July 10, 1945. C. W. BARNARD 2,379,859

STAMP HINGE FOLDING, CUTTING, AND PACKAGING ASSEMBLY

Filed July 3, 1941 4 Sheets-Sheet 1

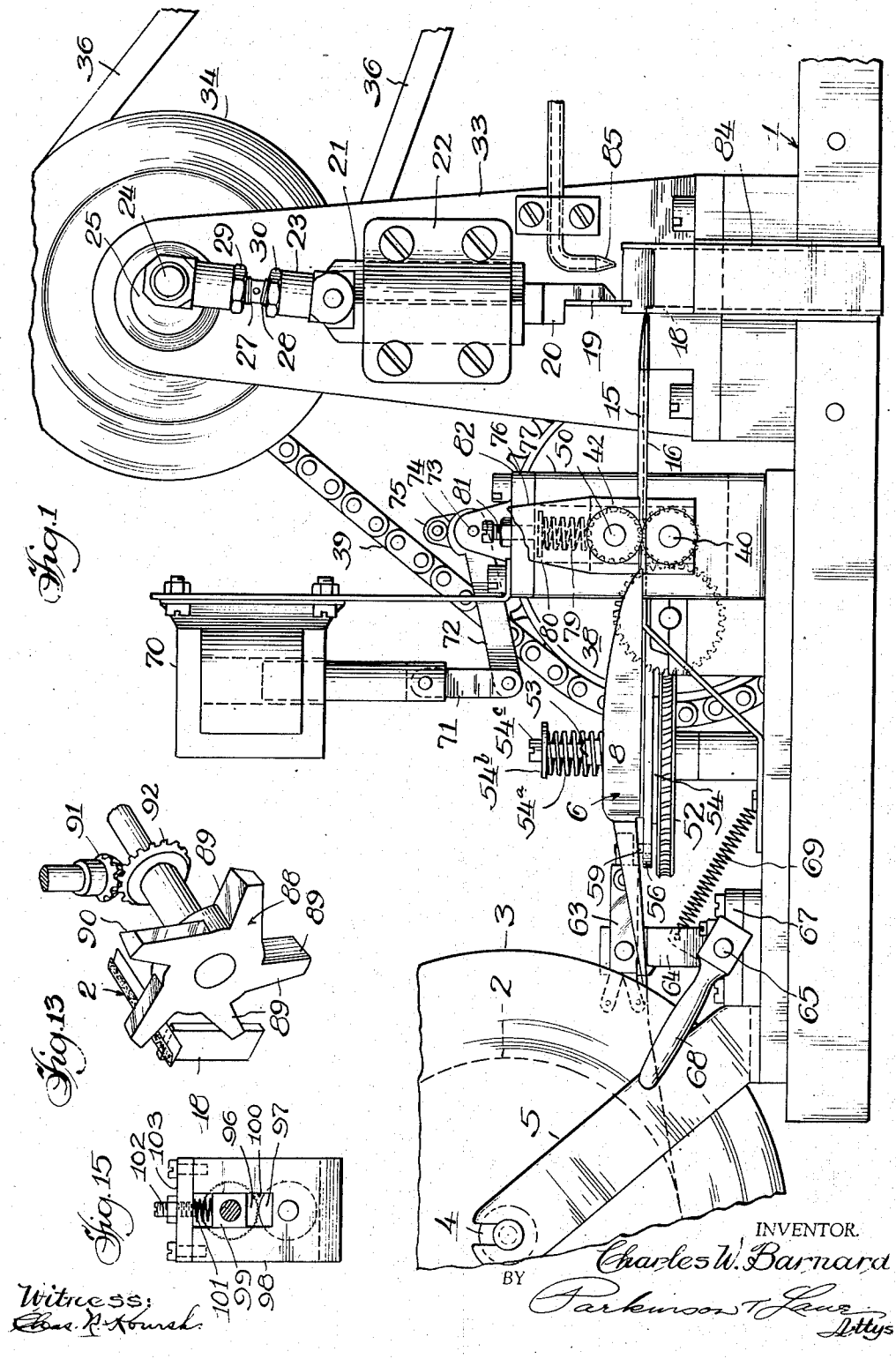


Fig. 1

Fig. 13

Fig. 15

Witness:
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STAMP HINGE FOLDING, CUTTING, AND PACKAGING ASSEMBLY

