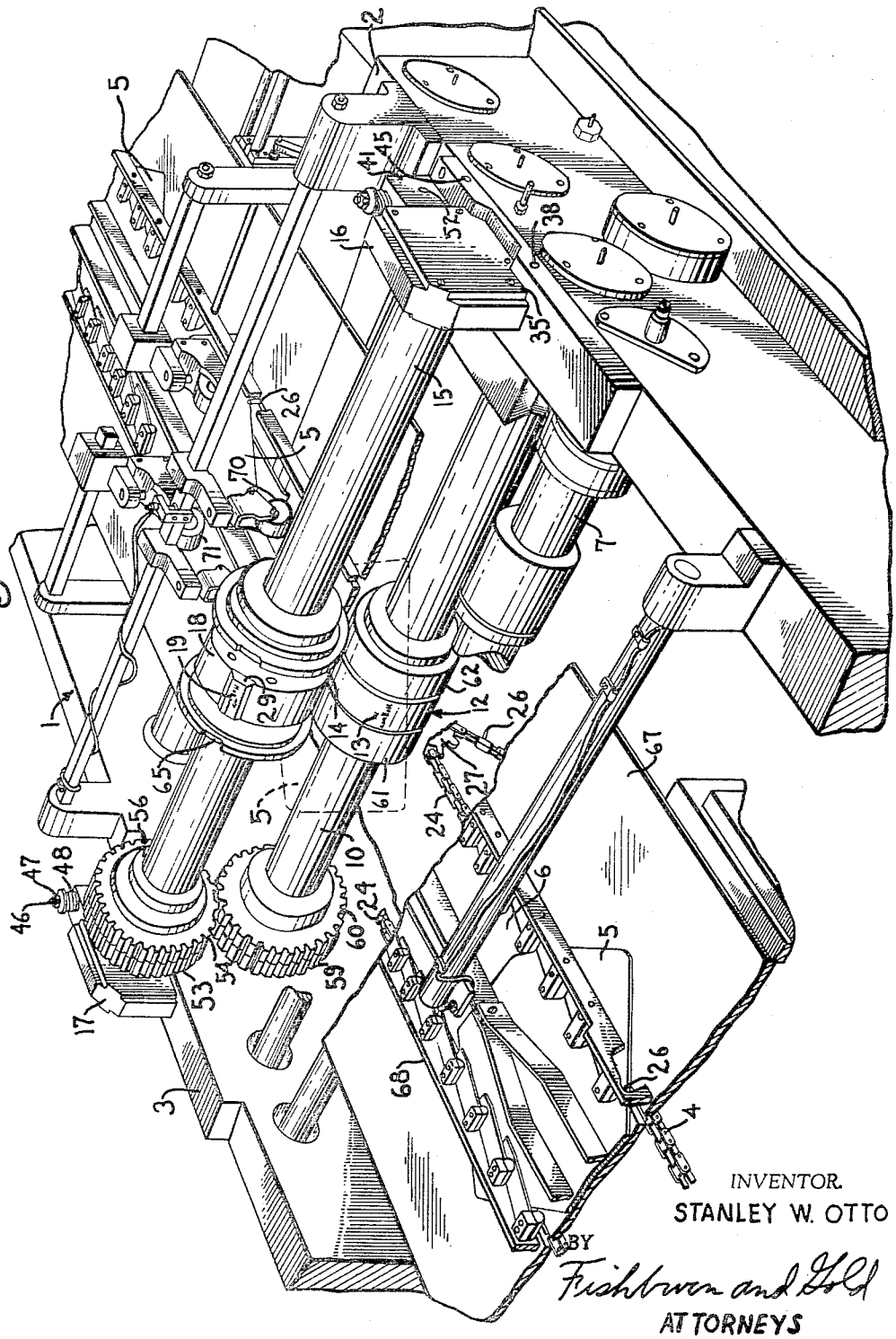
Feb. 7, 1967 S. W. OTTO 3,302,558

EMBOSSING APPARATUS

Filed April 12, 1965 5 Sheets-Sheet 1

Fig. 1.



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EMBOSSING APPARATUS

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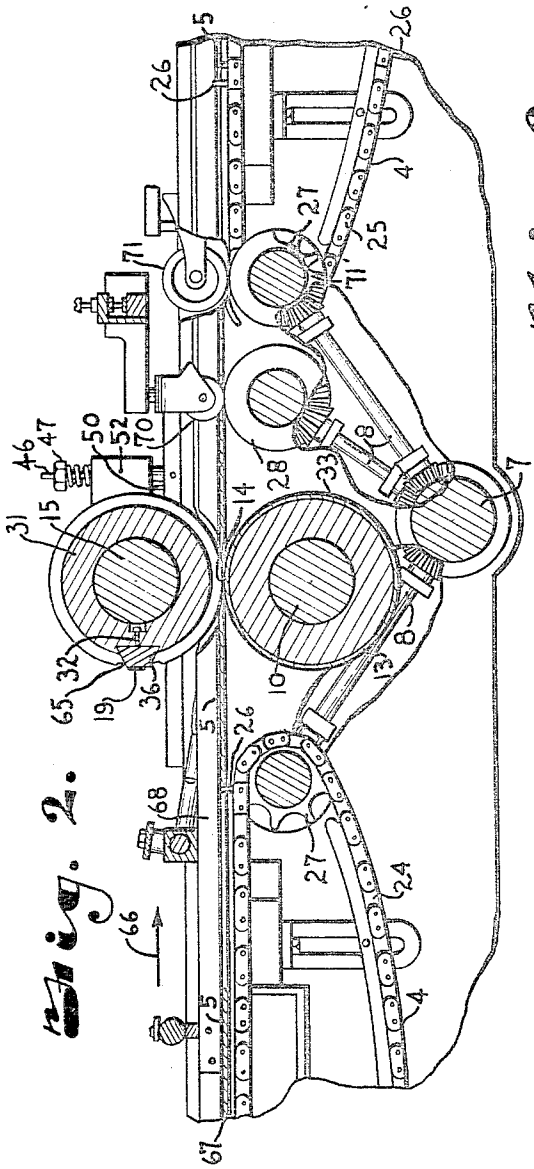


Fig. 2.

