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EMBOSSING APPARATUS

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2 Sheets-Sheet 2

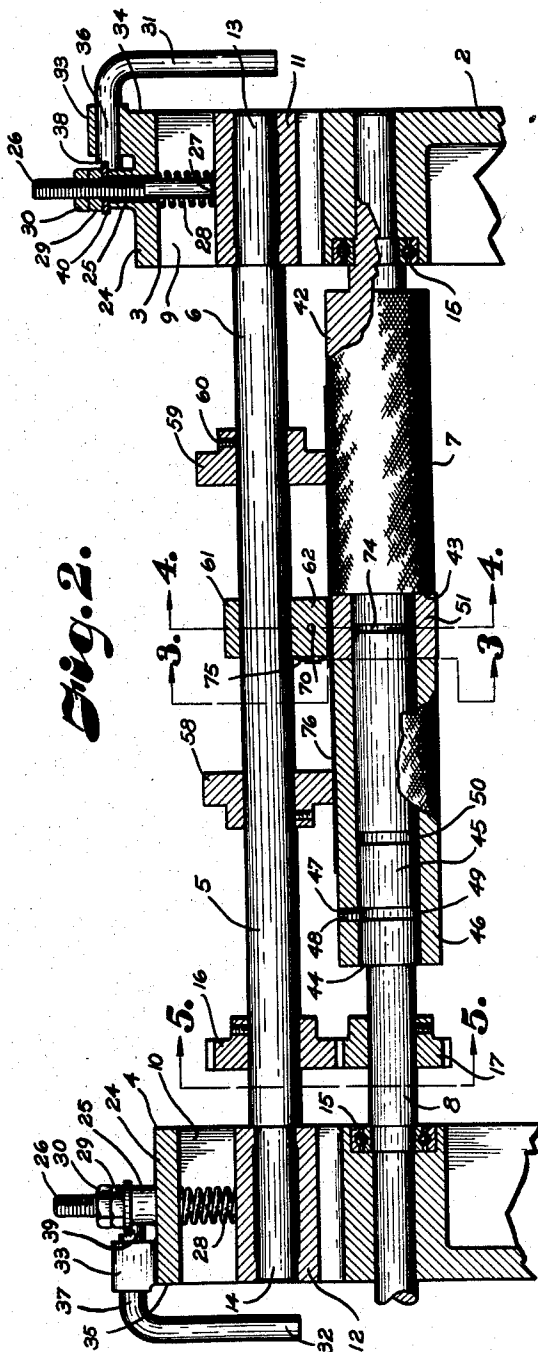


Fig. 5.

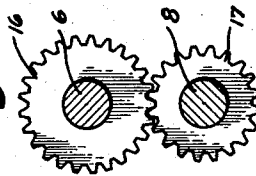


Fig. 4.

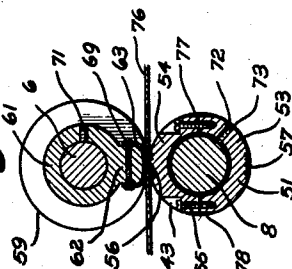
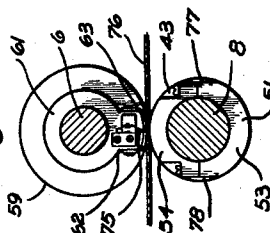


Fig. 3.



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## EMBOSSING APPARATUS

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This invention relates to embossing apparatus for application to an envelope making machine, and more particularly for embossing the paper for making of envelopes as they are passed through the envelope making machine.

Heretofore various devices and apparatus have been used for embossing paper by use of rubber rolls in connection with a printing block as distinguished from an embossing die. In other structures a rubber roller has been used to serve as a backing member with a male embossing die on another roller with the paper moving therebetween whereby a male embossing member would form the impression in the paper as it moved over the rubber backing roller. None of these devices have proven satisfactory for use in embossing paper for use in connection with high speed envelope making machines in use at the present time.

It is therefore the principal object of the present invention to provide an embossing device for envelope making machines having a roller provided with a collar in which is provided a recessed or female portion of the die having the engraving therein sometimes referred to as the embossing matrix, and an adjustable collar on another roller of the machine in which is mounted a male resilient embossing member for engaging in the female member.