Filed July 3, 1941 4 Sheets-Sheet 2

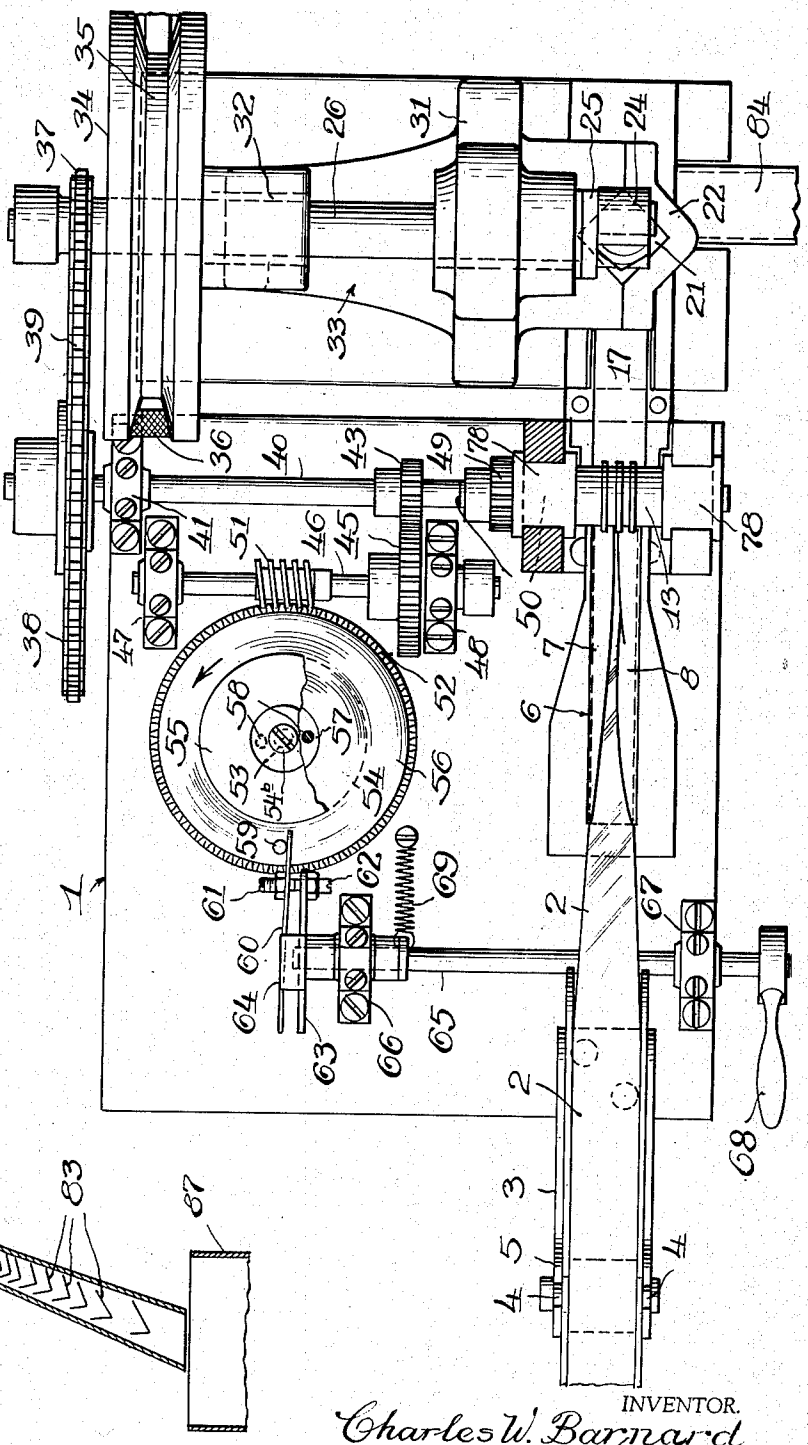


Fig. 2

Fig. 11

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STAMP HINGE FOLDING, CUTTING, AND PACKAGING ASSEMBLY

Filed July 3, 1941 4 Sheets-Sheet 3

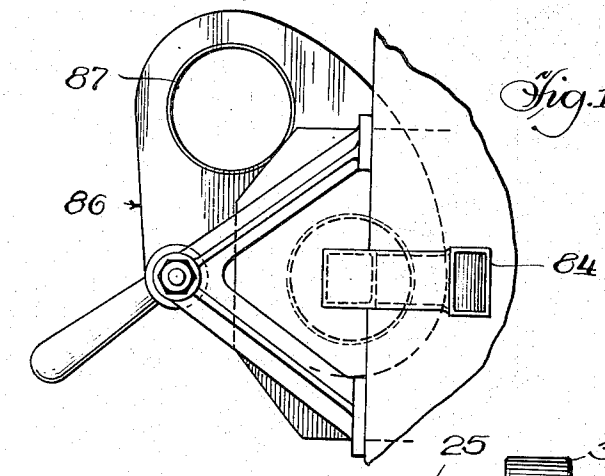


Fig. 12

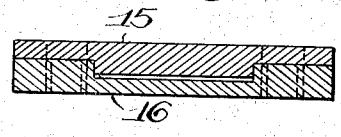


Fig. 10

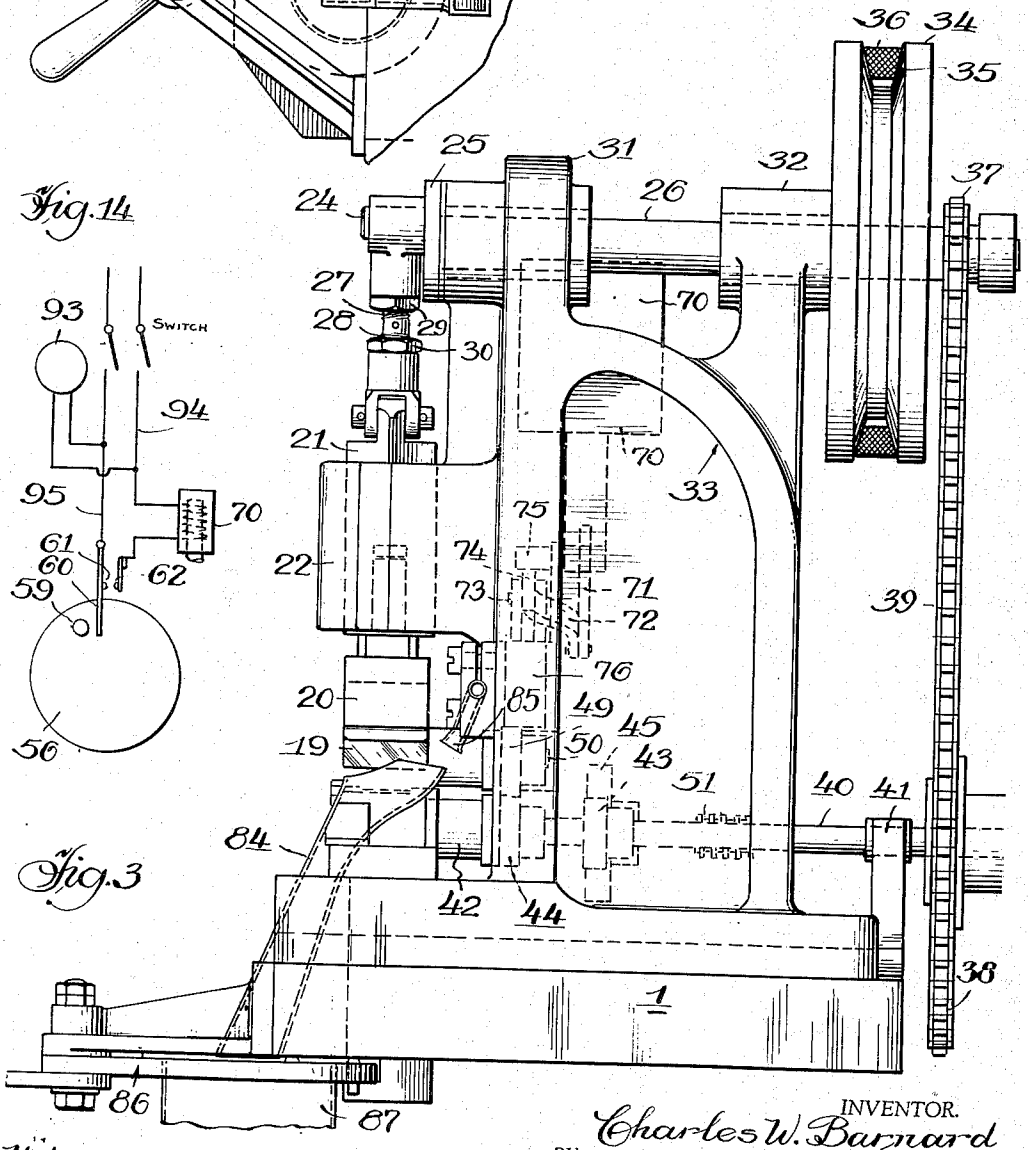


Fig. 3

Fig. 14

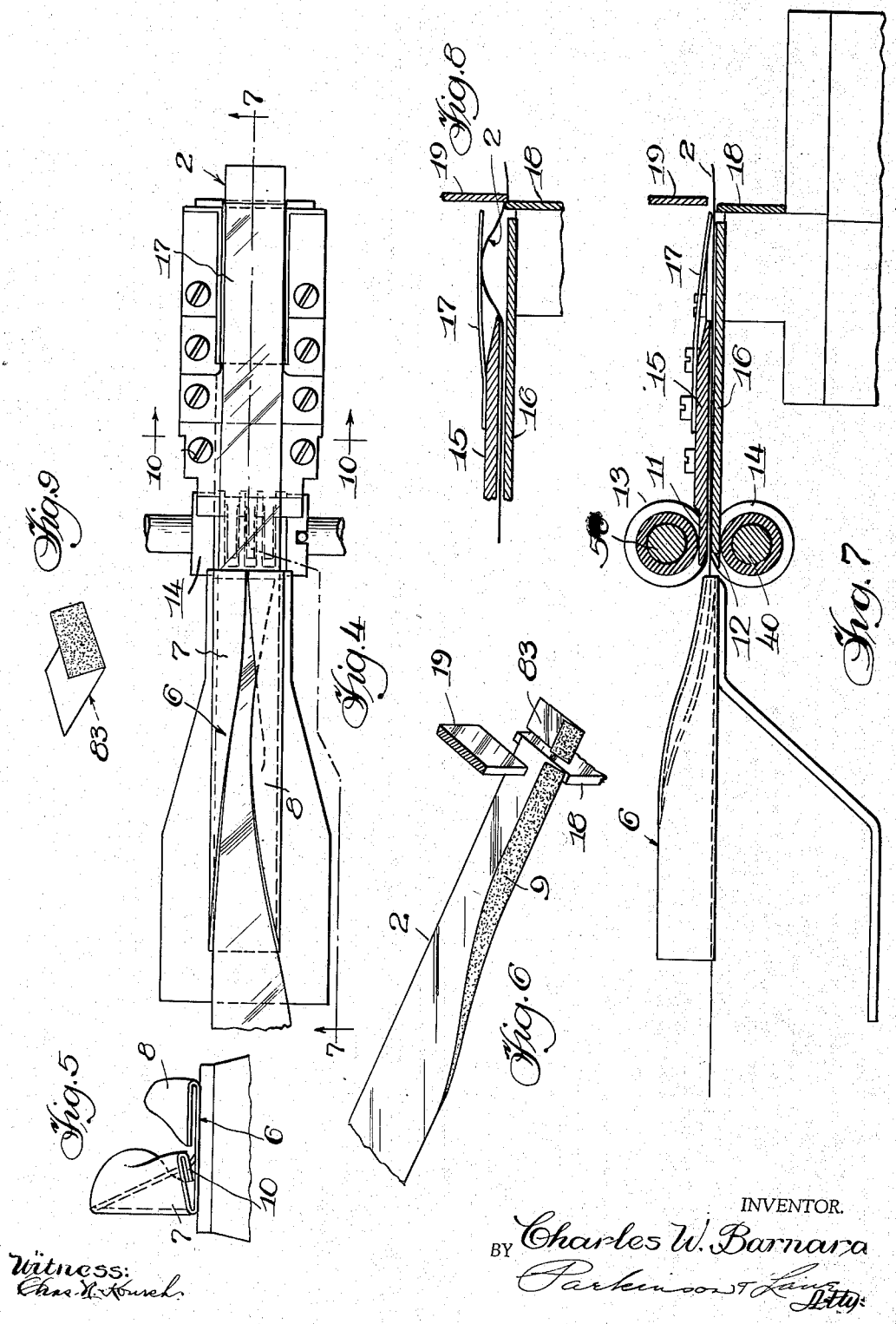
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STAMP HINGE FOLDING, CUTTING, AND PACKAGING ASSEMBLY

Filed July 3, 1941 4 Sheets-Sheet 4



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Patented July 10, 1945

2,379,859

UNITED STATES PATENT OFFICE

2,379,859

STAMP HINGE FOLDING, CUTTING, AND PACKAGING ASSEMBLY

Charles W. Barnard, Detroit, Mich.

Application July 3, 1941, Serial No. 400,954

12 Claims. (Cl. 93—1)

The present invention relates to a novel means and mechanism for successively folding, cutting, and packaging stamp hinges or mounting strips for photographs, etc. In the novel disclosed embodiment the gummed strip or stock is fed directly from the roll through a folding device in which it is folded into the desired shape. It is then progressively passed between feed rollers which crease the folded stock, then between guide plates, and then between shearing blades which cut the folded paper into the desired length. These sheared hinges are then discharged into a packing chute from which they are transported to an envelope or container in the desired number. This entire operation is automatically accomplished.