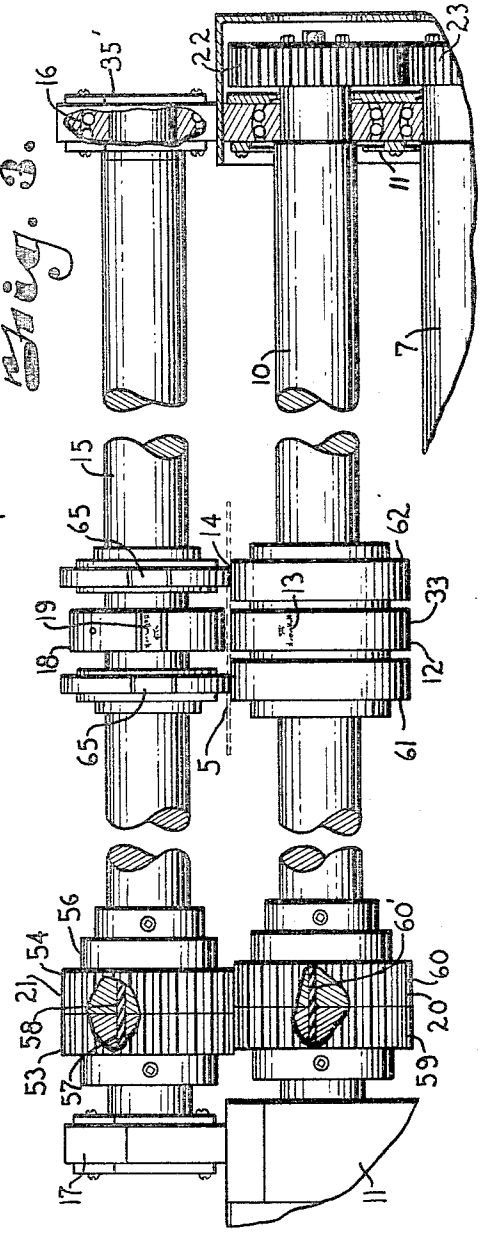


Fig. 3.

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EMBOSSING APPARATUS

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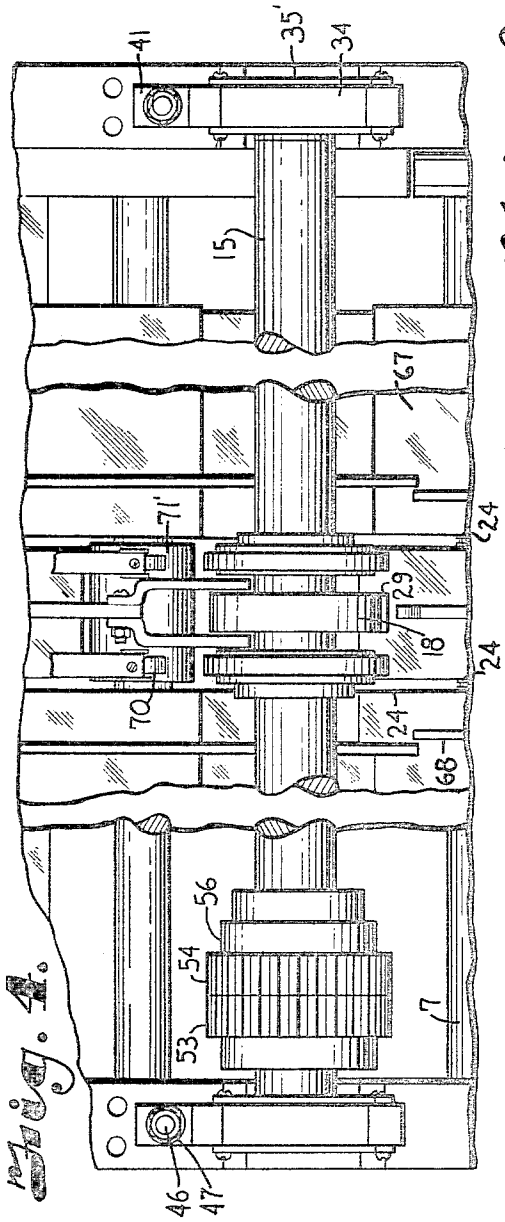


Fig. 4.

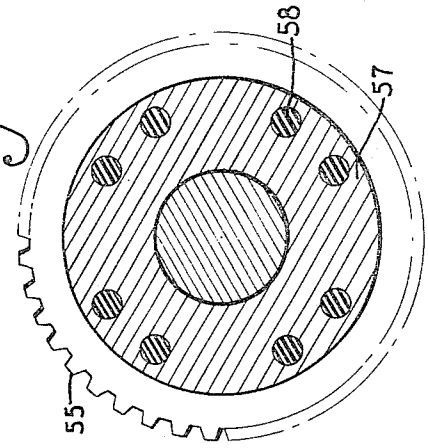


Fig. 6.