Other objects of the present invention are to provide the collar on the lower roller of the apparatus in two sections and having a female die portion, or engraved recessed portion, in each section for mating with the male portion of the apparatus on the upper roller; to provide means for synchronizing the rollers whereby the upper and lower rollers will operate at a different ratio to mate with the female members on the lower roller; to provide means for driving said rollers; to provide for removal of the male die portion on the collar of the upper roller so as to not interfere with normal operation of the envelope making machine when it is desired not to emboss the paper going through the machine; to provide for adjustment of the embossing dies on the rollers to place the embossing at the desired place on the envelope material as it passes through the envelope making machine; to provide means for exerting pressure on the rollers to facilitate the embossing on the envelope material and provide a sharp imprint on the material; to provide means for easy placement of the embossing matrix on the lower roller and removal therefrom; to provide means on the lower roller for closing the space after removal of the embossing matrix so that the roller may be operated without the sectional collar, and to provide a device of this character simple and economical to manufacture.

In accomplishing these and other objects of the invention we have provided improved details of structure the preferred forms of which are shown in the accompanying drawings, wherein:

Fig. 1 is a perspective view of the embossing apparatus attached to an envelope making machine, shown partly in fragmentary.

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Fig. 2 is a longitudinal cross-sectional view through the device, particularly illustrating the upper and lower rollers of the apparatus and the spring means for exerting pressure on the upper roller.

Fig. 3 is a cross-sectional view taken on a line 3—3 (Fig. 2).

Fig. 4 is a cross-sectional view taken on a line 4—4 (Fig. 2).

Fig. 5 is a cross-sectional view taken on a line 5—5 (Fig. 2).

Fig. 6 is an enlarged cross-sectional view through the embossing matrix and male die, shown as the envelope material is passing therebetween.

Fig. 7 is a fragmentary perspective view of the embossing matrix and male die.

Referring more in detail to the drawings:

1 designates an envelope making machine to which our apparatus is adapted to be applied, the machine including a framework 2 having end members or bearing housings 3 and 4 in which is mounted an upper feed roller assembly 5 including a shaft 6 and a feed roller assembly 7 including a shaft 8 mounted below the upper roller.

The end members 3 and 4 have spaced openings 9 and 10 and slidably mounted in said openings are bearing blocks 11 and 12 for receiving the respective ends 13 and 14 of the shaft 6. The lower shaft 8 is mounted in the end members underneath the openings 9 and 10 by bearings as indicated at 15 (Fig. 2) and the shafts 6 and 8 are connected by gears 16 and 17 for operating the rollers as later described.

Feed or guide rollers as at 18 are provided forwardly of the roller 5 and are mounted in bearing blocks 19 and 20 for vertical adjustment in openings 21 and 22 similar to the mounting of roller 5. Lower rollers (not shown) are provided below the rollers 18 and are mounted in openings 23 as is the usual practice for transportation of envelope material through the envelope machine.

The upper feed roller 5 is spring urged toward the lower roller 7 and for this purpose plates 24 are provided on top of the end members 3 and 4. Mounted on the plates at substantially the center thereof are vertical sleeve bearing members 25 for receiving rods or the like 26 which extend through such sleeve members and said plates and have one end secured to the bearing blocks 11 and 12 respectively in any suitable manner, such as welding or the like 27. Mounted on the rods 26 between the bearing blocks 11 and 12 and the underside of the plates 24 are coil springs 28. The outer ends of the rods 26 are threaded for receiving nuts 29 and lock nuts 30 to adjust the tension on the bearing blocks and regulate the pressure on the upper roller 5 with respect to the lower roller 7.

In order to move the upper pressure roller 5 from contact with the lower roller, we raise the bearing blocks 11 and 12 in the elongated openings 9 and 10 through manipulation of levers 31 and 32. The plates 24 are provided with horizontal sleeves 33 which extend from the outer side edges 34 and 35 to the bearing members 25. The levers 31 and 32 are turned laterally forming shafts 36 and 37 and engage in the sleeves 33 respectively. The shafts 36 and 37 have a cut-away portion as indicated at 38 (Fig. 2) forming a cam 39 on the respective ends of the shafts which engage washers 40 mounted below the nuts 29 and 30 on rods 26. By turning of the handles 31 and 32, the cam will operate against the washers 40 to raise and lower the bearing blocks 11 and 12 and the resulting movement of the upper pressure roller 5 to adjust the same with respect to the lower roller 7 and to disengage the male member from the female member of the embossing apparatus

as later described. The guide roller 18 may be raised and lowered in the elongated openings 21 and 22 by the same mechanism as previously described.