The invention further comprehends a novel drive mechanism by which the automatic folding, cutting and packaging operations are accomplished in sequence and so synchronized as to produce a desired or predetermined number of hinges in each cycle of operation.

A further object of the present invention is the provision of a novel means and method for preventing curling of the stamp hinge.

Further objects are to provide a construction of maximum simplicity, efficiency, economy and ease of assembly and operation, and such further objects, advantages and capabilities as will later more fully appear and are inherently possessed thereby.

The invention further resides in the construction, combination and arrangement of parts illustrated in the accompanying drawings, and while I have shown therein a preferred embodiment, it is to be understood that the same is susceptible of modification and change, and comprehends other details, arrangements of parts, features and constructions without departing from the spirit of the invention.

In the drawings:

Figure 1 is a view in side elevation of the novel assembly.

Figure 2 is a top plan view of the assembly.

Figure 3 is a view in end elevation of the novel construction.

Figure 4 is a plan view of the novel means for folding and creasing the stock.

Figure 5 is a view in end elevation of the discharge end of the folding device.

Figure 6 is a view in perspective of the stock after it has been folded and creased and showing the shearing operation.

Figure 7 is a view, part in side elevation and part in vertical cross section, taken in a plane represented by the line 7—7 of Figure 4.

Figure 8 is a fragmentary view in vertical cross-section of the right hand end of Figure 7 showing the position of the stock during the cutting operation.

Figure 9 is a view in perspective of a complete stamp hinge.

Figure 10 is a view in vertical cross section taken in a plane represented by the line 10—10 of Figure 4.

Figure 11 is a view in vertical cross section of the packing chute through which the stamp hinges are discharged.

Figure 12 is a top plan view of the packing chute and shiftable frame containing tubes for discharging a predetermined number of hinges into an envelope.

Figure 13 is a perspective view of an alternate construction of shearing mechanism.

Figure 14 is a wiring diagram for energizing the solenoid which disables the feed.

Figure 15 is a view in end elevation of a gum breaker.

The present invention relates to a stamp hinge folding, cutting and packaging assembly mounted upon a suitable support or base 1. The stock 2 may be of any desired width for use as a stamp hinge and is shown as rolled upon a take-off reel 3 removably and rotatably supported in cutouts 4 provided in spaced arms 5 of a supporting bracket projecting rearwardly and upwardly from the base 1 to provide for the desired clearance and unrolling of the stock. This stock is shown as gummed on its under side as it is unrolled and is fed into and through a folder 6 of the desired configuration and preferably formed of a sheet of metal having its opposite edges 7 and 8 bent or folded inwardly and upon themselves as clearly show nin Figures 4 and 5, so that one edge 9 of the stock is bent upwardly and over. This is accomplished by the reverse bend or fold 10, the folder being so contoured that as the stock is fed thereto, such stock in passing through the folder, is automatically given the form of the slot outlined by the edges or folds 7, 8 and 10.

After the stock has been folded as will be clear from Figure 6, it passes between a pair of guide fingers 11 and 12 and feed rollers 13 and 14, and from there between spaced guides 15 and 16. Upon the upper guide 15 is mounted a leaf spring 17 acting as a stripper and hold down spring for the folded stock as it is fed to and over the lower shearing blade 18, and between it and the upper

blade 19. The roll feed is driven continuously and the stock is allowed to buckle (see Figure 8) for the time required in the shearing operation, and as the upper shearing blade rises, the buckle is straightened out by the pressure of the spring 17.

The upper shearing blade 19 is made reciprocating and its reciprocatory movement is suitably synchronized with the stock fed to the cutter unit. For this purpose the upper blade 19 is mounted in or upon a blade holder 20 secured to a slide 21 slidably mounted in a guide 22. This slide is pivotally connected at its upper end to a connecting rod 23, the latter having its upper end mounted upon an eccentric crank pin 24 projecting from a crank disc 25 secured on an end of the crank shaft 26. The connecting rod is made adjustable through the opposed threaded portions 27 and 28 and lock nuts 29 and 30, so as to adjust the upper shearing blade 19.

