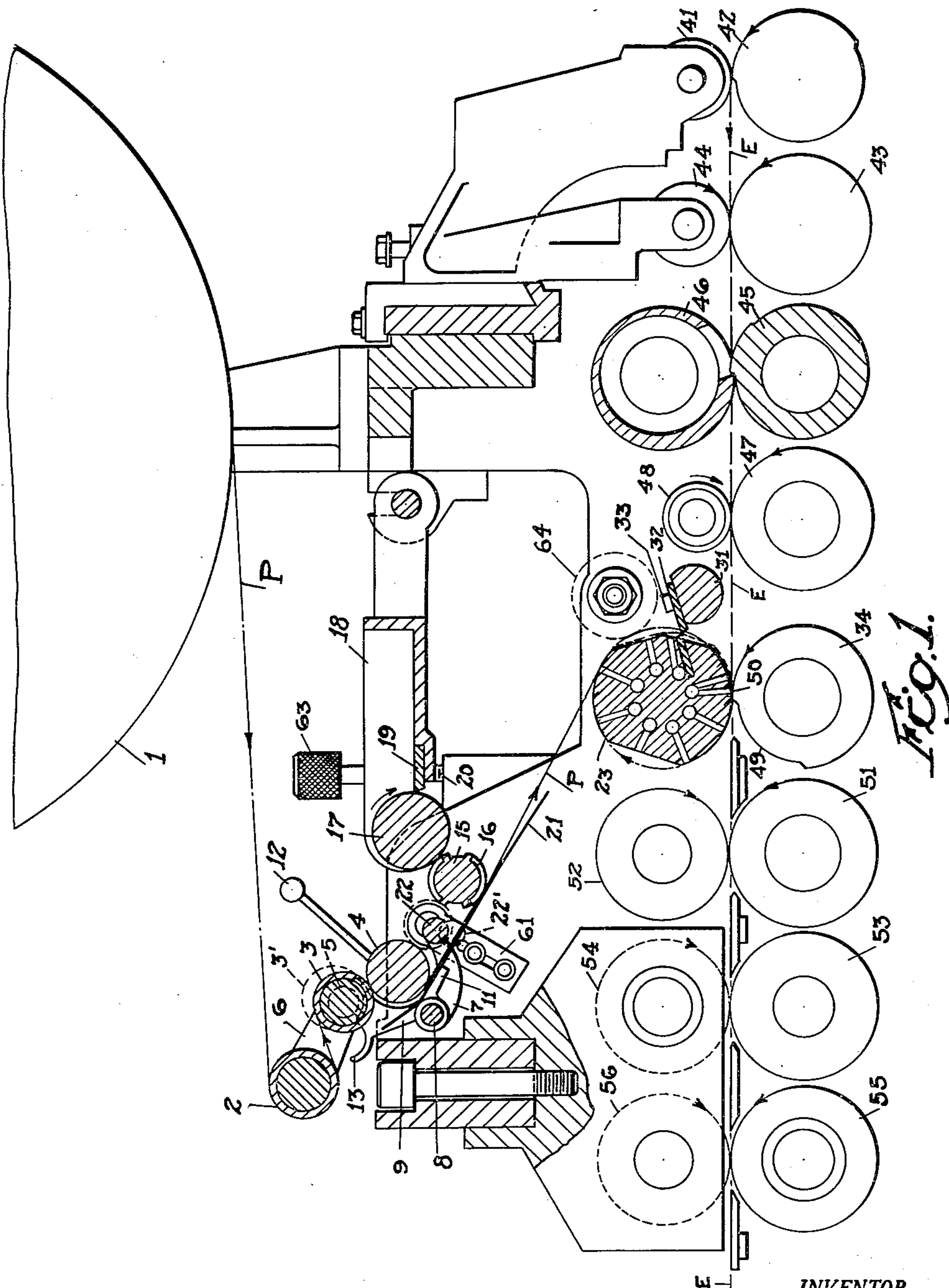


V. E. HEYWOOD

MANUFACTURE OF WINDOW ENVELOPES

4 Sheets-Sheet 1



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ATTORNEY

Sept. 20, 1960

V. E. HEYWOOD

2,953,071

MANUFACTURE OF WINDOW ENVELOPES

Filed April 16, 1956

4 Sheets-Sheet 2

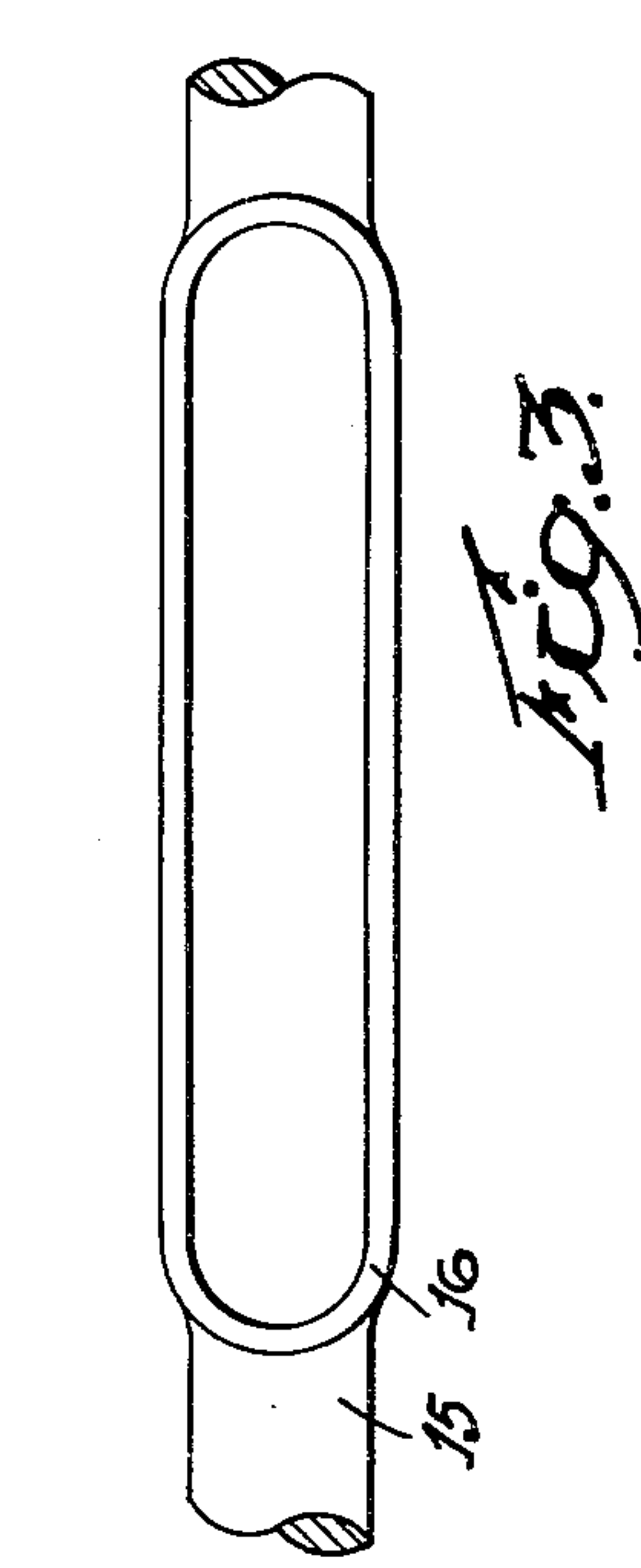


Fig. 2.