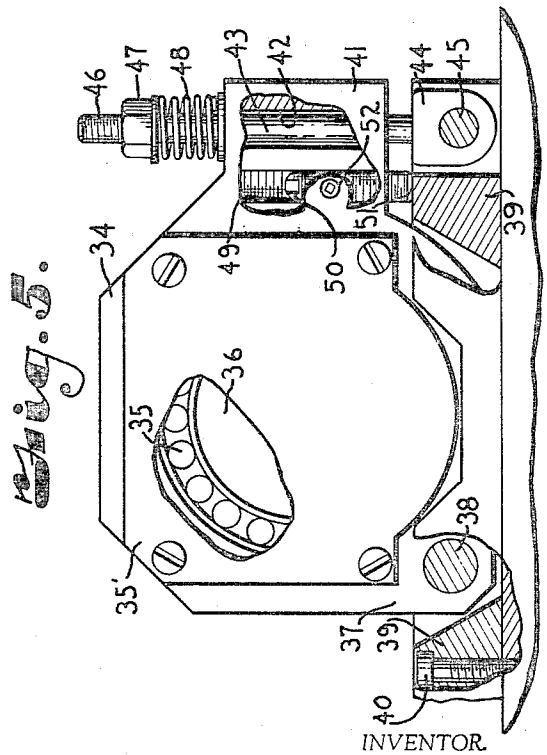


Fig. 5.

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EMBOSSING APPARATUS

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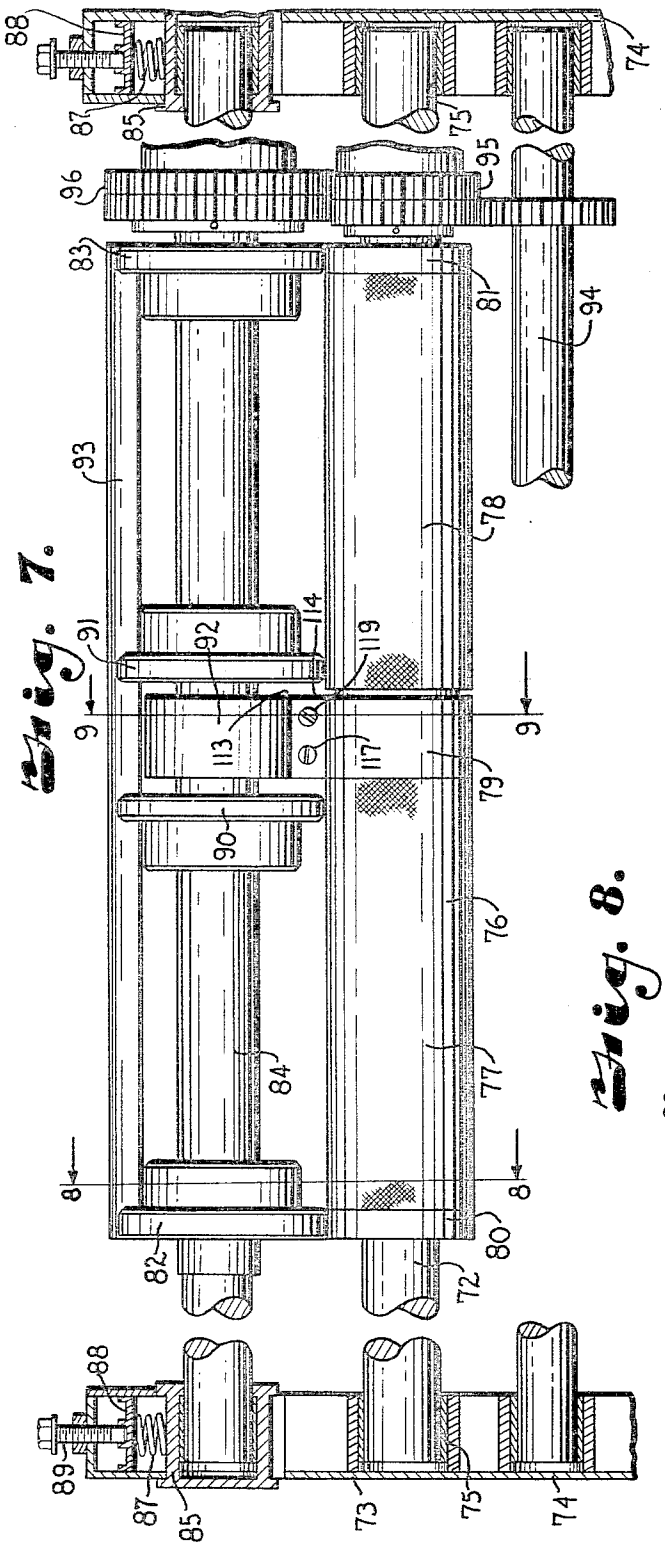


Fig. 7.

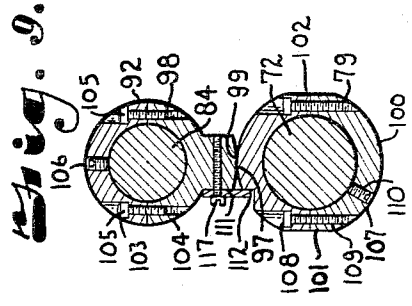


Fig. 9.

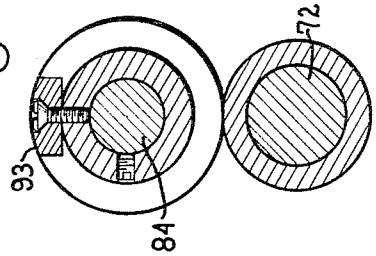


Fig. 8.