The shaft 26 is rotatably mounted in spaced bearing supports 31 and 32 on the frame or standard 33 rigidly secured to the base 1. Mounted upon this shaft adjacent the end opposite that of the crank pin 24 is a combined pulley and fly wheel 34 which is shown in Figures 2 and 3 as provided with a V-shaped groove 35 for reception of a V belt 36 driven from a motor or other source of power (not shown). A sprocket 37 is secured upon the shaft 26 adjacent the pulley and fly wheel 34 and this sprocket drives a sprocket wheel 38 through a chain 39. The sprocket wheel 38 is shown as mounted upon and driving a shaft 40 rotatably mounted in spaced bearings 41 and 42, and upon which shaft is keyed or secured the lower feed roller 14. Also keyed or secured upon this shaft 40 are spaced gears 43 and 44, the former meshing with and driving a gear 45 keyed to or secured upon and driving the shaft 46 rotatably mounted in spaced bearings 47 and 48, and the latter meshing with and driving a gear 49 keyed to the stub shaft 50 of the upper feed roller 13. Upon the shaft 46 is also keyed a worm 51 meshing with and driving a worm wheel 52 secured upon an upright stub shaft 53. A pair of spaced discs 54 and 55 are rotatably carried by the worm wheel 52 and between these discs is located an enlarged friction disc 56. The disc 56 is provided with an enlarged central opening 57 through which project upstanding pins 58 carried by the worm wheel 52 and adapted to be received in openings provided in the driven discs 54 and 55 so that the worm wheel 52 and discs 54 and 55 continuously rotate as a unit, and these discs carry along the intermediate disc 56 unless an abutment or stop is placed in its path of travel. A spring 54^a seating upon the upper disc 54 and held under compression by a washer 54^b and set screw 54^c, maintains the discs 54, 55 and 56 in frictional contact.

From the upper surface of the disc 56 projects a pin or stop 59 which is adapted to abut a spring bar 60 carrying an adjustable contact 61 and which bar and contact are adapted to be moved into engagement with a second contact 62 adjustably mounted in a bar 63. These bars are carried in a support 64 secured upon a shaft 65 rotatably mounted in spaced bearings 66 and 67 and which shaft is adapted to be manually rotated by the operator through a lever or handle 68. When the operator trips this lever handle by moving it in a counter-clockwise direction, he raises and thereby carries the spring bar 60 out of engagement with the stop pin, and the disc 56 and stop pin 59 are carried with the discs 54 and 55 and worm wheel 52 in a counter-clockwise direction. Upon release of the lever handle, the spring 69 automatically rotates the shaft 65 so as to return the spring bar 60 to a position in which the pin 59 will abut thereagainst when it has rotated through a complete circumference. It will be appreciated that due to the inherent resiliency of the bar 60, when the stop pin 59 no longer abuts thereagainst this bar will withdraw the contact 61 from the contact 62 and open the circuit to a solenoid 70.

As shown in Figure 1, when the solenoid 70 is energized, the plunger or arm 71 is raised and this arm in turn raises the arm or link 72 which has its outer end pivoted at 73. This outer end is so contoured as to provide a lifting cam 74 with the cam surface abutting against the under surface of a roller 75 carried in the upper end of the frame 76 in such manner that this roller and frame are raised a distance sufficient to separate the driven gear 49 and the upper feed roller 13 from the lower drive gear 44 and feed roller 14. This automatically stops feeding of the stock to the cutter unit. In order that the upper feed roller 13 may be so mounted as to be raised out of contacting or feeding engagement with the lower feed roller 14, the frame 76 is adjustably mounted within the stationary support 77 and the shaft 50 of the upper roller and its bearing block 42 are carried within the frame 76. A coil spring 79 seats against the bearing 42 and is held under compression by means of a plate 80. To allow for adjustment of the compression on this spring, the invention comprehends a set screw 81 threadedly mounted in the cap or head 82 of the stationary support 77.

The individual stamp hinges 83 upon being severed are blown into a chute 84 by means of compressed air discharged through the nozzle 85, as more clearly shown in Figures 1, 3, 11 and 12. The chute may be maintained stationary or it may be pivotally mounted to discharge into one or more receptacles. As shown in Figures 3 and 12, the chute is maintained stationary but a shiftable frame 86 is provided below the chute. This frame is preferably provided with two or more projecting tubes 87 of such size as to permit an envelope for receiving and packaging a predetermined quantity of the stamp hinges, to be slipped thereover. When one envelope has been filled with the required number of hinges, the frame 86 is moved to locate another tube 87 and envelope under the chute.

In Figure 13 is disclosed an alternate form of cutter or shearing device 88. This cutter is of the rotary type having a plurality of equally spaced blades 89 so contoured or inclined at 90 as to provide sufficient clearance to allow the gummed strip or stock 2 to be fed forwardly. This cutter may be driven from any suitable source of power and geared to the feed roll counting assembly as by means of bevel gears or the like 91 and 92.