The embossing attachment used in the envelope making machine includes what is commonly referred to as the seal flap lower roller 7 having one end 42 offset as indicated at 43 and then offset further as indicated at 44 (Fig. 2). Sleeved on the offset enlarged portion 45 of the shaft 8 is a sleeve 46 slidable longitudinally on the portion 45 of the shaft and having a threaded opening 47 for a screw or the like 48 for engaging in a groove 49 on portion 45 of the shaft 8 for retaining the sleeve thereon. The enlarged portion 45 of the shaft is also provided with a groove 50 spaced from the groove 49 for adjustment of the sleeve on the shaft when the embossing attachment is not in use. Both the offset end 42 and sleeve 46 are knurled for better feeding of the envelope material between rollers 5 and 7.

Mounted on the enlarged portion 45 of the shaft 8 and engaging between the sleeve 46 and the offset portion 43 of the enlarged end 42 of the shaft is a collar 51 formed in sections 53 and 54 secured on the shaft by screws 55 whereby the half sections are connected together in tight engagement around the portion 45 of shaft 8, as indicated in Fig. 4. Each half of the collar 51 is provided with an engraved recess 56 and 57 sometimes referred to as the embossing matrix, the upper half of the collar being illustrated in Fig. 6.

Mounted upon the upper shaft 6 are spaced rolls 58 and 59 and are adjustable laterally on the shaft 6 by set screws or the like 60 (Fig. 2). A collar 61 is mounted on the upper roller 5 between the spaced rolls 58 and 59, the collar having a boss 62 (Fig. 6) upon which is mounted an embossing clip 63.

The embossing clip comprises a flexible metal member 64 to which is secured a lining 65 of fabric or the other suitable material by adhesive or the like, and to the lining material is molded an embossing member 66, preferably made of a resilient material, such as plastic, rubber or similar material. The opposite edges of the clip 63 are provided with openings or slots 67 for receiving the shanks 68 of bolts 69 which engage in a threaded bore 70 extending through the boss 62 of the collar 61. The collar 61 is held in place on the shaft 6 by set screw or the like 71 and the collar is adjustable circumferentially on the shaft for aligning with the female members of the collar 51 on the lower shaft 8.

Operation of the machine without engraving the paper is accomplished by removal of the clip 63. The lower half 53 of the collar 51 on the lower shaft is provided with a threaded opening 72 for receiving a set screw or the like 73 for adjusting the collar 51 on the lower shaft so that the female member may be aligned with the male member on the upper shaft 6. It will be noted that the inner end of the set screw 73 may be engaged in a groove 74 on the enlarged portion 45 of the shaft of the lower roller 7.

The collar 51 is removable from the shaft 8 and by loosening of the screw 48 the sleeve 46 may be moved to the right to abut with the shoulder of the offset portion 43 to form a continuous surface of the roller 7. In this position the screw 47 will engage within recess 50 and the rubber embossing clip 63 is removed from the boss 62 by removal of the screw 69.

The collar 61 is adjustable laterally on the shaft 6 and the collar 51 may also be adjusted laterally to align with the collar 61 by the use of washers or the like (not shown) engaged between the offset portion 43 and the collar 51, in which event the sleeve 46 may be moved to the left on the shaft 8. If desired, a sleeve member like sleeve 46 could be used on the shaft 8 in place of the enlarged end 42 thereof, in which event both sleeves would be adjusted laterally on the shaft 8. The shape of the male punch member on the collar 61 on the upper roller is somewhat larger than the embossing matrix to

permit easy registration between the male die and the female die. It has heretofore been stated that the upper collar may be rotated on the shaft to index with the female die. An alignment pin 75 is provided on the side of the boss 62 for a correct setting of the clip 63 with respect to the embossing matrix 56 and 57.

In operation of the embossing apparatus, assembled as described, the envelope material, such as paper or the like as indicated at 76, passes between the rollers 5 and 7 and the male embossing member enters the engraved recesses 56 and 57 on the lower roller, and as the paper is moved therebetween the male embossing member will force the paper into the recesses and against the engraving therein and thereby emboss the paper. The embossing portion of the clip is of irregular or "blob" shape all of which does not enter the female portion of the die, but is resilient enough to enter sufficiently to engrave the paper.