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EMBOSSING APPARATUS

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Fig. 11.

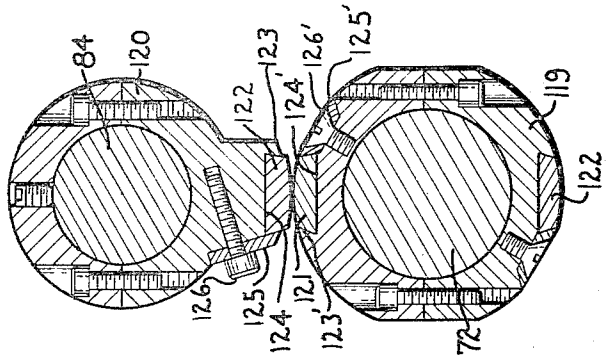
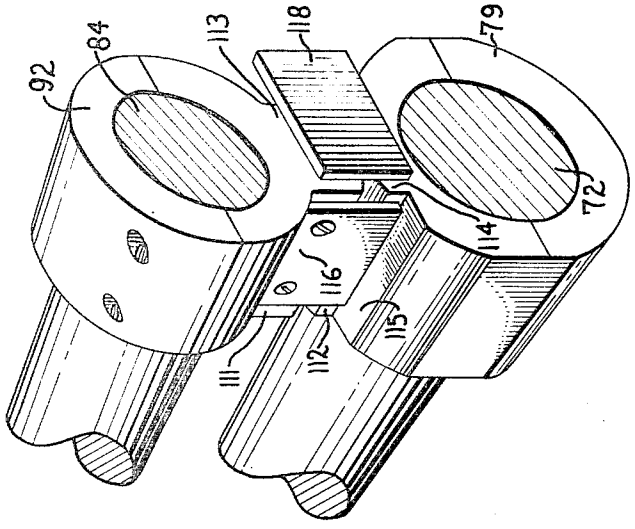


Fig. 10.



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United States Patent Office 3,302,558 Patented Feb. 7, 1967

3,302,558
EMBOSSING APPARATUS

Stanley W. Otto, Kansas City, Mo., assignor to Hallmark Cards, Incorporated, Kansas City, Mo., a corporation of Missouri

Filed Apr. 12, 1965, Ser. No. 447,372
5 Claims. (Cl. 101—23)

This invention relates to envelope manufacturing machinery, and more particularly to apparatus used with such machinery for placing an embossment on envelope blanks as they travel along a normal path in spaced apart relation through the machinery at high speed.

The principal objects of the present invention are: to provide embossing apparatus used in combination with conventional types of envelope making machinery, which apparatus does not interfere with the normal operation of said machinery; to provide such a combination which permits the envelope making machinery to operate at maximum speed; to provide such embossing apparatus for envelope blanks which does not require reciprocating parts for closing and separating the male and female die members; to provide such embossing apparatus which is synchronized to existing transporting conveyors on envelope making machinery, which conveyors transport envelope blanks in spaced apart relation along a path intersecting the place of embossment; to provide such embossing apparatus which guides the envelope blank therebetween without aid from an upstream conveyor and delivers it in proper position to a downstream conveyor for further operation thereon by the envelope making machinery; to provide such embossing apparatus which when used on a heavy frame envelope making machine permits the hobbing of the female die portion on the machine so as to avoid engraving same and automatically provide die alignment; to provide such embossing apparatus which may be used in conjunction with a fold-bar normally used on certain envelope making machines so that embossing and a folding operation may be produced at a single station; to provide such embossing apparatus which may be used on envelope making machinery particularly of the light frame type through the use of spacer rolls or discs which control the proper clearance between the embossing dies; to provide such embossing apparatus which has gauge surfaces to permit rapid and accurate axial and circumferential alignment of the mating dies; to provide a die holder and die configuration which permits rapid removal and replacement of dies; and to provide such embossing apparatus which is relatively inexpensive in construction, versatile, long-lived and reliable in use.

Other objects and advantages of this invention will become apparent from the following description taken in connection with the accompanying drawings wherein are set forth by way of illustration and example certain embodiments of this invention.

FIG. 1 is a fragmentary perspective view showing a portion of an envelope making machine equipped with embossing apparatus embodying this invention and having portions broken away to better show the embossing apparatus.

FIG. 2 is a fragmentary cross-sectional side elevation through the structure of FIG. 1, particularly showing the relationship between conveying members and the embossing apparatus.

FIG. 3 is a fragmentary cross-sectional transverse elevation through the structure of FIG. 1, particularly showing the embossing apparatus, driving structure and support members therefor.

FIG. 4 is a fragmentary plan view of the structure of FIG. 1 particularly showing the embossing structure and adjacent members.

FIG. 5 is a fragmentary side elevation of the structure of FIG. 1 on an enlarged scale showing an upper die member shaft bearing support with portions broken away showing details of construction.

FIG. 6 is a fragmentary cross-sectional view through the structure of FIG. 1 showing one of the embossing apparatus driving gears.

FIG. 7 is a fragmentary cross-sectional transverse elevation showing embossing apparatus embodying this invention used with a fold-bar on a typical light frame envelope making machine.

FIG. 8 is a cross-sectional view through the embossing apparatus taken on the line 8—8, FIG. 7.

FIG. 9 is a transverse cross-sectional view through the apparatus taken on the line 9—9, FIG. 7, particularly showing clearance maintaining discs.

FIG. 10 is a fragmentary perspective view on an enlarged scale showing the mating embossing members of FIG. 7, and illustrating the use of gauge members for alignment.