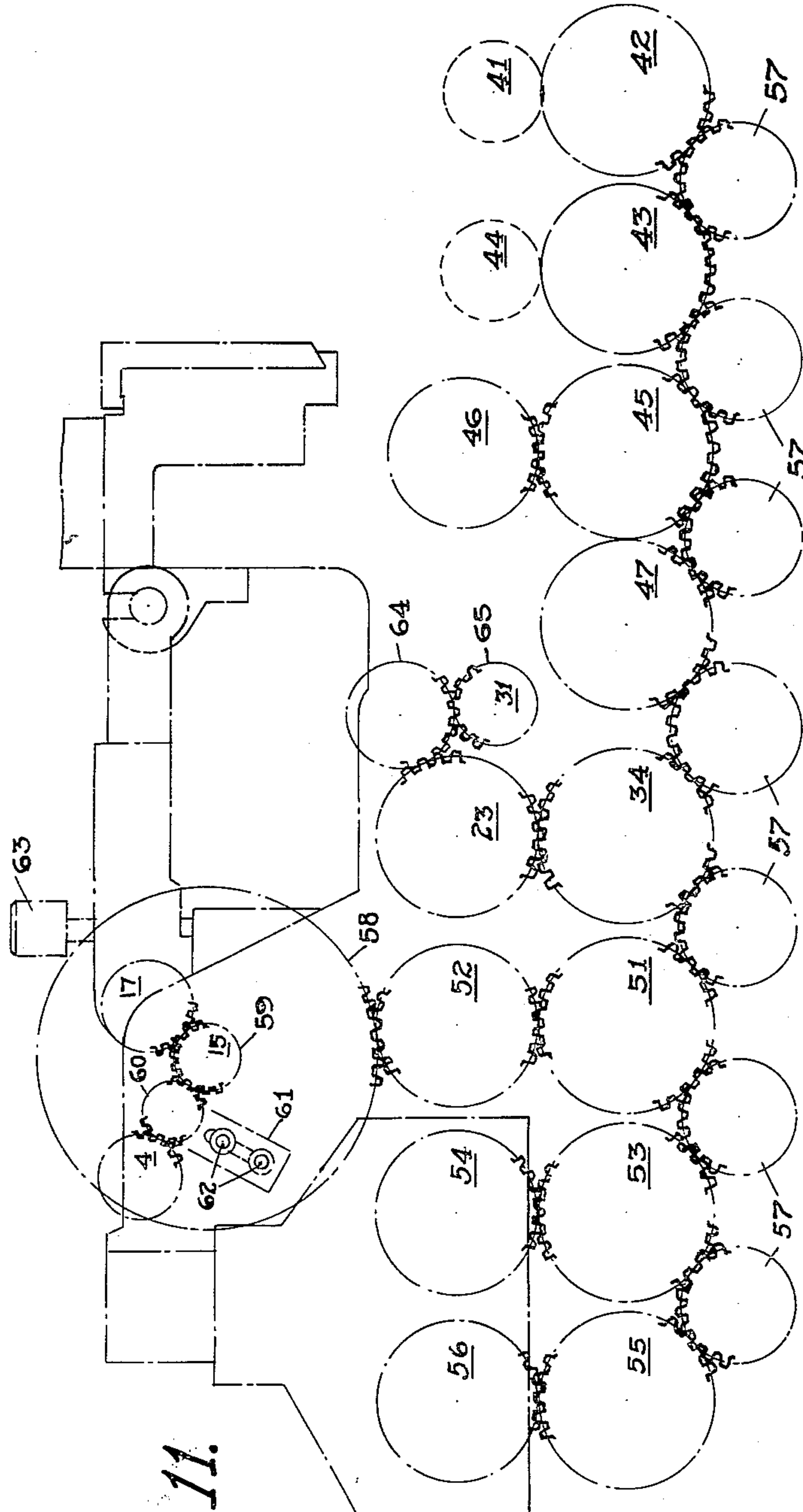


Fig. 11.

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MANUFACTURE OF WINDOW ENVELOPES

Filed April 16, 1956

4 Sheets-Sheet 3

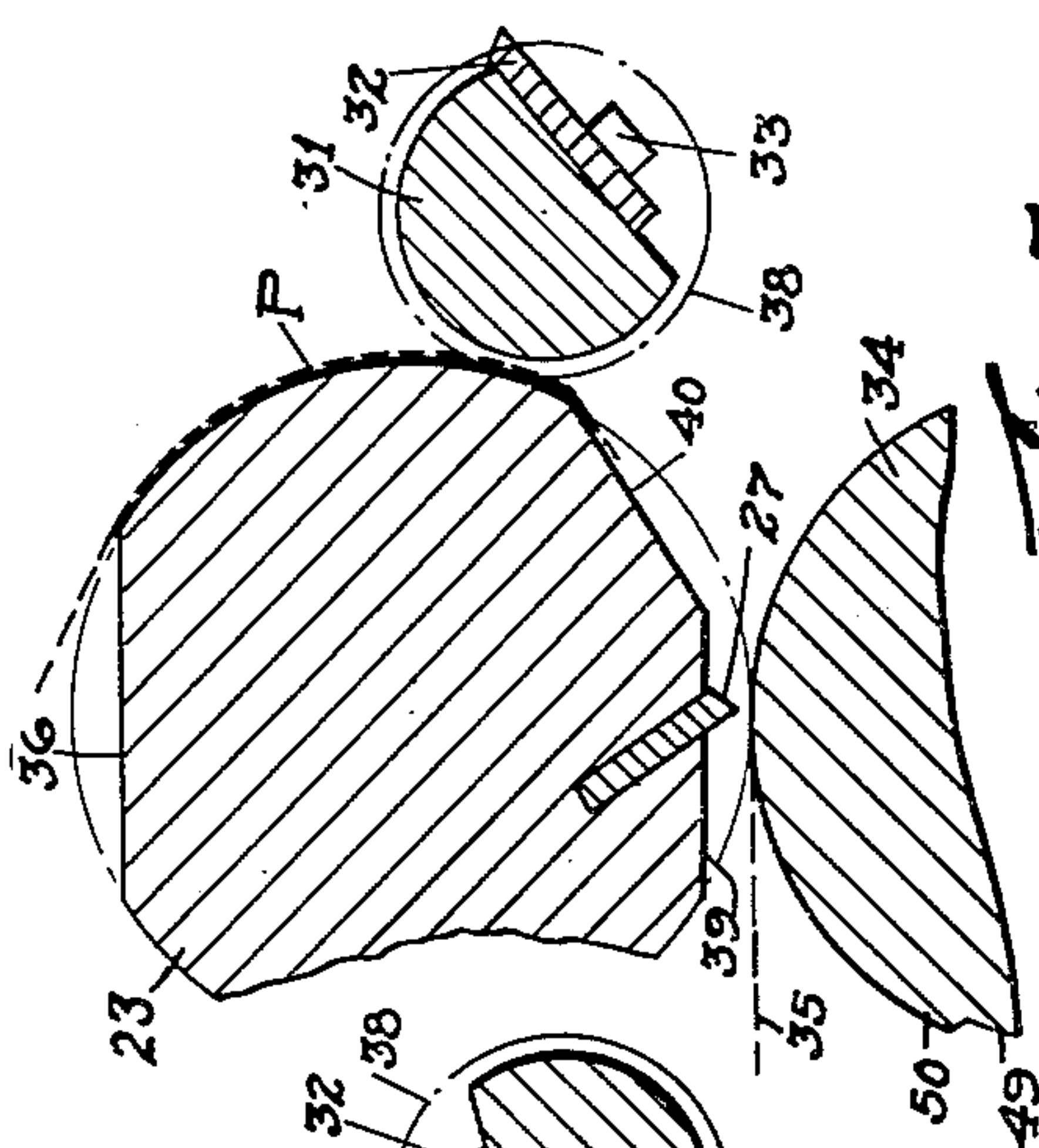


Fig. 3.

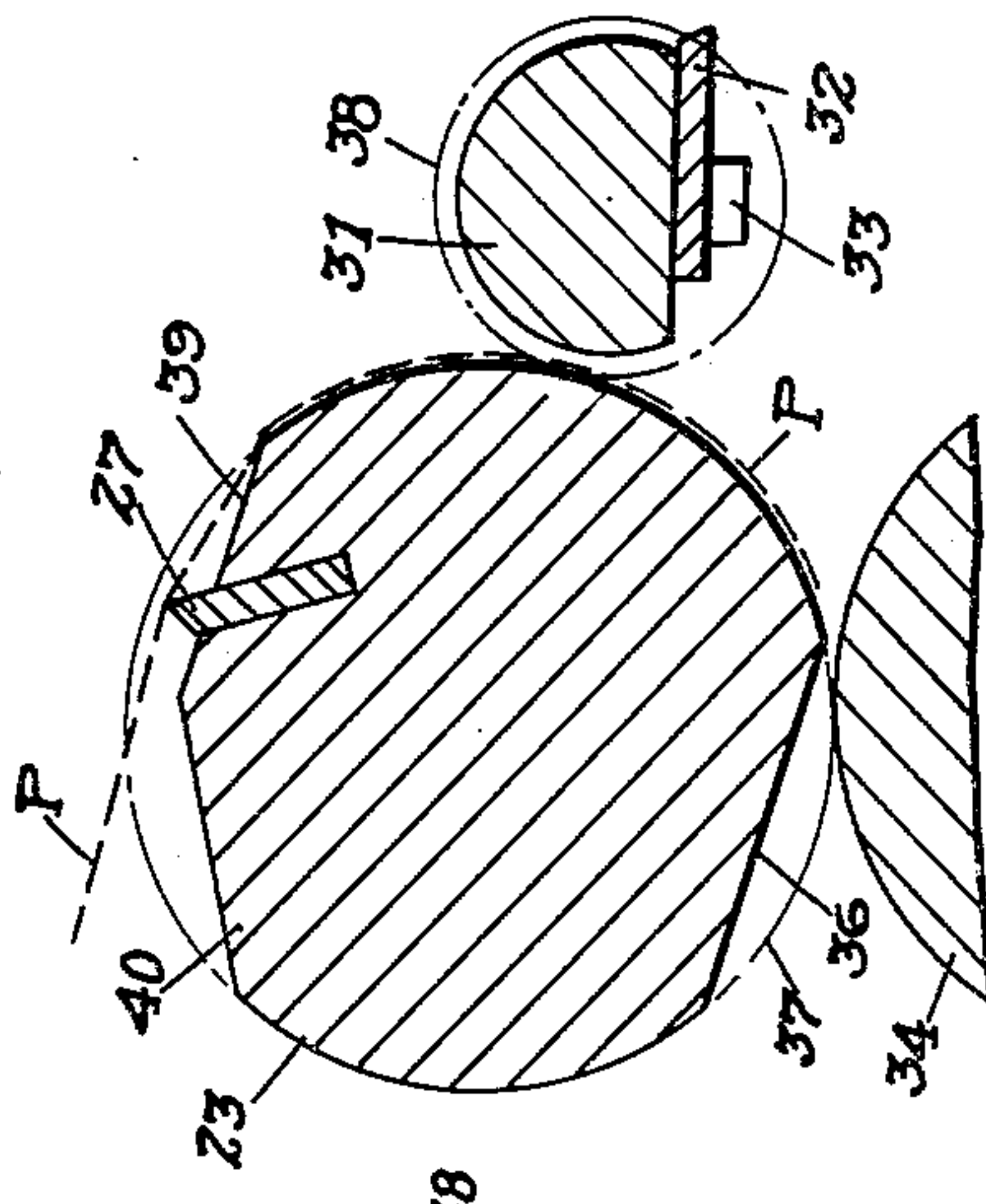


Fig. 4.