Figure 14 discloses a wiring diagram for operating the solenoid 70. The source of current for the motor 93 is through the wires 94 and 95 which may be connected to the usual 110 volt supply. These wires lead to the contacts 61 and 62 adapted to be closed when the spring arm 60 is impinged against by the stop pin 59. Closing of these contacts energizes the solenoid 70 shown in series in the line 94 and stops feeding of the gummed stock.

It will be readily apparent that the drive mechanism, feed rollers and counting assembly includ-

ing the gearing 43, 45, worm 51, worm wheel 52, friction disc 56 and contacts 61 and 62 are so constructed, arranged, proportioned and synchronized that a predetermined length of gummed stock is fed between the cutter blades, and a predetermined number of strips are cut therefrom before the worm wheel 52 rotates through a complete circumference and the pin 59 causes the contacts to engage and close the circuit to the solenoid 70. Energizing this solenoid causes separation of the feed rollers 13 and 14 and stops feeding of the gummed strip. By synchronizing the operation and properly proportioning the speed of rotation and number of teeth in the sprockets and associated gearing both in the feed assembly and in the counting mechanism, I am able to definitely determine the number of hinges to be produced in each cycle of operation. As an example, in the illustrative embodiment shown, these have been so proportioned as to cut and package one thousand hinges of the type shown in Figure 9 of the drawings.

By altering the folder 6, I am enabled to secure hinges longitudinally folded in any desired manner. As shown in Figure 6, the folded portion is approximately one-third the area of the hinge. This may be changed to substantially one-half or any other desired proportion. Also by bifurcating the upper shearing blade, I need not completely sever the adjoining hinges, but they may be linked together by a narrow connected portion. Furthermore, it will be readily apparent that by increasing the speed of feed of stock or by decreasing the speed of travel of the upper shearing blade or cutter, hinges of any desired length may be produced.

Figure 15 discloses a gum breaker device consisting of an upper corrugated or ribbed roll 96 preferably of a hard material such as metal and a lower roll 97 which may be of a softer metal but preferably of rubber or rubber-like material, the lower roll being journaled in a housing or support 98 while the upper roller is journaled in bearings 99 slidably mounted in vertical slots 100 in the end walls of the housing. In order to maintain this upper or breaker roll 96 under suitable pressure against the lower roll 97, coil springs 101 are provided and seat at their lower end against the bearing blocks 99 and at their upper end against an enlarged end of a set screw 102 adjustably mounted in the head plate 103 of the housing and retainer in adjusted position by a lock nut or other suitable locking means.

This device prevents the curling of the stamp hinge by breaking the continuous layer or coating of gum through pressure applied to the back side of the hinge. The roll being of corrugated or interrupted contour will give an undulated or interrupted surface to the hinge. The gum breaker is preferably placed between the roll of gummed paper and the folder, although it may be used separately for pre-breaking the gum whether the paper is in rolled or sheet form, and the paper may be fed therethrough in any desired manner with the resultant breaking extending longitudinally, transversely, diagonally or otherwise. Furthermore, the rolls 96 and 97 may be driven in synchronism with the rollers employed to draw the gummed strip through the machine, or these rolls may be free to rotate with the strip being drawn therethrough.

Having thus disclosed the invention, I claim:

1. A machine for successively folding, creasing and cutting a predetermined number of stamp hinges from a roll of gummed stock, comprising a member through which the gummed stock passes for folding the stock as it is fed from the roll, feeding mechanism including separable rolls for drawing the gummed stock through the folder and for creasing it, hinge cutting mechanism to which the folded and creased stock is fed from the feeding mechanism, and electrically actuated mechanism for separating the rolls and rendering the feeding mechanism inoperative when a specified number of hinges have been produced.

2. A machine for successively folding, creasing and cutting a predetermined number of stamp hinges from a roll of gummed stock, comprising means for folding the stock as it is fed from the roll, means for cutting the folded stock into hinges of a desired length, a pair of rolls positioned intermediate said folding and cutting means for feeding the stock thereto and for creasing the stock after it has been folded, one of said feed rolls being adapted to be raised out of operative position so as to stop feeding stock to the cutting means when a specified number of hinges have been produced, a solenoid for raising said feed roll when said specified number has been reached, an electrical circuit for energizing the solenoid, and mechanism associated with said feed rolls for maintaining the circuit to said solenoid open until such specified number has been reached.