FIG. 11 is a transverse cross-sectional view through a modified form of embossing apparatus showing easily removable mating die members.

Referring to the drawings in more detail:

The reference numeral 1 generally indicates an envelope making machine of the "heavy frame" type. The machine 1 has spaced apart elongated side walls 2 and 3 and conveyor apparatus generally designated 4 for transporting envelope blanks 5 in spaced apart relation along a path 6 extending longitudinally between the walls 2 and 3. The envelope machine 1 includes a rotary drive member 7 (FIG. 2) for driving the conveyor apparatus 4 through suitable shafting and gearing generally designated 8.

Embossing apparatus 9 is shown combined with the envelope making machine 1 and includes a first shaft 10 extending between the walls 2 and 3 and beneath the path 6. The shaft 10 normally forms part of an offset printing mechanism, not shown. Suitable bearings, in the illustrated example, self-aligning double-row ball bearings 11 rotatably mount the first shaft 10 on the respective side walls 2 and 3. A first rotary die member 12 is mounted on the first shaft 10 intermediate the ends thereof and is rotatable therewith. The first die member 12 has a die portion 14 adapted to rotate through a tangent position 14 coinciding with the path 6 upon each rotation of the first shaft 10.

A second shaft 15 extends between the walls 2 and 3 and is parallel to the first shaft 10. The second shaft 15 is rotatably mounted on the walls 2 and 3 by means of bearing members 16 and 17 described in detail hereinafter. The second shaft 15 is located above the path 6 adjacent the first shaft 10 and has a second rotary die member 18 mounted thereon. The die member 18 has a die portion 19 mateable with the die portion 13 and adapted to rotate through the tangent position 14 upon each rotation of the second shaft 15.

Gear members 20 and 21 are respectively fixed near one end of the first and second shafts 10 and 15 and engage each other whereupon the shafts 10 and 15 rotate synchronously in opposite direction and upon proper alignment the first and second die member portions 13 and 19 simultaneously arrive and mate at the tangent position 14. The shaft 10 has a gear 22 fixed to the other end thereof and engaging a gear 23 fixed to the rotary drive member 7. Thus the rotation of the drive member 7 drives the shafts 10 and 15 along with the conveyor means 4 whereby the envelope blanks 5 are successively delivered through the tangent position 14 as the die portions 13 and 20 arrive at the position 14.

The conveyor apparatus 4 includes upstream and downstream conveyor chains 24 and 25 supporting spaced

apart pins 26 which drive the blanks 5 along the path 6 as the chain moves on driven sprockets 27. A driven roll 28 is positioned to receive the blank 5 from between the die members for guiding towards the downstream conveyor chain 25, which in turn transports the envelope blanks to a downstream station (not shown) for further operating steps in finishing the envelope.

In the above combination, the die portion 19 comprises a male die of relatively hard material such as hardened steel raised from the outer surface of a trapezoidal block 29 received in a dovetail 30 formed in a mounting disc 31. The block 29 is secured in position by suitable machine screws 32 extending radially through the disc 31 and threadedly engaged in the block 29. The die portion 19 rolls into engagement with a sleeve 33 mounted on the first rotary die member 12. The sleeve 33 is a relatively soft material with respect to the die portion 19, such as copper, whereby upon decreasing the spacing between the shafts 10 and 15 to a predetermined dimension, the mutual rotation of the shafts 10 and 15 result in the die portion 19 pressing or hobbing into the sleeve 33 so as to form the female die portion 13. After hobbing the female die portion 13 the shafts 10 and 15 are backed away from each other slightly so as to provide clearance for the envelope blanks 5 to pass therebetween and become properly embossed without damaging the paper.

The bearing members 16 and 17 permit the shafts 10 and 15 to be adjusted in spacing with respect to each other so as to allow the above noted hobbing and subsequent running positions of the die portions. Referring particularly to FIG. 5, the bearings 16 and 17 each comprise a housing 34 containing a self-aligning bearing 35 which receives one end 36 of the shaft 15. A removable plate 35' normally covers the bearing 35 and shaft end 36. The housing 34 has a rear hinge pin receiving portion 37 receiving a pin 38 extending through a mounting bracket 39 fixed by means of suitable machine screws 40 to one of the envelope machine side walls. Suitable clearance is provided between the bracket 39 and housing 34 whereby the housings may be vertically pivoted about the pin 38.

A forwardly extending block 41 is integral with the housing 34 and is spaced above the bracket 39. The block 41 has a vertically extending bore 42 therethrough receiving an elongated rod 43. The rod 43 has a lower end portion 44 which is expanded and receives a transverse pin 45 which engages the mounting bracket 39 so as to pivotally mount the pin 43 for rocking movement in the plane of the housing 34. The upper end 46 of the rod 43 is threaded and extends above the block 41. A nut 47 is threadedly engaged with the upper end 46 an a helical compression spring 48 surrounds the rod 43 and bears at opposite ends thereof against the nut 47 and the block 41 for resiliently urging the housing and shaft end 36 downwardly about the pin 38. A threaded bore 49 extends vertically through the housing 34 adjacent the block 41 and receives a limit screw 50 therein. The limit screw 50 extends beneath the block 41 and bears against the upper surface of the mounting bracket at 51 to adjustably limit the downward movement of the housing 34 but permit an upward movement thereof against the pressure exerted by the spring 48. A suitable locking screw 52 extends into the housing 34 in a transverse direction and is adapted to engage the limit screw 50 to prevent rotation thereof following adjustment.