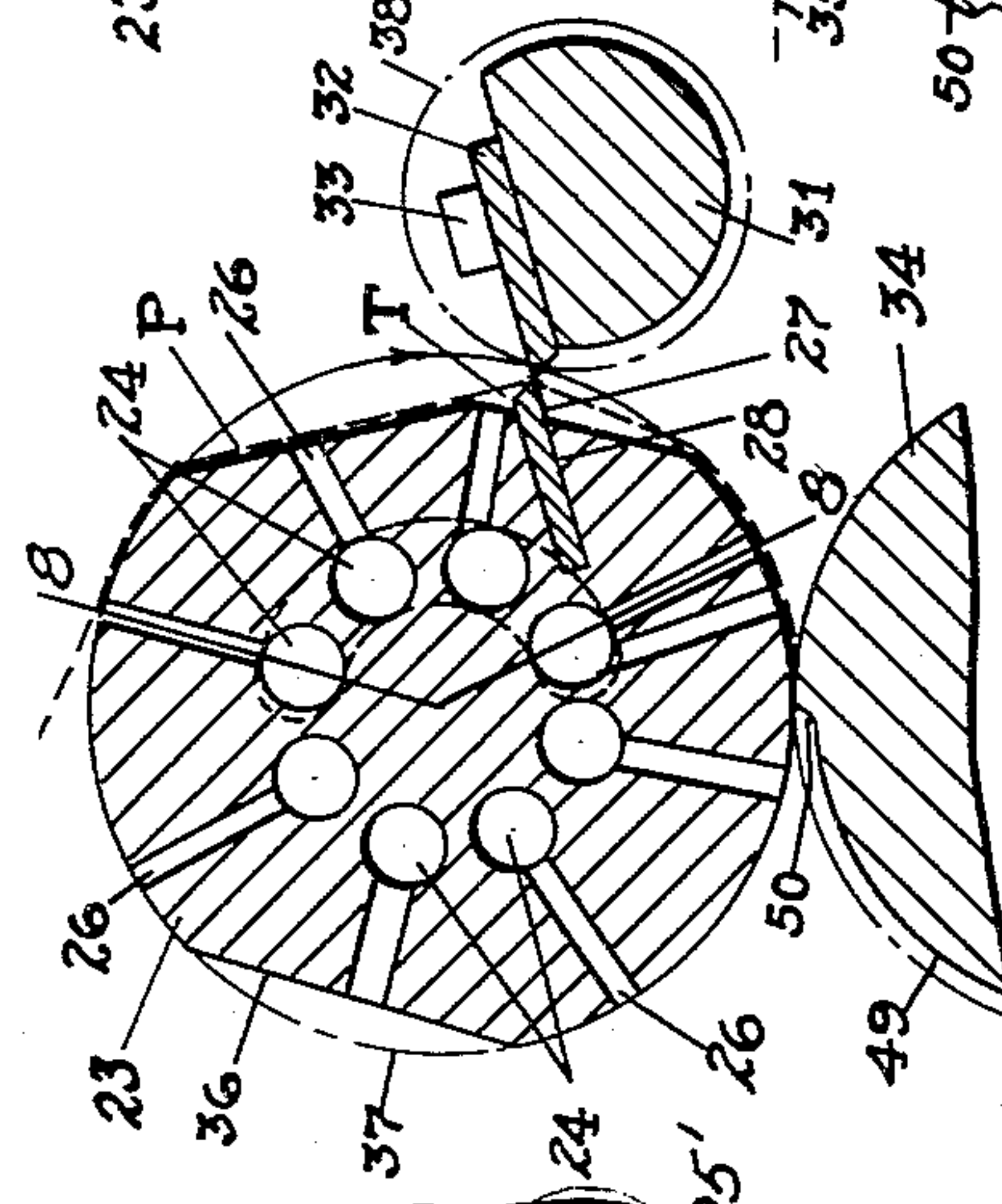


Fig. 5.

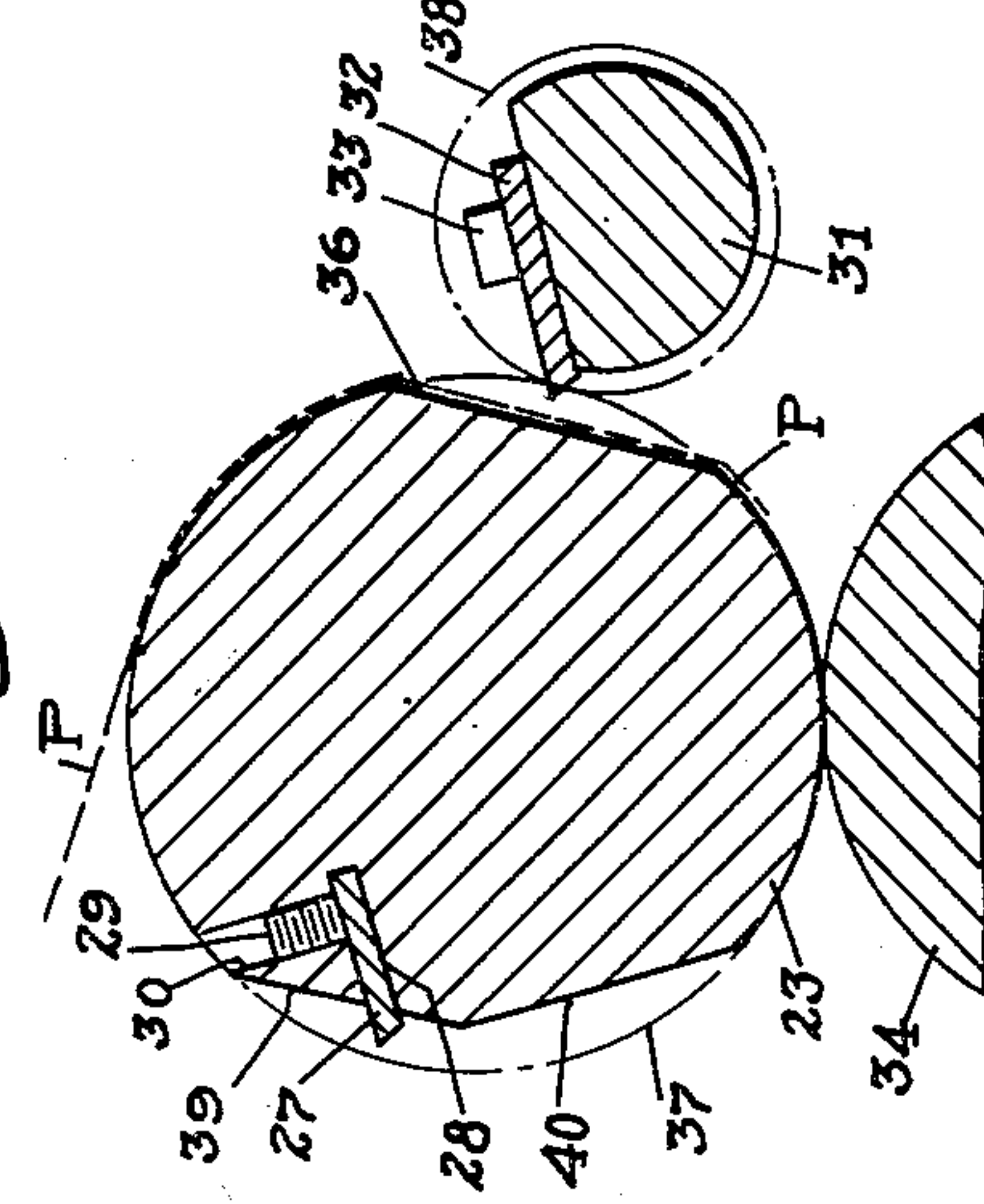


Fig. 6.

