Sept. 17, 1940. A. L. ROLOFF 2,215,073

SHEET MUTILATING APPARATUS

Filed Feb. 13, 1939 2 Sheets-Sheet 1

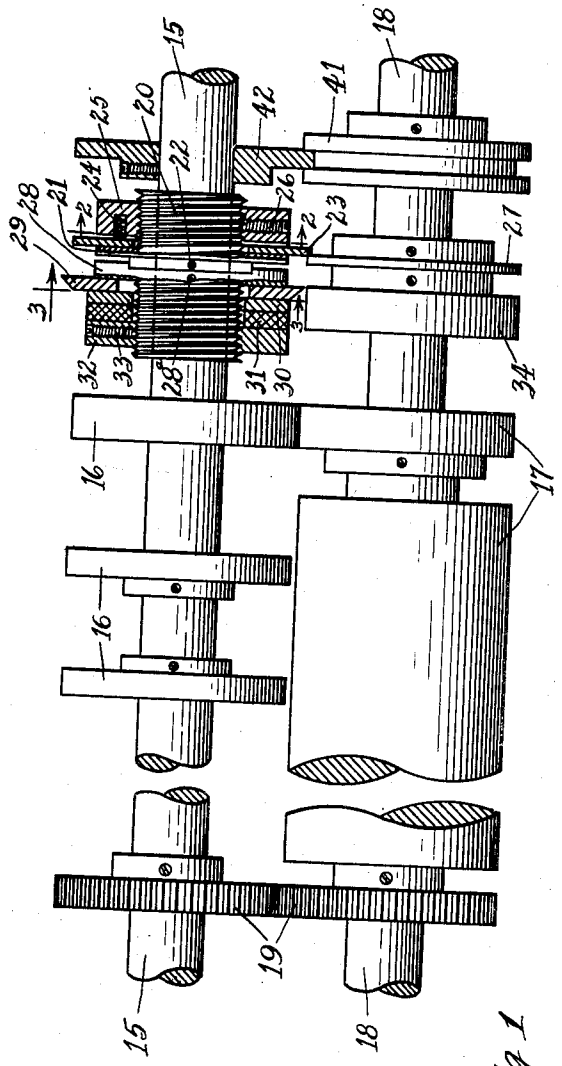


Fig 1

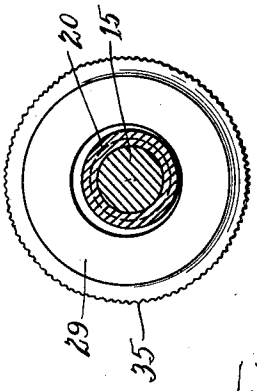


Fig 3

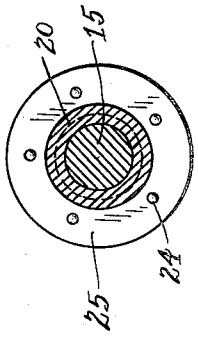


Fig 2

Inventor
Arthur L. Roloff.
By: Ames, Thiess, Olson & Mecklenburger
Attys

Sept. 17, 1940. A. L. ROLOFF 2,215,073

SHEET MUTILATING APPARATUS

Filed Feb. 13, 1939 2 Sheets-Sheet 2

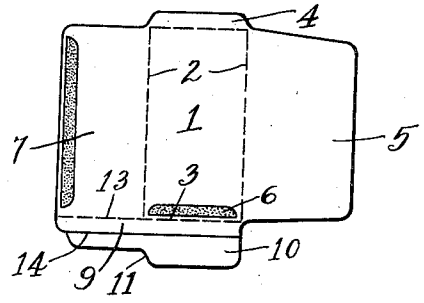


Fig 4

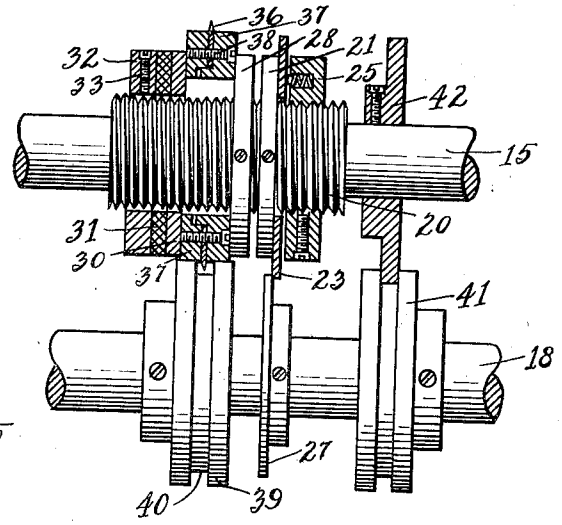


Fig 5

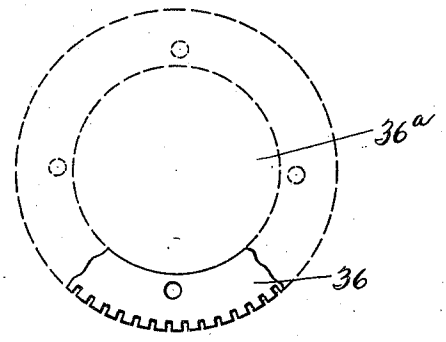


Fig 6

Inventor
Arthur L. Roloff.
By: Ames, Thiess, Olson, & Mecklenburger
Attys

Patented Sept. 17, 1940 2,215,073

UNITED STATES PATENT OFFICE

2,215,073

SHEET MUTILATING APPARATUS

Arthur L. Roloff, Chicago, Ill., assignor to Garden City Envelope Co., Chicago, Ill., a corporation of Illinois

Application February 13, 1939, Serial No. 256,058

2 Claims. (Cl. 164—61)

This invention relates to sheet mutilating apparatus and more particularly to apparatus adapted to perforate, cut, or otherwise mutilate sheet material such as paper or the like.

This application is a continuation in part of my copending application Serial No. 182,968, filed January 3, 1938, and entitled Envelope machine and envelope blank used therewith. The copending application is directed to an envelope machine adapted for manufacturing envelopes having a binding strip which may readily be bound in with the pages of a magazine or the like, whereby the envelope itself may readily be detached from the magazine and mailed to an address already provided on the envelope. The machine is particularly adapted to provide a weakened line between the binding strip and the envelope proper. This line is perforated or otherwise mutilated to enable the envelope to be readily detached.

The present application is directed to a mutilating apparatus such as disclosed in the copending application and which is adapted for perforating, cutting, or otherwise mutilating envelopes or any other suitable sheet material in which predetermined types of mutilated lines may be required.