3. A machine for successively folding, creasing and cutting a predetermined number of stamp hinges from a roll of gummed stock, comprising means for folding the stock as it is fed from the roll, means for cutting the folded stock into hinges of a desired length, a pair of rolls positioned intermediate said folding and cutting means for feeding the stock thereto and for creasing the stock after it has been folded, one of said feed rolls being adapted to be raised out of operative position so as to stop feeding stock to the cutting means when a specified number of hinges have been produced, and means for automatically raising said feed roll when said specified number has been reached and thereby rendering the feed rolls inoperative.

4. A stamp hinge folding, cutting and packaging machine comprising a folder for folding gummed stock into the shape of the desired hinge, feed rollers for feeding the gummed stock through the machine and creasing the folded stock, a cutter for cutting the folded stock into the desired length of hinge, and means for automatically separating said rollers to stop feeding of the stock.

5. A machine for the manufacture of stamp hinges, comprising in combination, means for folding gummed stock, means for cutting said folded stock into hinges, a plurality of rollers positioned intermediate said folding and cutting means for feeding stock thereto and creasing the folded stock, means including a solenoid for stopping the feeding of said stock when a predetermined number of said hinges have been made, and means including an electric circuit for maintaining said solenoid inoperative until said predetermined number of hinges have been made.

6. A machine for the manufacture of stamp hinges, comprising in combination, a folding element for folding gummed stock, a plurality of separable rollers for drawing said stock through said folding element and thereafter creasing the folded stock, stock cutting means including a blade for cutting said folded and creased stock in predetermined lengths, and means including

electrically actuated mechanism for separating and rendering said rollers inoperative after a specified number of hinges have been cut.

7. A machine for successively and continuously folding, creasing, and cutting a predetermined number of stamp hinges, comprising a member for receiving and automatically folding a continuous strip of gummed stock as it passes therethrough, feeding mechanism including a pair of rolls for drawing the stock through the member and thereafter creasing the folded stock, a cutter for shearing the folded and creased stock into hinges of a desired length and to which the stock is continuously fed by the feeding mechanism, means for automatically separating the rolls and thereby rendering the feeding mechanism inoperative when a predetermined number of hinges have been sheared, and means for collecting the hinges as they are sheared, the feeding mechanism and cutter being so driven, constructed and co-related that the feeding mechanism automatically stops operating and ceases feeding stock to the cutter when a predetermined number of hinges have been formed and sheared from the strip of gummed stock.

8. A machine for successively folding, creasing and cutting a predetermined number of stamp hinges from a continuously fed roll of gummed stock, comprising a member through which the gummed stock passes for folding the stock as it is fed therethrough from the roll, feeding mechanism including a pair of separable rolls for drawing the gummed stock through the folder and for creasing it, hinge cutting mechanism to which the folded and creased stock is continuously transmitted from the feeding mechanism, and means for separating the rolls and rendering said feeding mechanism inoperative when a predetermined number of hinges have been cut.

9. A machine for successively folding, creasing and cutting a predetermined number of stamp hinges from a roll of gummed stock, comprising a member through which the gummed stock passes for folding the stock as it is fed from the roll, feeding mechanism including separable rolls for drawing the gummed stock through the folder and for creasing it, hinge cutting mechanism to which the folded and creased stock is fed from the feeding mechanism, and mechanism actuated by the drive to the feeding mechanism for separating the rolls and rendering said last mentioned mechanism inoperative when a predetermined number of hinges have been produced.

10. A machine for automatically folding, creasing and cutting stamp hinges from a continuous length of gummed stock, comprising a member formed to provide a slot of the contour of the desired hinge and having a part for folding an edge of the stock, a plurality of separable rollers for feeding the stock to and through said member and creasing the folded stock, means for cutting the folded and creased stock into hinges of a desired length, and means for separating the rollers when a predetermined number of hinges have been cut.

11. A machine for automatically folding, creasing and cutting stamp hinges from a continuous length of gummed stock, comprising a member formed to provide a slot of the contour of the desired hinge and having a part bent in reverse for folding an edge of the stock, means for cutting the folded stock into hinges of a desired length, a plurality of separable rollers successively feeding the gummed stock to and through said slot, creasing the gummed stock after it is folded and continuously feeding the stock in folded and creased condition to said cutting means, and means for separating the rollers when a predetermined number of hinges have been cut.

12. A machine for successively folding, creasing and cutting a predetermined number of stamp hinges from a roll of gummed stock, comprising means for folding the stock as it is fed from the roll, means for cutting the folded stock into hinges of a desired length, means including a pair of separable rolls intermediate the folding and cutting means for feeding the stock thereto and for creasing the stock after it has been folded, and means for automatically separating and rendering the rolls inoperative for feeding the stock when the predetermined number of hinges has been reached.

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