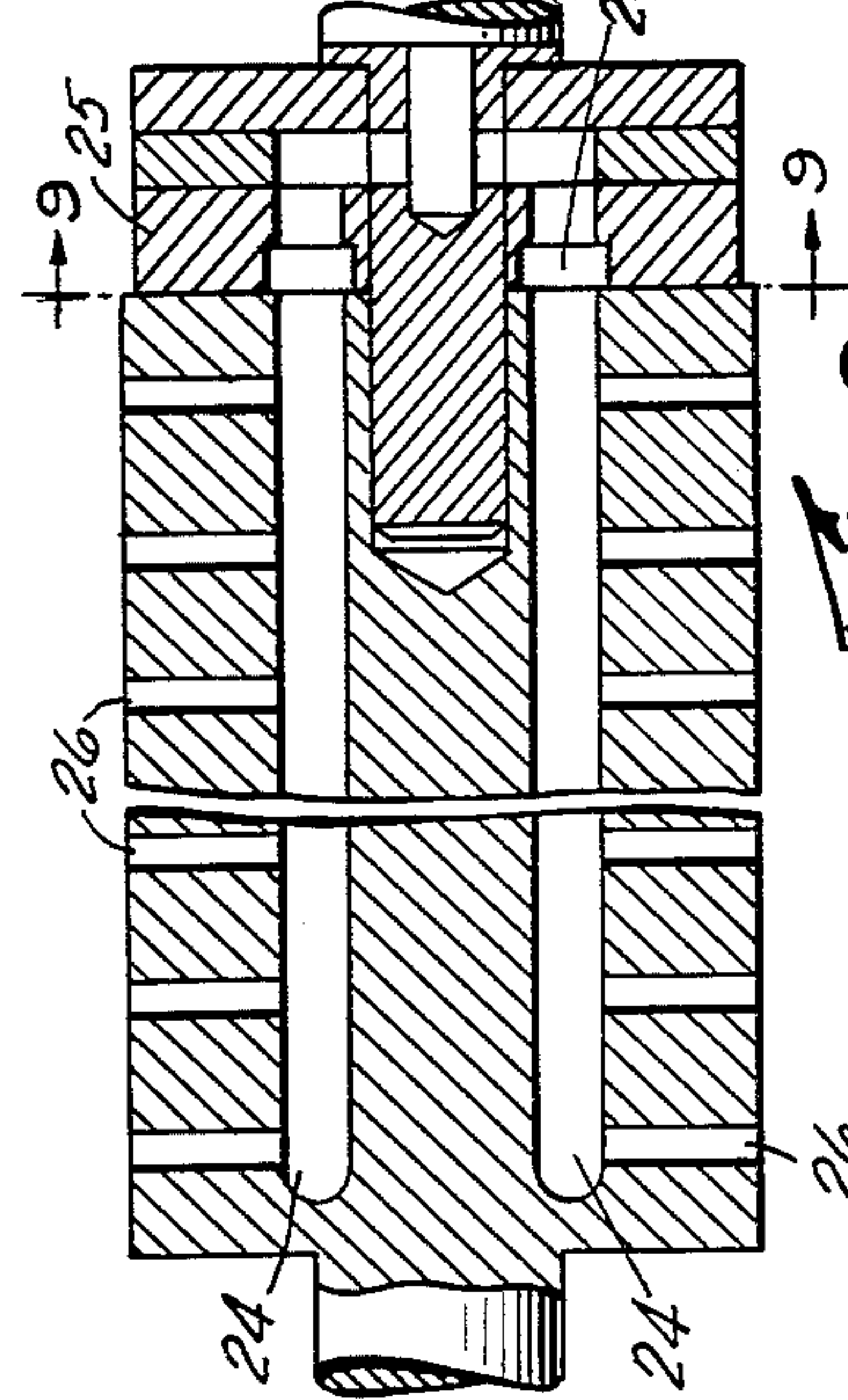


Fig. 7.

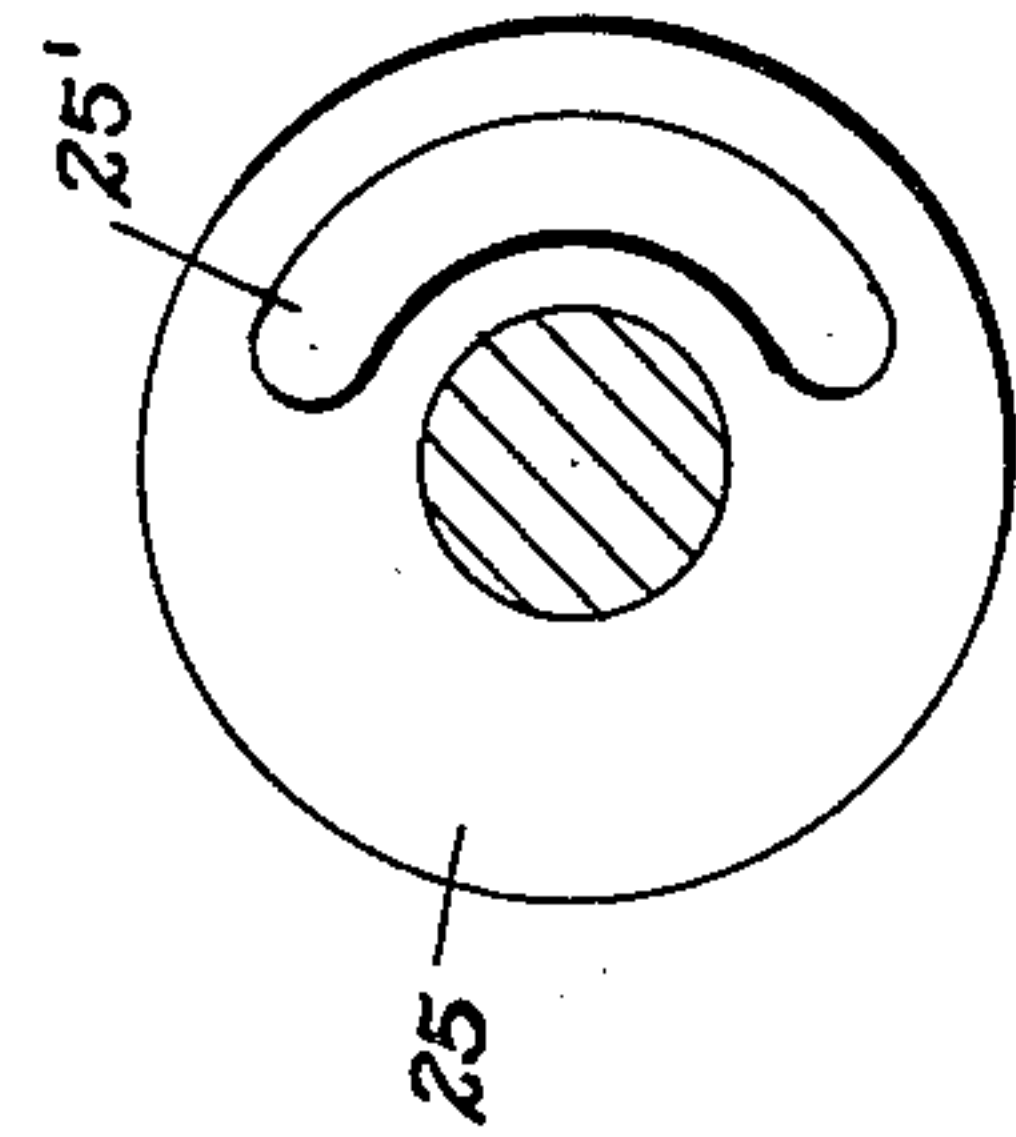


Fig. 8.

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MANUFACTURE OF WINDOW ENVELOPES