The speed of the upper roller may be the same as the lower roller when only one female embossing matrix is to be used, depending on the amount of envelope material passing between rollers 5 and 7 before the next embossing may take place. In the illustrated structure, we have provided a larger gear 16 on shaft 6 and a smaller gear 17 on shaft 8 at a gear ratio of four to five (Fig. 5). As the boss 62 on shaft 6 completes one rotation, the collar 51 has performed a one end one-fourth rotation whereby a flat or reduced portion 77 of the collar 51 will be directly opposite the clip 63 on boss 62. However, there will be no engagement between the clip 63 and collar 51 at this point of rotation since the diameter of said collar is reduced to said flat portion 77. As boss 62 continues for another rotation, collar 51 has again completed a one and one-fourth rotation, thus bringing the recess 57 into engagement with the clip 63 on boss 62 and embossing the envelope material 76 therebetween. A further rotation of boss 62 will pass a flat or reduced portion 78 on collar 51 directly opposite to clip 63 without engagement therebetween, thus preventing unnecessary wear of the plastic material on said clip. Stating the above described operation differently, on every second rotation the male embossing member on shaft 6 engages with one of the matrices 56 or 57 for engraving of the envelope material 76.

One further rotation of the boss 62 on shaft 6 then again brings the clip 63 thereon in engagement with the matrix 56 on collar 51 and performs another embossing on the envelope. In other words, the upper roller 5 turns four times while the lower roller 7 turns five times, or at a five to four ratio.

It will be obvious that the embossing occurs when the envelopes are passed between the upper and lower collars. The pressure from the springs 28 on the rods 26 causes the embossing member 66 to force the paper into the embossing female matrices and give the desired emboss on the paper. The flexibility of the male embossing portion of the apparatus will allow entry into the female portions so that a clear imprint of the engraving in the recesses or matrices will be indented on the paper as plainly illustrated in Fig. 6. It will be obvious that the resilient embossing member must form the paper in the recess and as this is a rolling action the rubber embossing member will have such resiliency that it can be made with substantially less clearance from the sides of the recesses and thereby obtain a more uniform embossing of all portions in the design. In this rolling action the clearance must be such that the forward and rearward edges can move on their respective arcs and not bind on the forward and rear edges of the engraved recesses. The central portion of the rubber will be deformed whereby it can pass from the edges of the recesses without binding.

It will be further obvious from the foregoing that we have provided an improved embossing apparatus for envelope making machines wherein the male embossing

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member can be removed and another replaced on the collar on the upper roll and the lower female embossing matrix be changed with very little work and thus eliminate time in change of these parts. The embossing apparatus is adjustable on the rollers and may be removed entirely when the envelope machine is desired to be used without the embossing apparatus.

What we claim and desire to secure by Letters Patent is:

1. Embossing apparatus for envelope making machines having a lower roller and a pressure roller thereabove, said lower roller having an enlarged portion at one end, a sleeve on the roller spaced from the enlarged portion, a two-piece removable collar on the lower roller between the sleeve and said enlarged portion having an engraved recess therein, a collar on the pressure roller, said second roller having a boss thereon, and means on said second collar for adjusting the same circumferentially on said pressure roller to align said boss with the recess on the first collar as the rollers are rotated, and a U-shaped removable clip on said boss, said clip having a lining adhesively secured thereto and a resilient rubber face adhesively secured to said lining and clip for engaging in said recess on the first collar as the envelope material passes between said rollers.

2. Embossing apparatus for envelope making machines having a lower roller and a pressure roller thereabove, a two-section removable collar on the lower roller having an engraved recess in each section, said recess being equally spaced from each other circumferentially of the roller, a collar on the pressure roller, said collar having a boss thereon, a removable clip on said boss having a resilient face thereon for engaging in said recesses on the first collar, and means on said rollers for operating the pressure roller at a different speed than the lower roller so that the boss will align with both of said recesses as the envelope material passes between said rollers.