The gear members 20 and 21 each comprise matched gears 53 and 54 in face-to-face relation and having gear teeth 55 slightly rotationally offset from each other, for example, one degree. The gear 53 is rotatably fixed to the respective shaft and the facing gear 54 is rotatably mounted with respect to the shaft on a suitable collar 56. A plurality of longitudinally extending circumferentially spaced bores 57 extend through the body of the gears 53 and 54 and are aligned when the gear teeth 55 of the respective gears are offset from each other the desired rotational angle. Elongated cylindrical plugs 58 of resilient material such as 70 durometer rubber extend through the aligned bores 57 filling same whereby the gear teeth on the respective gears may be aligned by applying relative rotational pressure tending to resiliently transversely compress the rubber plugs. Thus, the rubber plugs are maintained in slight transverse compression when the teeth on a mating gear is forced into engagement with both gears 53 and 54, in the the illustrated example, gear 59. This prevents any measurable degree of play or backlash which would interfere with the proper running alignment of the respective die portions. The gear 59 has a facing gear 60 rotatably mounted on the shaft 10 in the manner of the gear 54 and resiliently offset from the gear 59 by means of rdbber plugs 60'. The gear 60 engages only the gear 54 and functions to further prevent any relative rotational play between the shafts 10 and 15.

The first shaft 10 includes a pair of rigid discs 61 and 62 mounted thereon and respectively positioned adjacent the first rotary die member 12 on each side thereof for rotation therewith. The second shaft 15 includes a pair of resilient discs 63 and 64 mounted thereon and respectively positioned adjacent the second rotary die member 18 on each side thereof for rotation therewith. The resilient discs 63 and 64 respectively engage the rigid discs 61 and 62 forming bights therebetween for drawing envelope blanks 5 through the tangent position 14 between the rotary die members 12 and 18. The discs 61, 62, 63 and 64 maintain the blank in proper alignment with the die members and in proper spaced relation with prior and subsequent blanks continuously moving through the tangent area 14 on the conveyor apparatus 4. It is sometimes desirable that the resilient discs 63 and 64 each have peripheral cut-out portions 65 adjacent the die portion 19 to eliminate the bight on the envelope blank during embossing and thus avoid any possibility of wrinkling or otherwise damaging the blanks during this critical time. Thus, only the embossing dies will drive the blanks during the instant of embossing.

In operation, the blanks are driven at high speed in the direction indicated by the arrow 66 by the pins 26 on the conveyor chain 24. The blanks are maintained against the bed 67 of the machine 1 by suitable guides or runners 68 which terminate adjacent the tangent position 14 and begin again immediately downstream therefrom. Since the rotary die members move with the conveyor apparatus and are synchronized therewith, the respective blanks are delivered into the bight of the discs 61–64 which continues to drive the blank along the bed 67 at the same speed as the upstream conveyor chain 24. The flap 69 of the blank is the portion to be embossed and it trails the blank 5 as it passes through the machine. Thus, in this example, the major portion of the blank passes between the rotary die members before embossing occurs. The die portions 13 and 19 meet at the tangent position 14 when the flap 69 is in the proper position therebetween and embosses the flap without changing the speed of travel of the blank through the machine or interfering with the spacing between the prior and succeeding blanks. After embossing the blank continues to be driven by the roll 28, which cooperates with smaller rollers 70 to produce a driving bight therebetween, to a position where the downstream conveyor chain 25 causes a set of pins 26 to engage the blank, driving it to succeeding stations of operation, not shown. Rollers 71 cooperate with rolls 71' on the drive of the conveyor chain 25 to make the transition in driving members smooth.

As noted with the above described example, the female die portion is hobbed into the soft sleeve 33 by the male die portion 19 and the proper spacing between the die portions is adjusted following hobbing by the adjustment of the respective limit screws 50. It is to be understood

that the springs 48 are either removed or completely compressed during hobbing so that sufficient pressure for this operation can be applied between the die member 19 and the soft sleeve. In this regard, it is necessary that the shafts 10 and 15 and the frame of the envelope machine be of sufficient rigidity to accomplish this without undue deflection. After hobbing, the limit screws 50 are readjusted to provide the proper embossing clearance between the respective die members and the springs 48 are replaced or permitted to expand to provide the proper relief during embossing.

Certain envelope machines in common use do not have frames or transverse shafts with sufficient rigidity for in-place hobbing of the female die. Under such circumstances, an embodiment of this invention such as that illustrated in FIG. 7 may be used. Referring to FIG. 7, the first shaft 72 is rotatably mounted on the side frames 73 and 74 of the envelope making machine on suitable bearings 75. An elongated cylindrical sleeve 76 has a first portion 77 and a second portion 78 fixed on the shaft 72 on opposite sides of a female die member 79. The sleeve portions 77 and 78 have hardened, smooth outer discs or peripheries at 80 and 81 which engage hardened steel discs 82 and 83, respectively. The discs 82 and 83 are mounted in spaced apart relation on the second shaft 84 which extends parallel to the shaft 72 and thereabove, the shaft 84 being journaled into suitable bearings 85 mounted in vertically movable slide blocks 86 on the frames 73 and 74. The slide blocks 86 are urged downwardly by means of helical springs 87 bearing thereagainst and against adjusting abutments 88 engaged with adjusting screws 89 threadedly cooperating with the respective side frames. The springs 87 urge the opposite ends of shaft 84 downwardly toward the shaft 72 and cause the discs 82 and 83 to remain in rolling contact with the outer peripheries 80 and 81 on the shaft 72. The discs 82 thus act as spacers to maintain a predetermined distance between the shafts during mutual rotation thereof. It is noted that the diameters of the mating outer peripheries 80 and 81 and discs 82 and 83 are unequal. The reason for this is explained hereinafter.