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4 Sheets-Sheet 4

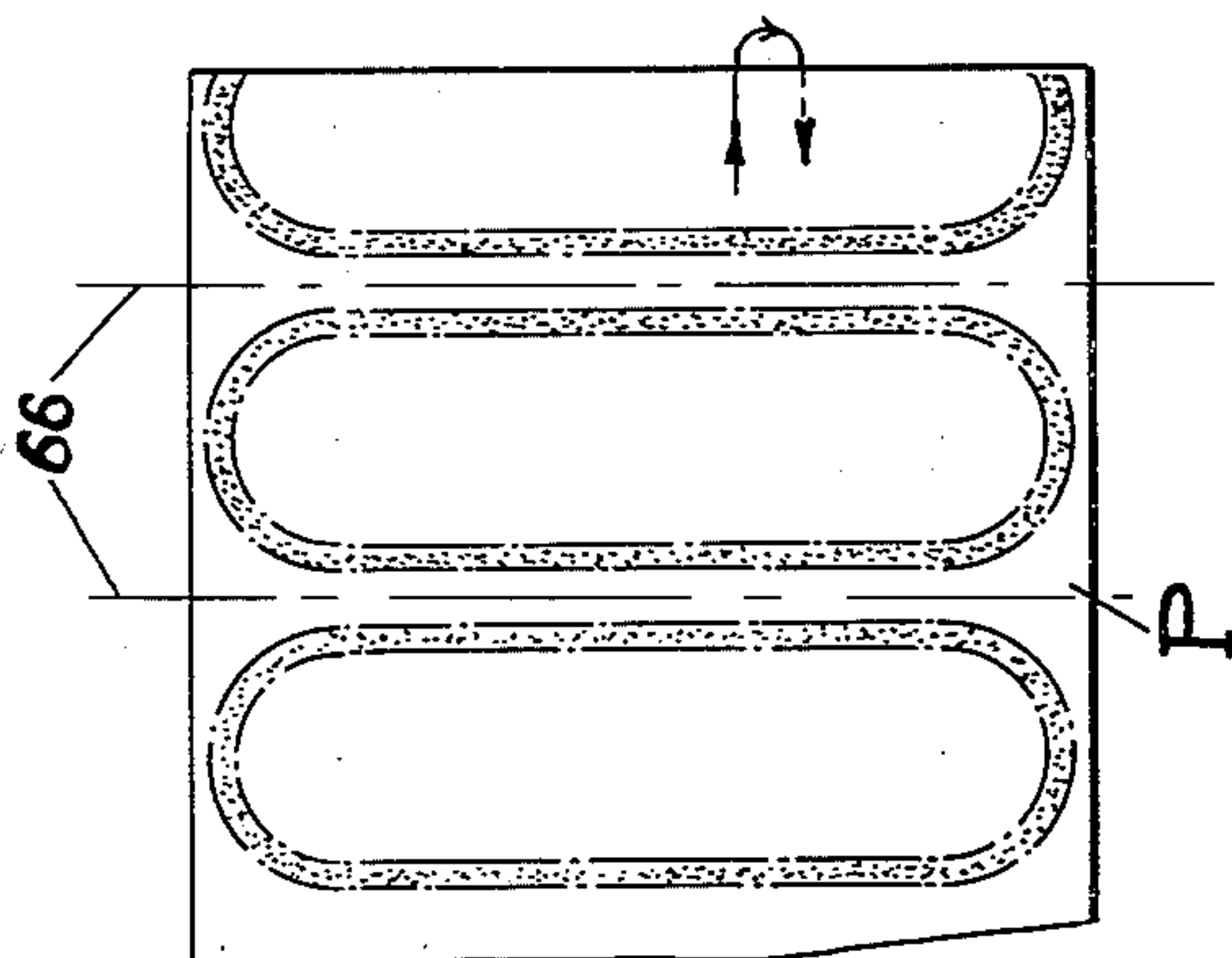
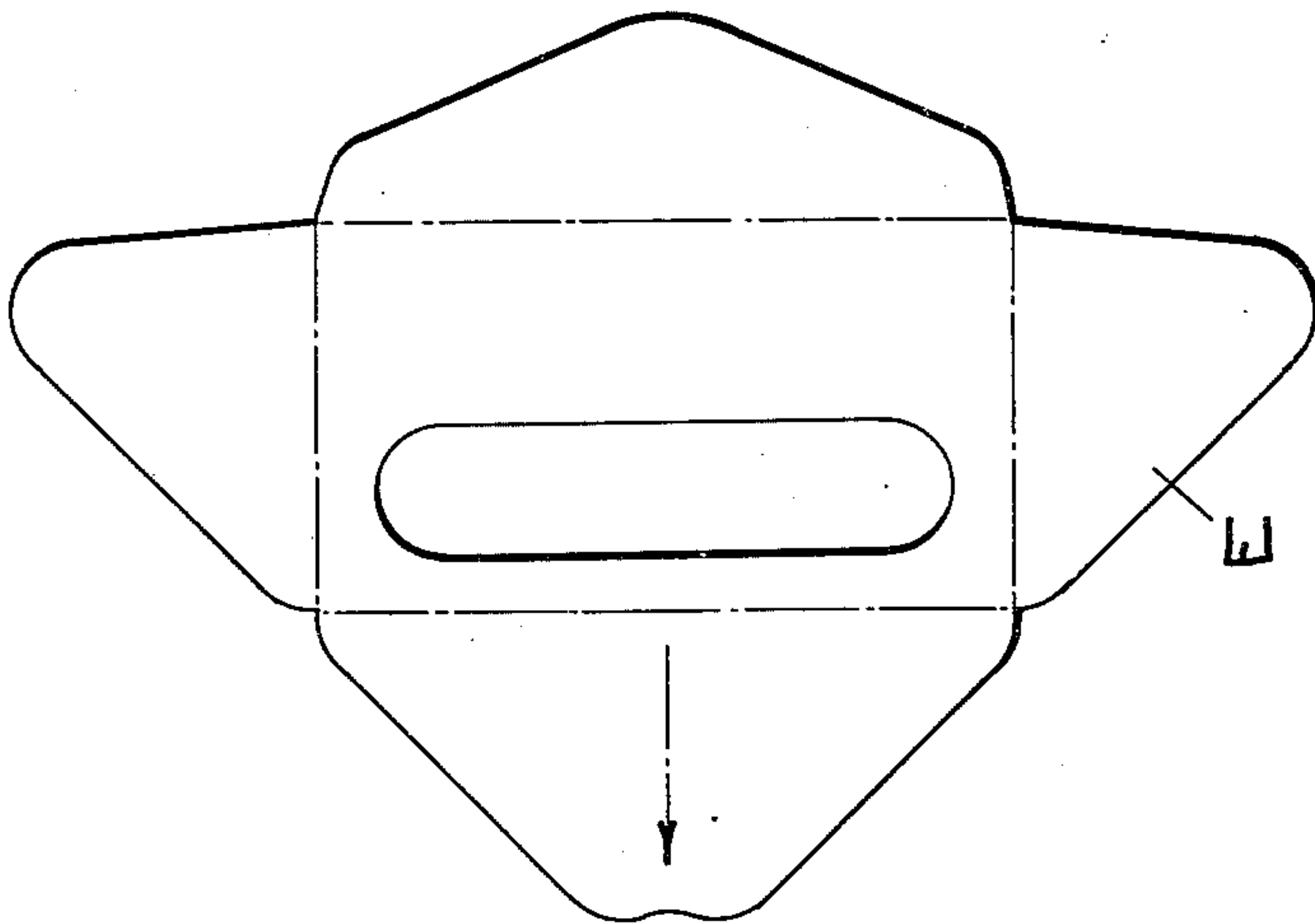
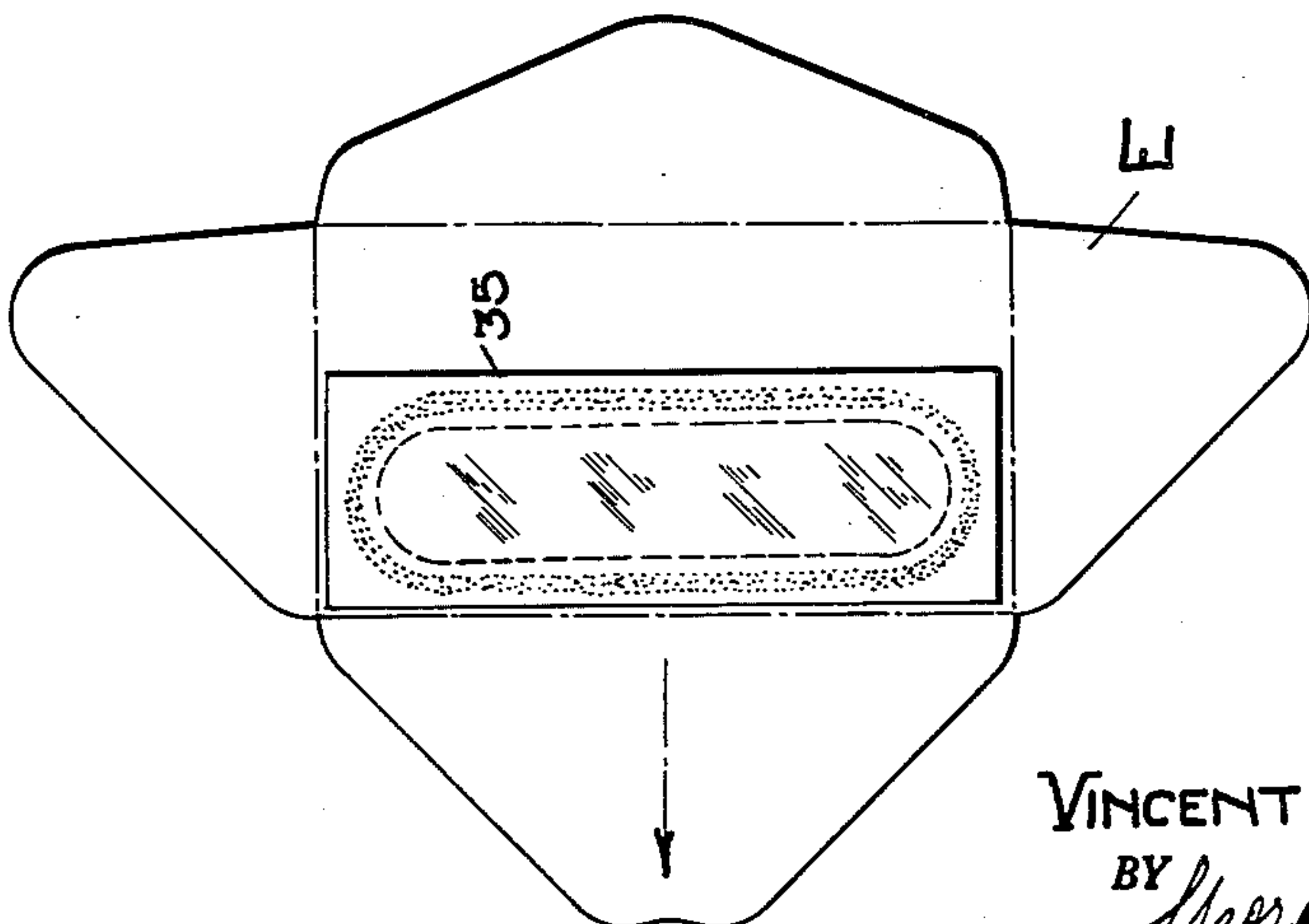


Fig. 10.



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2,953,071

MANUFACTURE OF WINDOW ENVELOPES

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Filed Apr. 16, 1956, Ser. No. 578,390

7 Claims. (Cl. 93—61)

This invention relates in general to the manufacture of window envelopes of the type in which patches of transparent material are adhesively secured to the margins of the address-revealing windows or openings of the envelope blanks, before the latter are folded.

More particularly the invention relates to a window patch applying method and apparatus for use with envelope making equipment that achieves extremely high rates of envelope production. Such equipment is typified by Heywood Patent No. 2,772,611 of December 4, 1956, for Envelope Making Method and Mechanism, and also by the pending applications of Heywood Serial No. 670,981, filed July 10, 1957, now Patent No. 2,851,934 of September 16, 1958, for Manufacture of Envelopes and George H. Kennedy, Jr., Serial No. 568,493, filed February 29, 1956, now Patent No. 2,811,905 of November 5, 1957 for Envelope Manufacture. In such equipment, the flat unfolded blanks are advanced at rates of the order of 900 to 1200 per minute, several times faster than the rate of blank advance in conventional envelope making equipment.