It is an object of the present invention to provide a simple and efficient mutilating apparatus which will be of few parts, easily assembled, and which will not easily get out of order; also in which the pressure of the mutilating edges on the platen roller may be reduced to a minimum or completely eliminated so that the cutting edges will remain sharp much longer than in ordinary practice.

Further objects will be apparent from the specification and the appended claims.

In the drawings:

Fig. 1 is a vertical sectional view through one embodiment of the mutilating apparatus.

Fig. 2 is a transverse sectional view taken on a line substantially corresponding to line 2—2 of Fig. 1.

Fig. 3 is a transverse sectional view taken on a line substantially corresponding to line 3—3 of Fig. 1.

Fig. 4 is a plan view of an envelope blank suitable for mutilation in the apparatus disclosed herein.

Fig. 5 is an enlarged sectional view of a slightly different embodiment of the mutilating apparatus.

Fig. 6 is a side elevation of the sheet metal perforating or mutilating ring shown in Fig. 5.

In the copending application above referred to, an envelope blank was disclosed similar to that shown in Fig. 4 of the present application and, although the disclosure of the present application is adapted for mutilating all suitable types of sheet material and the invention may be adapted to meet various requirements, it is particularly useful in the manufacture of envelopes which are formed of a blank such as shown in Fig. 4 and to which the description in this application will be confined. The blank from which the envelope is formed comprises a rectangular portion 1 bounded by scored and perforated lines 2 and 3, as indicated. The envelope is provided with a side edge flap 4 which is finally folded over on the central portion 1 and the bottom flap 5 is folded over and secured to a gummed area 6 and to a similar gummed area on the back of the flap 4 to form the envelope pocket. A closing flap 7 is provided for closing the envelope and is adapted to be sealed by means of a gummed part 8.