Resilient discs 90 and 91 are mounted on the shaft 84 on opposite sides of a male rotary die member 92 and respectively bear against the knurled sleeve portions 77 and 78 for driving the envelope blanks between the respective shafts. In this embodiment, the embossing die members are used on existing shafts for supporting apparatus for folding one portion or panel of the envelope blank. In order to maintain this function the fold-bar 93 is maintained in the existing position and cooperates in the same manner with the knurled sleeve portions 77 and 78 to fold one panel of the envelope blank although embossing die members are also mounted on these shafts. The shafts 72 and 84 are driven synchronously by means of a drive shaft 94 engaging with the fixed gear of a set 95 similar to the anti-backlash gears described above and mating with a second set of anti-backlash gears 96, engaging the shaft 84.

In this embodiment, the die members 79 and 92 are laterally and rotationally adjustable with respect to each other so as to produce proper mating during rotation. Further, due to the proportions of the machine and the necessity of cooperating with the fold-bar 93, an embossment cannot occur upon each rotation of the respective shafts, but rather must occur on every other rotation, permitting the fold-bar to operate on the previous rotation. In order to accomplish this, the diametrical position of the respective dies are not equal and the diameters of the gear sets 95 and 96 are respectively different in a proportion which causes the first or lower shaft 72 to rotate one and one-quarter times for each full rotation of the upper or second shaft 84. The male die portion 97 extends radially outwardly from the shaft 84, the remaining portion of the male die member being recessed, as at 98. Two female die portions, 99 and 100, are located in diametrically opposed positions on the female die member 79 and flats 101 and 102 are located in diametrically opposed positions 90 degrees out of phase with the female die portions 99 and 100. Thus, as the male die member rotates the female die member rotates therewith, but one-quarter turn per revolution faster whereby on every second rotation the male die portion will align with one of the female die portions producing an embossment and then with one of the flats 101 or 102, producing no embossment. The fold-bar 93 engages the sleeve portions 77 and 78 as usual for producing a conventional panel fold in a forward panel of the envelope blank, while the trailing flap is embossed.

The male die member 92 is made up of semi-circular sections 103 and 104 which are assembled into a hollow cylinder by suitable machine screws 105. A suitable set screw 106 in the section 103 permits rotational and longitudinal adjustment with respect to the shaft 84 and subsequent locking in desired position. The female die member 79 is comprised of semi-circular portions 107 and 108 held together by suitable machine screws 109 on the shaft 72. A set screw 110 permits the longitudinal and rotational adjustment of the female die member on the shaft 72.

In order to provide suitable guides for aligning the male and female die portions, accurate finished surfaces on the respective die members are provided at 111, 112, 113 and 114. The surfaces 111 and 113 are associated with the male member 92 and the surfaces 112 and 114 are associated with the female member 79. The surface 112 is formed as one wall of a notch 115. The surfaces form reference planes for locating the respective die engravings on the die members. When the respective die members are to be aligned on the shafts 72 and 84, a first gauge plate 116 is temporarily secured by screws 117 against the surface 111 and, when the plate 116 contacts the surface 112, rotational alignment of the respective die members is indicated. For longitudinal alignment, a gauge plate 118 is inserted into a notch or opening 119 formed between the sleeve portion 78 and the female die member 79 and between the resilient disc 91 and the male rotary die member 92. When the gauge plate 118 is flat against both surfaces 113 and 114 longitudinal alignment is indicated. As noted above, the cooperation between the discs 82, 83 and the peripheries 80, 81 produce the proper separation for the die portions. The embossing operation of this embodiment is similar to the first described embodiment.

If desired, die portion inserts may be used to reduce the cost of replacing worn die members. Referring to FIG. 11, die members 119 and 120 are illustrated which are generally similar to those described in connection with FIG. 10, however, the die portions 121 and 122 thereof, instead of being integral with the die members are removable inserts which may be manufactured, for example, by electrical disposition in molds. The die members 121 and 122 are secured in the die members 119 and 120 by engagement with lips 123 and 123', the other side of the notch being provided by suitable mounting members 125 and 125' secured in position by suitable machine screws 126 and 126'.

Although certain forms of this invention have been illustrated and described, it is not to be limited thereto except insofar as such limitations are included in the following claims.

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

1. In combination with a thin material converting machine having means for transporting thin material in a path, embossing apparatus comprising:

(a) a first rotary die member mounted on said machine and having a die portion adapted to rotate through a tangent position with said path,

(b) a second rotary die member mounted on said machine in opposed relation to said first die member and having a die portion mateable with said first die

portion and adapted to rotate through said tangent position with said path, and

(c) motion transmitting members connected to said die members and cooperating to cause said die members to rotate synchronously and said first and second die portions to simultaneously arrive and mate at said tangent position,

(d) said die members respectively including a first and a second shaft, bearing means rotatably mounting said second shaft, said bearing means including a shaft bearing receiving one end of said second shaft, a housing containing and supporting said bearing and having a rear hinge pin receiving portion, a mounting bracket fixed to one of said side walls and having a pin received in said housing at said hinge pin receiving portion for vertically pivotally mounting said housing on said bracket,

(e) a forwardly extending block on said housing and spaced above said bracket, said block having a vertically extending bore therewith, an elongated rod extending vertically through said bore and having a lower end portion pivotally mounted on said bracket and a threaded upper end extending above said block, a nut on said threaded upper end, a helical compression spring surrounding said rod an bearing at opposite ends thereof against said nut and block for resiliently urging said housing and second shaft downwardly, and

(f) a vertically extending limit screw threadedly engaged in said housing adjacent said rod and bearing downwardly against said mounting bracket to limit the downward movement of said housing, whereby said second shaft may move upwardly to limit pressure exerted between said die portions.

