing cutting edge, and a plurality of inward directed shank portions adapted to be inserted in a support.

20. In web perforating mechanism, the combination with a roll having projecting cutting edges, a platen cylinder pressed against said edges, and gearing for driving said roll and said cylinder at relative speed ratios which are not integral so that the wear will be distributed over the periphery of said cylinder.

In testimony whereof I affix my signature, in presence of two witnesses.

WM. F. MARRESFORD.

Witnesses:
C. V. EDWARDS,
H. C. EGAN.