All of the above-mentioned flaps extend from the rectangular center portion 1, including a binding strip 9 which extends laterally as shown. The envelope is also provided with a laterally extending wing portion 10 which extends from the binding strip 9. This wing 10 provides a shoulder 11 and the flap 4 on the opposite end of the envelope provides a shoulder 12. These shoulders are adapted to be engaged by pins on suitable conveyors for carrying the envelope blank through the machine. During the passage of the envelope blank through the machine, it is perforated or otherwise mutilated along the line 13, as shown, and, simultaneously with this mutilation, the flap 10 is cut off on the line 14.

The present invention is adapted to simultaneously perforate or otherwise mutilate along the line 13 and simultaneously cut off the blank along the line 14. It will, of course, be understood that operation on this envelope is described merely as an example and the device is adapted for cutting or otherwise mutilating any other suitable type of sheet material, and the cut-off device may or may not be used.

The embodiment illustrated in Fig. 1 comprises a shaft 15 having suitable feed rolls 16 thereon for co-operation with feed rolls 17 on a parallel shaft 18, which latter may be driven from the shaft 15 by means of suitable gears 19. The feed rolls are for the purpose of passing the sheet material through the machine. The shaft 15 is provided with a threaded sleeve 20 which

may rigidly be secured thereto or may be integral therewith to form an enlarged threaded portion of the shaft to receive the shearing and mutilating members. The threaded sleeve 20 is provided with a correspondingly threaded collar 21 which may be secured in any adjusted position on the sleeve by means of a setscrew 22. A shearing disc 23 is mounted on the sleeve adjacent the collar 21 and retained snugly in position by means of coil springs 24 in suitable pockets in a threaded collar 25 which is, in turn, secured to the threaded sleeve 20 by means of setscrews 26. The shearing disc 23 co-operates with a complementary shearing disc 27 which is mounted for longitudinal adjustment on the shaft 18. It will, therefore, be apparent that, whenever a sheet of paper or other suitable material is passed through the machine, it will be smoothly sheared by these discs, the upper one of which is pressed snugly against the lower by means of springs 24. The disc 23 is also longitudinally adjustable on the shaft 15 by virtue of the threaded members 21 and 25.

A threaded collar 28 is also mounted on the threaded sleeve 20 and may be secured in adjusted position by means of a setscrew 28*a*. A cutter or perforator or other suitable mutilating disc or ring 29 is frictionally held against the collar 28 by means of a friction device comprising a metal washer 30, preferably of brass, and a washer 31 of leather or other suitable material. These washers are secured in position snugly against the mutilating disc 29 by means of a collar 32, which is threaded on the sleeve 20 and secured by means of setscrews 33. By this arrangement the mutilating disc 29 will be rotated with the shaft 15, but may be moved radially by lateral pressure which will be resisted by friction.

The axial opening of the mutilating disc 29 is somewhat larger than the diameter of the threaded sleeve 20, whereby, when the edge of the mutilating disc 29 is pressed snugly against a co-operating platen roller 34 on the shaft 18, the mutilating disc 29 will be slightly eccentric with the shaft 15.

This eccentricity will be continuous during operation of the machine and the friction may be adjusted for any desired pressure on the platen.

The distance of the upper edge of the perforating disc 29 from the axis of the shaft 15 will tend to be greater than the distance of the lower edge of the perforating disc from the axis of the shaft. As the perforating disc rotates, portions of the perforating edge gradually increasing in distance from the axis of the shaft will be rotating toward the point of contact between the perforating edge 35 and the paper sheet. This will cause a continuous shifting of the perforating disc 29 with respect to the axis of the shaft 30 on which it is mounted. The large opening in the perforating disc 29 and the frictional mounting effected by the washers 30 and 31 enable this shifting of the perforating disc with respect to its axis. By properly tensioning the friction disc, just the required degree of pressure of the perforating disc on the paper sheet may be secured.