2. In combination with a thin material converting machine having transport means for transporting thin material in a path, embossing apparatus comprising:

(a) a first rotary die member mounted on said machine and having a die portion adapted to rotate through a tangent position with said path,

(b) a second rotary die member mounted on said machine in opposed relation to said first die member and having a die portion mateable with said first named die portion and adapted to rotate through said tangent position with said path,

(c) motion transmitting members connected to said die members and cooperating to cause said die members to rotate synchronously and said first and second die portions to simultaneously arrive and mate at said tangent portion,

(d) said die members respectively including a shaft, said motion transmitting members each comprising a pair of matched gears in face-to-face relation, one of said gears of each gear pair being rotatably fixed to the respective shaft and the other of the gears being rotatable with respect to their respective shaft,

(e) means cooperating with each of said pairs for resiliently urging the gears of said pairs rotatably offset from each other but permitting the gears of each pair to be aligned by applying relative rotational pressure thereon,

(f) the fixed gear of one of said gear pairs engaging both gears of the other gear pair, and the rotatable gear of said one gear pair engaging one gear of the other gear path,

3. In combination with a thin material converting machine transport means for transporting thin material in a path, embossing apparatus comprising:

(a) a first rotary die member mounted on said machine and having a die portion adapted to rotate through a tangent position with said path,

(b) a second rotary die member mounted on said machine in opposed relation to said first die member and having a die portion mateable with said first named die portion and adapted to rotate through said tangent position with said path,

(c) motion transmitting members connected to said die members and cooperating to cause said die members to rotate synchronously and said first and second die portions to simultaneously arrive and mate at said tangent position,

(d) said die members respectively including a first and a second shaft, said first shaft including a pair of discs mounted and respectively positioned adjacent said first rotary die member on each side thereof for rotation therewith,

(e) said second shaft including a pair of discs mounted thereon and respectively positioned adjacent said second rotary die member on each side thereof for rotation therewith, said respective first and second named discs engaging forming bights therebetween for drawing said thin material therebetween,

(f) said second named discs having peripheral cutout portions adjacent said second die member die portion, whereby said discs do not form a bight on said thin material during the moment of embossing.

4. In combination with a thin material converting machine having transport means for transporting thin material in a path, embossing apparatus comprising:

(a) a first rotary die member mounted on said machine and having a die portion adapted to rotate through a tangent position with said path,

(b) a second rotary die member mounted on said machine in opposed relation to said first die member and having a die portion mateable with said first named die portion and adapted to rotate through said tangent position with said path, and

(c) motion transmitting members connected to said die members and cooperating to cause said die members to rotate synchronously and said first and second die portions to simultaneously arrive and mate at said tangent position,

(d) said die members respectively including mounting shafts, said first die member having a longitudinal gauge surface adjacent the die portion and extending longitudinally of the first die member mounting shaft, said second die member having a longitudinal gauge surface positioned to align with said first named longitudinal gauge surface when said die portions are in rotational alignment,

(e) said first die member having a transverse gauge surface adjacent the die portion and extending transversely of the first die member mounting shaft, said second die member having a transverse gauge surface positioned to align with said first named transverse gauge surface when said die portions are in longitudinal alignment, whereby alignment of said respective longitudinal and transverse surfaces on said die members produces operational alignment of said respective die portions.

5. In combination with an envelope making machine having spaced apart elongated side walls and conveyor means for transporting envelope blanks in spaced apart relation in a path extending longitudinally between said walls and a drive member for driving said conveyor means, embossing apparatus comprising:

(a) a first shaft extending between said walls and beneath said path, bearing means rotatably mounting said first shaft on said walls, a first rotary die member mounted between said walls on said first shaft and rotatable therewith, said first die member having a die portion adapted to rotate through a tangent position coinciding with said path upon each rotation of said first shaft,

(b) a second shaft extending between said walls, bearing means rotatably mounting said second shaft on said walls and located above said path adjacent said first shaft, a second rotary die member mounted on said second shaft between said walls and hav-

ing a die portion mateable with said first named die portion and adapted to rotate through said tangent position upon each rotation of said second shaft,

(c) motion transmitting members fixed to said first and second shafts and engaging whereupon said shafts rotate in opposite directions and said first and second die member portions periodically simultaneously arrive and mate at said tangent position, and

(d) means engaging said drive member with said motion transmitting members for driving said shafts synchronously with said conveyor means whereby spaced apart envelope blanks delivered into said tangent position by said conveyor means are embossed between said die portions,

(e) said envelope making machine having a fold-bar on one of said shafts and sleeve on the other of said shafts, said fold-bar and sleeve cooperating for folding a panel of an envelope blank upon every other rotation of said fold-bar,

(f) said second die member being mounted on said one shaft with the die portion thereof extending in opposed relation to said fold-bar, said first die member being mounted on the other of said shafts with a pair of opposed die portions respectively engageable with said second die member die portion, and

(g) a pair of opposed flats on said first die member and located 90 degrees from said first die member die portions to provide clearance for the passage of said second die portion past said first die portion when said die members are out of phase, said motion transmitting members being of a ratio whereupon said second die portion engages one of said first die portions upon every other rotation and clears one of said flats at said tangent position on the previous rotation.

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