Patch applying apparatus presently in use with conventional envelope making equipment always supplies the adhesive, for patch sticking, to the margin of each blank's window. This is not feasible with blanks advancing at rates of the order of 900 to 1200 per minute, because the rotary glue applicator at these speeds invariably throws off centrifugally considerable quantities of the wet glue, such as to foul up the machine, and the materials passing therethrough.

To overcome this difficulty, the patch sticking glue is here applied, in a series of transverse closely-adjacent imprints, to the patch material web, since the latter's speed of advance, for successive cut-offs of the relatively narrow patches from its leading end, is only a small fraction of the blank speed.

My invention provides simple and effective suction roll means, rotating at blank speed, by which successive patches are accurately shear cut from the slow-moving patch web, and immediately rolled onto the fast-moving blanks—all in the absence of any shear blade contact with the passing blanks, or any shear blade fouling by the closely-adjacent imprints of wet patch sticking glue on said web.

Other and further objects and advantages of the invention will become apparent from the following detailed description thereof, taken in connection with the accompanying illustrative drawings in which

Fig. 1 is a side elevational view, partly in section, of mechanism embodying this invention.

Fig. 2 is a side elevation on a larger scale of one of the roll-lifting levers of Fig. 1.

Fig. 3 is a plan view on a larger scale of the rotary gum applicator shown in Fig. 1.

Fig. 4 is a cross-sectional view on a larger scale of the vacuum roll and smaller cutter roll shown in Fig. 1.

Figs. 5, 6 and 7 are views similar to Fig. 4 showing

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the vacuum roll and cutter roll in different relative positions.

Fig. 8 is a view in longitudinal section of the vacuum roll, taken substantially on the section line 8—8 of Fig. 4.

Fig. 9 is a left-hand end view on a larger scale of the vacuum commutator as taken along section line 9—9 of Fig. 8.

Fig. 10 is a large scale plan view showing the relative positions of the window patching material and envelope blanks before and after patching.

Fig. 11 is a side view of the gearing arrangement employed with the various rolls shown in Fig. 1.

Referring to the drawings in detail, in Fig. 1 a continuously moving high-speed succession of envelope blanks E (shown in broken lines) passes from the right to the left between the various opposed rolls which are illustrated in the lower portion of this figure. At the same time, a web of transparent patch material P (about 5 inches wide) is drawn at constant speed from a large supply roll 1, and around a guide roll 2, by its passage between a pair of closely contacting feed rolls 3 and 4, rotating at a surface speed which, in the nature of things, can only be about a third to a fifth of the blank speed. The web material P passes thence from left to right, first beneath a rotating gum applicator 15, and then onto and embracingly around a constantly rotating vacuum roll 23, to be described in detail hereinafter. The surface speed of this vacuum roll 23 is substantially the same as the blank speed, and the blank path is tangent to said roll's surface at a point (see Fig. 1) which is almost 180° distant from the web material's initial contact with said surface. As the subtended length of slower speed web material moves along this right-hand half of the vacuum roll's surface (in the "slip draft" manner later to be described), knives 27 and 32 will cut successive patches from the web. Immediately after each patch is cut, vacuum roll 23 will apply this pre-gummed patch at high speed to that envelope blank which is then passing at high speed between the bite of vacuum roll 23 and its associated underlying platen roll 34.

Feed roll 3 is a rubber covered roll which is mounted on a movable axle 5 (dotted lines) and held in pressure contact with feed roll 4 by means of springs (not shown). Feed roll 4 is a gear-driven steel roll which is mounted on a fixed axis. Movable axle 5 is journaled at its ends in a pair of spaced arms 6 (only one of which is shown) which are pivotally attached at their upper left-hand ends to the journals of roller 2.

The roll 3 is arranged to be moved away from the roll 4, for the purpose of threading the web P into position, before the mechanism is put into operation. For this purpose, the mechanism provides a pair of spaced levers 7 (only one of which is shown in Fig. 1) which are keyed to the opposite ends of rocker shaft 8. As best shown in Fig. 2, each lever 7 is provided with three radial arms 9, 10 and 11, which will be described later in greater detail. At one end of the rocker shaft 8 (which is journaled in the frame of the machine) a handle 12 is attached for the purpose of rotating the shaft and pivoting the levers 7 in unison. Returning to Fig. 2, each radial arm 9 has a cammed surface consisting of a left-hand depression 13 and a right-hand depression 14. When the rolls 3 and 4 are in their web-feeding position as shown in Fig. 1, the right-hand depressions 14 will lie below the axle 5 of roll 3 and out of contact therewith. However, when the handle 12 is urged in a clockwise direction (as it appears in Figs. 1 and 2), the left-hand depression 13 will move under the axle 5 and lift the roll 3 to the broken line position 3' shown in Fig. 1.

Assuming that feed rolls 3 and 4 are in their solid line positions as shown in Fig. 1, the web of patching material

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P will be directed beneath feed roll 4 and also beneath the rotary gum applicator 15. The latter element, as best shown in Fig. 3, has a pair of elevated convex areas or lands 16, on opposite surfaces of the applicator, each land being in the shape of a long flat oval. A thin layer of glue or gum is supplied to these lands 16 by surface contact between the applicator 15 and a tub roll 17 which is rotatably mounted at one end of a gum tub 18. A doctor blade (or scraper) 19, attached to the bottom of the tub by means of screws 20 can be adjusted to increase or decrease the thickness of the gum coating on the gum roll 17.

As the web P passes beneath and in surface contact with the rotating gum applicator 15, the latter will imprint successive and spaced bands of gum on the upper surface of the web, said bands being in the same flat oval shape as the lands 16. Since patch gumming at the speeds indicated herein requires the application of a thin viscous layer, it is important that surface contact between the web and the applicator 15 be assured at all times; for this purpose, a wide clock spring 21 secured to the radial arms 11 of the levers 7 bears against the under side of the web and holds the latter firmly against the applicator under a light but constant pressure.

For the purpose of moving the web of patching material P away from the gum applicator 15, a round bar or rod 22 is connected to the ends of arms 10 of the levers 7 so as to extend across and above the web P in the normal Fig. 1 position. Therefore, when the levers 7 are rocked in a clockwise direction by means of handle 12, not only will the feed rolls 3 and 4 be separated, but also the clock spring 21 will be moved downwardly away from the applicator 15, and the bar 22 will push the web positively away from the applicator; the web-removing position of bar 22 is shown in dotted lines at 22' in Fig. 1.

From the gum applicator 15, the web of patching material P is directed to the upper surface of vacuum roll 23, which is rotating at the full-line speed of the envelope blanks passing through the mechanism. As best shown in Figs. 4 and 8, this vacuum roll 23 has a plurality of inner, longitudinal channels 24 which are closed at one end of the roll, but which open at said roll's other end against the inner face of a stationary vacuum distributor 25, concentric with said roll. Said distributor's inner face as shown in Fig. 9, provides, in the path of the several channels' open ends, an arcuate recess or opening 25', which is connected by distributor passages 25a and 25b with any suitable source of suction or vacuum, not shown. This arcuate recess or opening 25', as shown by broken lines in Fig. 4, is co-extensive substantially with the web-contacted right-hand half of the roll 23, thereby to establish the access of suction to all of the channels 24 which at any given instant are occupying a position to the right of the vertical center line of the vacuum roll 23 (as it appears in Fig. 1 and Figs. 4 to 7). Channels 24 communicate with the outer surface of the vacuum roll by means of a plurality of spaced holes or ports 26 extending substantially radially outward from each of the channels 24 along the lengths thereof (as best shown in Fig. 4). Under this arrangement, the right-hand portion of the surface of the vacuum roll 23 (as it appears in Fig. 1 and Figs. 4 to 7) will always be under vacuum.

Fig. 4 shows the true relationship between the vacuum roll 23 and the various vacuum openings therein; for the sake of simplicity, these vacuum channels and ports have been omitted from the illustrations of Figs. 5, 6 and 7, although they would otherwise normally appear in these figures.

Since the peripheral speed of vacuum roll 23 is considerably greater (about five times as shown in the drawings) than the linear speed of the web of patching material P, as metered out, so to speak, by the slower speed feed rolls 3 and 4, the length of web material on the

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right-hand half of roll 23, though held closely by suction to the roll's surface, will be in a constant slip draft relationship to said rapidly rotating surface; the vacuum pull from the holes 26 will hold the web against the right-hand surface of the vacuum roll while this relative slipping or dragging effect occurs. Thus, the web P will travel in a clockwise direction over the surface of vacuum roll 23 in a close fitting and slipping relationship until the foremost portion is severed from the web, in a manner later to be described. This severed portion, released from restraint imposed by the patch web's slower feed rolls 3 and 4, will immediately assume the full line speed of the vacuum roll against which it is still held by the force of vacuum.

A knife blade 27 is received within a slot 28 (see Fig. 6) in the vacuum roll 23 and held in place by means of a plurality of longitudinally spaced screws 29 located in screw holes 30. A smaller roll 31, referred to hereinafter as the cutter roll, carrying a second knife blade 32, is mounted to the right of the vacuum roll 23. Knife blade 32 is secured to the cutter roll 31 by means of a plurality of longitudinally spaced screws 33.