Figs. 5 and 6 illustrate a slightly different embodiment of mutilating disc and platen roller. In this embodiment a mutilating ring 36 may be substantially as shown in Fig. 6 and may be formed of very thin sheet steel which may, if desired, be only a few thousandths of an inch thick. This ring may have any desired mutilating edge such as serrations of any suitable shape to provide cutting points or spaced mutilating edges, as shown. This very thin sheet metal disc may be provided with a central opening 36*a* which is materially larger than the diameter of the threaded sleeve 20. The disc 36 is clamped rigidly between two collars 37 by means of suitable screws 38. The collars 37 are provided with a central opening which is also materially larger than the threaded sleeve 20, so that the continuous eccentric slipping movement may take place in this embodiment in the same manner as previously described.

The disc 36 and collars 37 provide a unit which is clamped between the threaded collar 28 and collar 32, and a metal washer 30 and friction washer 31 are provided in the same relative position as previously described so that a friction clutch is provided to enable eccentric rotation of the mutilating unit. In this embodiment a platen member 39 is provided on the shaft 18 for co-operation with the mutilating unit. This platen member is provided with a clearance groove 40, and the collars 37 frictionally engage the surface of the platen on opposite sides of the groove, as shown, with the cutting edge of the mutilating disc extending into the groove 40.

It will be apparent that, when sheet material such as paper is passed between the platen and the cutting unit, it will be snugly clamped between the platen and the mutilating unit, as shown, and the edges of the thin sheet metal disc 38 may mutilate the paper in accordance with the formation of the edge of the disc as the paper is passed through the machine. In other words, as the paper passes through the machine, it will be held taut over the groove 40 of the platen 39 and the pressure of the cutting disc 36 will effectively perforate or otherwise mutilate the paper without any harmful engagement of the mutilating edge with the platen.

It will, of course, be understood that the cutting discs 23 and 27 may be positioned at any required point on the shafts and will co-operate to cut the paper along any desired line.

If desired, a pair of aligning discs may be provided in the manner illustrated in Fig. 1. These aligning discs comprise a slotted disc 41 on the shaft 18 and a co-operating disc 42 secured to the shaft 15. The disc 42 fits snugly into the groove in the disc 41 and proper alignment of the entire structure is maintained thereby. These two discs hold the two shafts against relative endwise play so that proper alignment of the mutilating disc is maintained at all times. If desired, one of these discs may provide a guide for the paper as it is passed through the machine. The aligning discs may be adjustable on the respective shafts and secured by suitable setscrews.

In the claims, where the word "mutilate" is used, it is to be understood as being broad to cover shearing, perforating, cutting, and the like.

Modifications may be made without departing from the spirit of the invention, and it is therefore desired that the invention be limited only by the prior art and the scope of the appended claims.

Having thus described this invention, what is claimed and desired to be secured by Letters Patent is:

1. A sheet-mutilating apparatus comprising a rotatable gripping rotor having two annular sheet-gripping portions axially spaced from each other to provide clearance therebetween, a rotatable shaft having its axis parallel to the axis

of said rotor, a second gripping rotor mounted on said shaft for limited radial movement with respect to said shaft and yieldingly urged toward said first gripping rotor and cooperating with said axially spaced sheet-gripping portions to hold the sheet taut between said spaced sheet-gripping portions, and a circular sheet-mutilating member coaxial with said second gripping rotor and carried thereby for mutilating the sheet between said spaced annular gripping portions, the mutilating edge of said mutilating member being out of contact with said first gripping rotor.

2. A sheet-mutilating apparatus comprising a rotatable gripping rotor having two annular sheet-gripping portions axially spaced from each other to provide clearance therebetween, a rotatable shaft having its axis parallel to the axis of said rotor, a second gripping rotor, mounted on said shaft for limited radial movement with respect to said shaft and yieldingly urged toward said first gripping rotor, rotatable about an axis parallel to the first gripping rotor and cooperating with said axially spaced sheet gripping portions to hold the sheet taut between said spaced gripping portions, and a circular sheet-mutilating member coaxial with said second gripping rotor for mutilating the sheet between said spaced gripping portions, the mutilating edge of said mutilating member being out of contact with said first rotor.

ARTHUR L. ROLOFF.