3. Embossing apparatus for envelope making machines having a lower roller and a removable upper roller thereabove, a two-section removable collar on the lower roller having an engraved recess in each section, said recess being equally spaced from each other circumferentially of the roller, a collar on the upper roller, said collar having a boss thereon, a removable clip on said boss having a resilient face thereon for engaging in said recesses on the first collar, and means on said machine cooperating with the upper roller for exerting pressure thereon to cause the clip on the boss to enter said recess in the collar on the lower roller, and means on said rollers for operating the upper roller at a different speed from that of the lower roller so that the boss will align with said recesses as the envelope material passes between said rollers.

4. Embossing apparatus for envelope making machines having a lower roller and a pressure roller thereabove, a two-section removable collar on the stationary roller having an engraved recess in each section, said recesses being equally spaced from each other circumferentially of the roller, a collar on the pressure roller, said collar having a boss thereon, a U-shaped removable clip on said boss having a rubber face adhesively secured thereon for engaging in said recesses on the first collar, and means on said rollers for operating the pressure roller at a different speed from that of the lower roller so that the boss will align with said recesses as the envelope material passes between said rollers.

5. In an envelope making machine having a frame and end members on the frame having elongated vertical openings therein and a pressure roller movably mounted in said openings and having a lower roller on said frame underneath and parallel with the pressure roller, said lower roller having an enlarged portion at one end forming a shoulder and a sleeve on said lower roller spaced from said shoulder on the enlarged portion and form-

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ing a space therebetween, the combination of a collar on the lower roller in the space between said sleeve and said enlarged portion of the roller having an engraved recess therein, a collar on the pressure roller, said collar having a boss thereon, a removable clip on said boss having a resilient face thereon for engaging in said recess on the first collar as the envelope material passes between said rollers, and means on said rollers for rotating the same in opposite direction at the same speed so that the boss will align with said recess.

6. In an envelope making machine having a frame and end members on the frame having elongated vertical openings therein and an upper roller movably mounted in said openings and having a lower roller on said frame underneath and parallel with the upper roller and said pressure roller having bearings on its respective ends movable in said openings in the frame and a guide roller forwardly of said upper and lower rollers, the combination of a two-piece removable collar on the lower roller having an engraved recess therein, an adjustable collar on the upper roller, said collar having a boss thereon, a removable clip on said boss having a resilient face thereon for engaging in said recess on the first collar as the envelope material passes between said rollers, and means on said end members cooperating with said bearings for exerting pressure on said upper roller to cause the face of the boss to enter said recess in the collar on the lower roller.

7. In an envelope making machine having a frame and end members having top plates on the frame having elongated vertical openings therein and an upper roller having bearing members on its respective ends movably mounted in said openings and having a lower roller on said frame underneath and parallel with the upper roller, said lower roller having an enlarged portion at one end forming a shoulder and a sleeve on said lower roller spaced from said shoulder on the enlarged portion and forming a space therebetween, the combination of a removable collar on the lower roller in the space between said sleeve and said enlarged portion of the roller having an engraved recess therein, an adjustable collar on the upper roller, said collar having a boss thereon and a removable clip on said boss, having an irregular resilient face thereon for engaging in said recess on the first collar as the envelope material passes between said rollers, sleeves on said top plates extending vertically thereof, rods engaging in said sleeves having one end secured to said bearings on the upper roller and its other end threaded, coil springs on said rods having one end bearing against said bearings and the other against said plates, nuts on the threaded ends of the rods, washers between the nuts and vertical sleeves, and levers having cam means engaging with the said washers for raising and lowering said upper roller with respect to the lower roller.

8. Embossing apparatus for envelope making machines having a horizontal shaft and a pressure roller thereabove, approximately one-half of said shaft being enlarged forming a shoulder near the center of said shaft, a sleeve on said shaft of the same diameter as the enlarged end of the shaft and having its inner end spaced from the said shoulder, means for holding said sleeve on said shaft, a two-section removable collar on said shaft between said sleeve and said shoulder having an engraved recess in each section, said recess being equally spaced from each other circumferentially of the roller and said sleeve, collar and enlarged end of the shaft forming a lower roller, a collar on the pressure roller, said collar having a boss thereon, a removable clip on said boss having a resilient face thereon for engaging in said recesses on the first collar, and means on said rollers for operating the upper roller at a greater speed than the lower roller so that the boss will align with said recesses as the envelope material passes between said rollers.

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