As shown in Figs. 4 to 7, inclusive, vacuum roll 23 rotates in a clockwise direction such that its outer peripheral speed is equal to the linear speed of the envelope blanks passing beneath it. Cutter roll 31 rotates in a clockwise direction at twice the angular speed but at approximately the same peripheral speed as that of vacuum roll 23. Design limitations, as determined by the optimum spacing between the blank feeding rolls (hereinafter described), dictates the use of a cutter roll having the relative size illustrated in the drawings; however, it should be understood that the cutter roll could be made of any convenient size apart from that shown, depending upon the spacing designed into the machine. As shown here in the drawings, cutter roll 31 will make two complete revolutions for each revolution of vacuum roll 23.

In the Fig. 4 position, the leading portion of the patching web P is shown as extending beyond the knife 27 to the point of tangency between vacuum roll 23 and a lower platen roll 34 (later to be described). Under these conditions, knife blade 27 is moving downwardly against the upwardly moving knife blade 32 so as to shear off the leading portion of the web P, thus forming a separate gummed patch 35. At the moment that patch 35 is severed from the web P, its speed will become the same as the peripheral speed of the vacuum roll 23; thus, as the envelope blanks E pass in succession between rolls 23 and 34, the successive patches 35, gummed and severed in the manner described above, will be applied to these blanks at the same linear speed at which the blank themselves are traveling.

Fig. 5 shows the relative positions of the rolls 23, 31 and 34, patch 35 and the web P at a short time subsequent to the Fig. 4 position. The patch 35 has advanced at the full line speed of the envelope blanks E (not shown in this figure) such that it is beyond the bite of the rolls 23 and 34. The knife blade 27 has moved almost 90° while the knife blade 32 has moved nearly 180°. The forward end of the web P (which was over the end of knife blade 27 in the Fig. 4 position) has moved between 15 and 20 degrees clockwise, or about one-fifth of the linear displacement of the tip of knife blade 27.

In the Fig. 6 position, knife blade 27 has moved about 180° from the Fig. 4 position, while knife blade 32 has made a complete revolution. It should be noted that vacuum roll 23 is flattened along its length as at 36 to provide clearance for the knife 32. The forward edge of the web P has further advanced to a position slightly forward of the flat surface 36.

The Fig. 7 position shows the vacuum roll 23 about 90° before the next cut. The forward edge of the web P is approaching the bite of rolls 23 and 34.

It should be apparent, from a consideration of Figs.

4 to 7, that knife blade 27 is slightly recessed within the outer circumference (or pitch line) 37 (extended by dotted lines) of the vacuum roll 23. This latter arrangement prevents contact between the tip of knife blade 27 and the platen roll 34. On the other hand, knife blade 32 projects slightly beyond the imaginary circumference 38 (dotted lines) which would be tangent to the circumference 37 and concentric with the central axis of cutter roll 31. This means that the linear speed of the tip of knife blade 27 would be slightly less than the peripheral speed of roll 23 (on its completely rounded portions); and, by the same token, the speed of the tip of knife blade 32 would be slightly greater than the peripheral speed of roll 23.

As shown also in Figs. 4 to 7, vacuum roll 23 is provided with two additional flattened portions 39 and 40 so as to prevent contact between the knife blade 32 and the gummed web P except at the location of the cut. Otherwise, there would be tendency for the knife blade 32 to scrape off some of the gum or glue at positions before and after the cut. Flat 39 extends on opposite sides of the knife blade 27 with the latter projecting rearwardly outward from the surface of flat 39. Flat 40 extends rearwardly from the trailing edge of flat 39 and at an angle thereto. As the web P is dragged over the surface of vacuum roll 23, it conforms to the shape of the roll, including the flattened portions. As best shown in Fig. 4, the web P forms a triangular space T with the knife blade 27 and the flat surface 39. As soon as the web is severed by the shearing action of the knives, the leading edge of the web will be sucked immediately into the triangular space T, preventing further contact between the web and the knife 32, as the latter passes by.

Cutter roll 31 is positioned relative to vacuum roll 23 such that each cut 66 (see Fig. 10) in the web will be made in the narrow space between successive gummed areas.

Envelope blanks E moving in a continuous spaced succession at a high rate of speed are introduced at the right of Fig. 1 from a blank forming mechanism of the type which is disclosed, for example, in Heywood Patent No. 2,696,255. One of the main features of the latter patent involves the cutting, from a continuous web, of diamond or rhomboid-shaped blanks which are then fed at an angle to the direction of web feed for subsequent scoring, corner cutting, etc. Whereas the instant invention has been designed for use in connection with the mechanism of the above mentioned patent, it is by no means limited thereby; the instant invention might be equally well adapted for use with other blank-forming mechanisms and envelope machines operating at relatively high speeds.

The envelope blanks are fed between direction changing rolls 41 and 42 which form no part of this invention, and which are fully described in the aforementioned patent. From rolls 41 and 42, the envelope blanks E pass between a lower solid roll 43 and a pair of spaced upper scoring rolls 44 which provide suitable score lines for the side flaps of the envelope blanks in a conventional manner.

From the side-flap scoring rolls, the envelope blanks pass between a pair of conventional window cutting rolls 45 and 46 of the same general type as described in United States Patent No. 1,202,122, issued October 24, 1916 to G. W. Swift, Jr. The chip from the window is drawn through the hollow female punch 46 by vacuum and sent to a chip bin (not shown). Since window cutting, per se, is old and well known it is considered unnecessary to add further to the above description. It should be mentioned, however, that the position of the resulting window opening in the blank, as effected by the angular positions of rolls 45 and 46, is oriented relative to the cutting action of knives 27 and 32 so as to permit proper registry between the successive pre-cut and pre-gummed patches and the corresponding window openings of the successive

blanks as the latter pass at high speed between rolls 23 and 34.

From the window-cutting rolls the envelope blanks pass between a lower, solid transfer roll 47 and a pair of spaced upper narrow rolls (disc rolls) 48. From these transfer rolls the envelopes pass directly into the bite of rolls 23 and 34 for the patching operation, as described above.

It should be noted that the surface of lower platen roll 34 is provided with an arcuate recessed portion 49 and a remaining raised sector portion 50; the recessed portion 49 prevents the platen roll from engaging the leading edge of the patch web until a patch 35 is severed therefrom by knives 27 and 32. The angular position of the recessed portion 49 is adjusted relative to the cutting action of the knives so that the actual cutting takes place at the instant that the leading edge of the sector portion 50 bites the leading edge of patch web.

Beyond the vacuum roll 23 and the platen roll 34, the blanks advance at their same high speed into the bite of rolls 51 and 52. These latter rolls, both rubber covered, serve to press the gummed patch 35 firmly against the blank E. Also, by virtue of score blades (not shown) imbedded in the upper roll 52, score lines are provided in a conventional manner for the top and bottom flaps of each blank passing between these rolls.

To the left of rolls 51 and 52 are two pairs of opposed rolls 53, 54, 55 and 56 which serve the function of cutting or notching corners into the blanks as they pass between them. This corner cutting or notching, which forms no part of the instant invention, is fully described in the aforementioned United States Patent No. 2,696,255. Beyond the notching rolls 53 to 56, the envelope blanks are directed to various instrumentalities (not shown) for the subsequent folding, gumming and drying of these blanks into completed envelopes.

Fig. 10 shows in plan view the relationship between the web of patching material as it passes around the vacuum roll (not shown) and a pair of blanks located before and after the patch-applying station, respectively. The right-hand blank is shown just after its window opening has been cut out. The web of patching material is shown as travelling rearwardly, downwardly and then forwardly (see arrows). The oval-shaped stippling represents the gummed areas resulting from the prior operation of the gum applicator 15 (not shown). The dot-and-dash lines 66 represent the locations of the cuts to be made by the knives 27 and 32 (not shown). The left-hand envelope blank is shown leaving the patch-applying station with the patch 35 properly positioned relative to the window opening. Although the instant patch-applying mechanism has been described heretofore in reference to a blank-forming mechanism (United States Patent No. 2,696,255) which produces diamond or rhomboid-shaped blanks and in reference to high speed envelope-making mechanism (for example, the aforesaid Heywood Patent No. 2,772,611) which operates on such diamond-shaped blanks, the particular blanks illustrated in Fig. 10 are not derived from the diamond-shaped variety; these blanks are so illustrated in Fig. 10 to indicate the universal utility of the patch-applying mechanism disclosed herein. It should be apparent that the principle of slow speed feeding and gumming of the patch material could be combined with high speed cutting and applying steps in connection with other high speed envelope machines, whether operating on diamond-shaped blanks or not.

Fig. 11 is a semi-diagrammatic illustration showing the gearing connections for the various driven rolls of Fig. 1. The lower rolls 42, 43, 45, 47, 34, 51, 53 and 55 (from right to left) which drive their corresponding upper rolls are geared together by lower idler gears 57. The gear for upper scoring roll 52 drives a larger gear 58 which is keyed to the shaft (not shown) of the gum applicator 15. This latter gearing arrangement will cause

the gum applicator to turn at one-half the rotational speed of roll 52. A smaller gear 59, also keyed to the shaft of the gum applicator, drives the tub roll 17 and a movable idler gear 60 which is mounted on a slidable support 61. The latter support may be slidably adjusted relative to the frame of the machine by means of bolts 62. Idler gear 60 drives the feed roll 4. If it is desired to change to a different size applicator 15, the idler gear 60 may be adjusted up or down to provide proper driving connection between the gear for the substituted applicator and the gear for the feed roll 4; at the same time, the gum tub and tub roll assembly can be adjusted up or down by means of knob 63 to provide proper meshing of the gear on the tub roll 17.

The gear for vacuum roll 23 drives an idler gear 64 which in turn drives a gear 65 on the shaft of cutter roll 31. Gears 64 and 65 (and cutter roll 31 as well) are mounted on a pair of movable yokes (not shown) which are pivotally attached to the journals of vacuum roll 23 and are adjusted to various angular positions relative to the vacuum roll 23 by means of conventional and adjustable clamping means (not shown). With the latter arrangement, the position of cutter roll 31 may be adjusted around the periphery of vacuum roll 23 to compensate for variations in the width of the patch to be cut.

This invention admits of many modifications apart from those disclosed herein; for example, Fig. 1 shows the use of window cutting rolls 45 and 46 in connection with the mechanism of this invention; whereas the latter arrangement is particularly advantageous from a standpoint of insuring alignment between the window openings and the applied patches, as well as simplifying the feeding of the envelope blanks themselves, it should be obvious that the window openings could be pre-cut into the blanks before their introduction into the patch-applying mechanism of the instant invention. This pre-cutting of the window openings, in the case of the aforementioned United States Patent No. 2,696,255, could take place in the web; i.e. before the severing of the diamond-shaped blanks from the web. In the case of the more conventionally shaped blanks as illustrated in Fig. 10, the window openings could be pre-cut into the blanks in the well-known and conventional manner.

In this invention, however, it is only necessary that the window patches be applied to the window-envelope blanks at some time subsequent to the cutting of the window openings in the blanks, whether these window openings, as described above, are pre-cut or not. It is likewise important, for reasons that should be inherently obvious, that the window patch should be applied to the blank prior to the infolding of its top, bottom and side flaps. The notching of the corners in the blanks, as provided by rolls 53, 54, 55 and 56, could take place either before or (as shown) after the application of the window patch to the blank.

This invention has been described herein with particular reference to the patching of window envelopes. The essence of the invention involves a relatively slow-speed feeding and gumming of a web of patching material followed by a high-speed cutting and applying of the pre-gummed patches to a high-speed moving assembly of window-envelope blanks. It should be pointed out that the instant invention might be equally well adapted to any high-speed moving surface (continuous or interrupted) to which pre-gummed paper patches need to be applied; for example, it might be desirable to apply pre-addressed (or otherwise printed) and pre-gummed patches of paper to a high-speed succession of post cards or to a high-speed web. The slow-speed patch feeding and gumming of the instant invention as combined with its high-speed cutting and applying steps could obviously be used in such a situation.

Other and further modifications apart from those in-

dicated herein could be made within the spirit of this invention.

I claim:

1. Means for applying pre-cut and pre-gummed patches to a continuously moving high-speed progression of thin, flat articles comprising means for feeding a continuous succession of said articles at a high rate of speed and in spaced-apart relation through an elongated substantially uniplanar article-treating zone, a rotary vacuum roll located adjacent said zone and intermediate the ends thereof for assisting in the high-speed advance of said articles through said zone, the peripheral speed of said vacuum roll being substantially equal to said high rate of speed of said articles, means for feeding and gumming a continuous web of patching material at a relatively slow rate of speed, said web of patching material extending beyond its feeding and gumming means into tangent relation with the outer surface of said vacuum roll, means for supplying a source of suction to the outer surface of said vacuum roll for holding said web of patching material against said surface in a taut slipping relationship, a knife blade carried by said vacuum roll, a cutting edge on said knife blade extending in substantially parallel relation with the axis of said vacuum roll and within the pitch line of said vacuum roll's outer cylindrical surface, a pair of longitudinally extending flattened recesses in the surface of said vacuum roll on opposite sides of said knife blade to permit the angular bending of said web of patching material at said cutting edge and within said pitch line, and means spaced from said vacuum roll and cooperating with said knife blade for shearing successive and equal sized patches from the leading end of said web, said vacuum roll immediately advancing the successive so-sheared and so-gummed patches into said zone at said high rate of speed against the successive articles for adherence thereto.

2. Means for applying window patches to a continuously moving high-speed progression of window-envelope blanks comprising means for feeding a continuous succession of pre-cut window-envelope blanks at a high rate of speed and in spaced-apart relation through an elongated substantially uniplanar blank-treating zone, a rotary vacuum roll located adjacent said zone and intermediate the ends thereof for assisting in the high-speed advance of said blanks through said zone, the peripheral speed of said vacuum roll being substantially equal to said high rate of speed of said blanks, means for feeding and gumming a continuous web of patching material at a relatively slow rate of speed, said web of patching material extending beyond its feeding and gumming means into tangent relation with the outer surface of said vacuum roll, means for supplying a source of suction to the outer surface of said vacuum roll for holding said web of patching material against said surface in a taut slipping relationship, a knife blade carried by said vacuum roll, a cutting edge on said knife blade extending in substantially parallel relation with the axis of said vacuum roll and within the pitch line of said vacuum roll's outer cylindrical surface, a pair of longitudinally extending flattened recesses in the surface of said vacuum roll on opposite sides of said knife blade to permit the angular bending of said web of patching material at said cutting edge and within said pitch line, and means spaced from said vacuum roll and cooperating with said knife blade for severing successive and equal sized patches from the leading end of said web, said vacuum roll immediately advancing the successive so-severed and so-gummed patches into said zone at said high rate of speed against the successive window-envelope blanks and in registry with the window openings therein.

3. Means for applying window patches to a continuously moving high-speed progression of window-envelope blanks comprising means for feeding a continuous succession of pre-cut window-envelope blanks at a high rate of speed and in spaced-apart relation through an elongated substantially uniplanar blank-treating zone, a rotary vacuum roll located adjacent said zone and intermediate the

ends thereof for assisting in the high-speed advance of said blanks through said zone, the peripheral speed of said vacuum roll being substantially equal to said high rate of speed of said blanks, means for feeding and gumming a continuous web of patching material at a relatively slow rate of speed, said web of patching material extending beyond its feeding and gumming means into tangent relation with the outer surface of said vacuum roll, means for supplying a source of suction to the outer surface of said vacuum roll for holding said web of patching material against said surface in a taut slipping relationship prior to the cutting of said web, a knife blade carried by said vacuum roll, a cutting edge on said knife blade extending in substantially parallel relation with the axis of said vacuum roll and within the pitch line of said vacuum roll's outer cylindrical surface, a pair of longitudinally extending flattened recesses in the surface of said vacuum roll on opposite sides of said knife blade to permit the angular bending of said web of patching material at said cutting edge and within said pitch line, and means spaced from said vacuum roll and cooperating with said knife blade for severing successive and equal sized patches from the leading end of said web, said vacuum roll immediately advancing the successive so-severed and so-gummed patches into said zone at said high rate of speed against the successive window-envelope blanks and in registry with the window openings therein.

4. Means for applying window patches to a continuously moving high-speed progression of window-envelope blanks comprising means for feeding a continuous succession of pre-cut window-envelope blanks at a high rate of speed and in spaced-apart relation through an elongated substantially uniplanar blank-treating zone, a rotary vacuum roll located adjacent said zone and intermediate the ends thereof for assisting in the high-speed advance of said blanks through said zone, the peripheral speed of said vacuum roll being substantially equal to said high rate of speed of said blanks, means for feeding and gumming a continuous web of patching material at a relatively slow rate of speed, said web of patching material extending beyond its feeding and gumming means into tangent relation with the outer surface of said vacuum roll, means for supplying a source of suction to the outer surface of said vacuum roll for holding said web of patching material against said surface in a taut slipping relationship prior to the cutting of said web, a knife blade carried by said vacuum roll, a cutting edge on said knife blade extending in substantially parallel relation with the axis of said vacuum roll and within the pitch

line of said vacuum roll's outer cylindrical surface, a pair of longitudinally extending flattened recesses in the surface of said vacuum roll on opposite sides of said knife blade to permit the angular bending of said web of patching material at said cutting edge and within said pitch line, and a rotary shearing means spaced from said vacuum roll and cooperating with said knife blade for severing successive and equal sized patches from the leading end of said web, said vacuum roll immediately advancing the successive so-severed and so-gummed patches into said zone at said high rate of speed against the successive window-envelope blanks and in registry with the window openings therein.

5. In an apparatus of the class described, a rotary vacuum roll, a plurality of open-ended and spaced vacuum channels extending from their open ends at one end of said vacuum roll longitudinally within said roll, a plurality of longitudinally spaced radial ports extending outwardly from each of said channels to the surface of said vacuum roll, a stationary vacuum commutator adjacent said one end of said vacuum roll, an opening in said commutator for communicating with the open ends of certain of said channels as they pass over said opening during the rotation of said vacuum roll, a longitudinal knife blade carried by said vacuum roll, an outer cutting edge on said knife blade extending in substantially parallel relation with the axis of said vacuum roll and within the outer pitch line of said vacuum roll's outer cylindrical surface, and a pair of intersecting and longitudinally extending flattened recesses in the surface of vacuum roll on opposite sides of said knife blade.

6. Window patch severing and delivering apparatus as claimed in claim 4, in which the rotary shearing means is rotated at twice the angular speed of said vacuum roll, so as to cooperate with the latter's knife blade on alternate revolutions of said rotary shearing means.

7. Window patch severing and delivering apparatus as claimed in claim 4, in which the vacuum roll's surface, in a zone 180° removed from its knife blade, is flattened, to escape contact with said rotary shearing means on the latter's non-shearing revolutions.

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