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BLANKET CYLINDER CONSTRUCTION FOR PRINTING MACHINES

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2 Sheets-Sheet 1

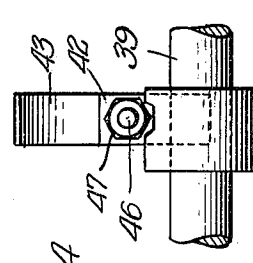
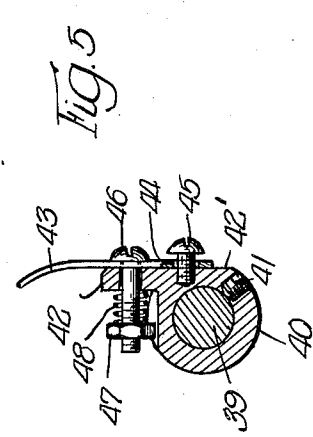
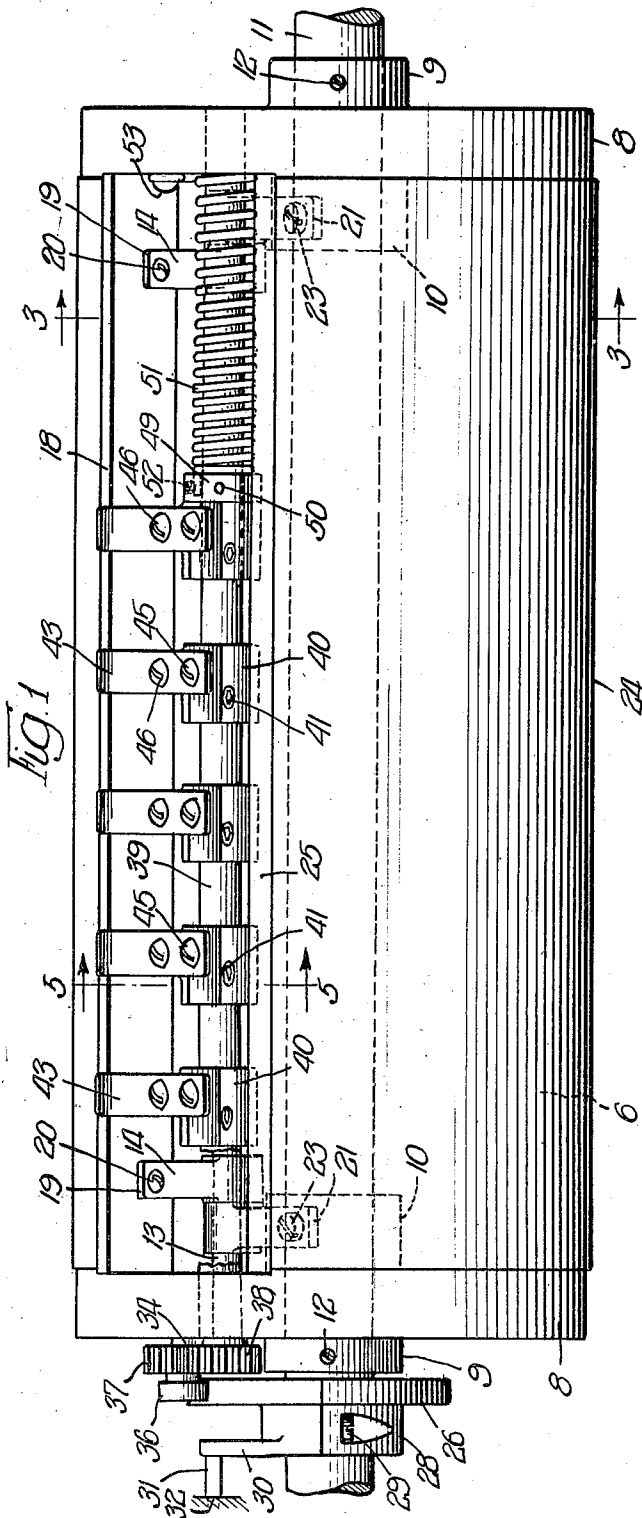


FIG. 4

Fig. 5

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Fig. 3

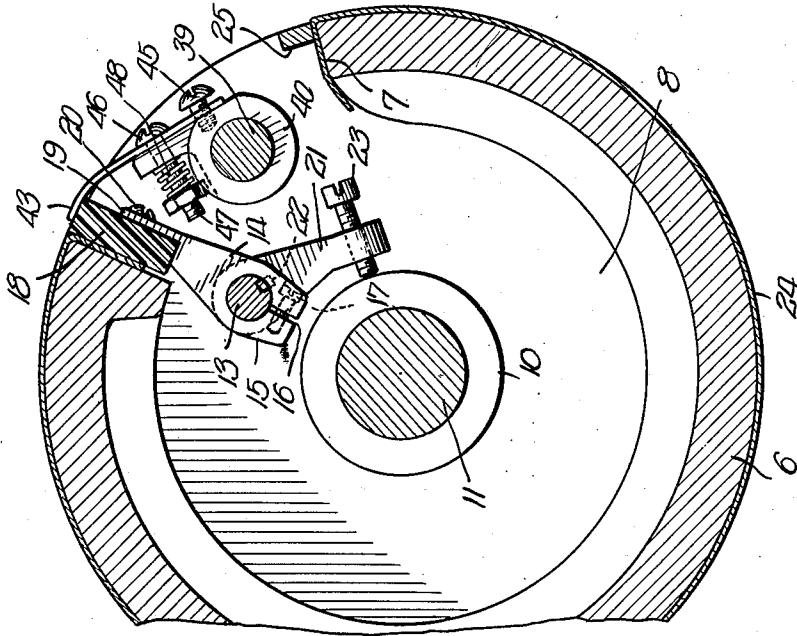
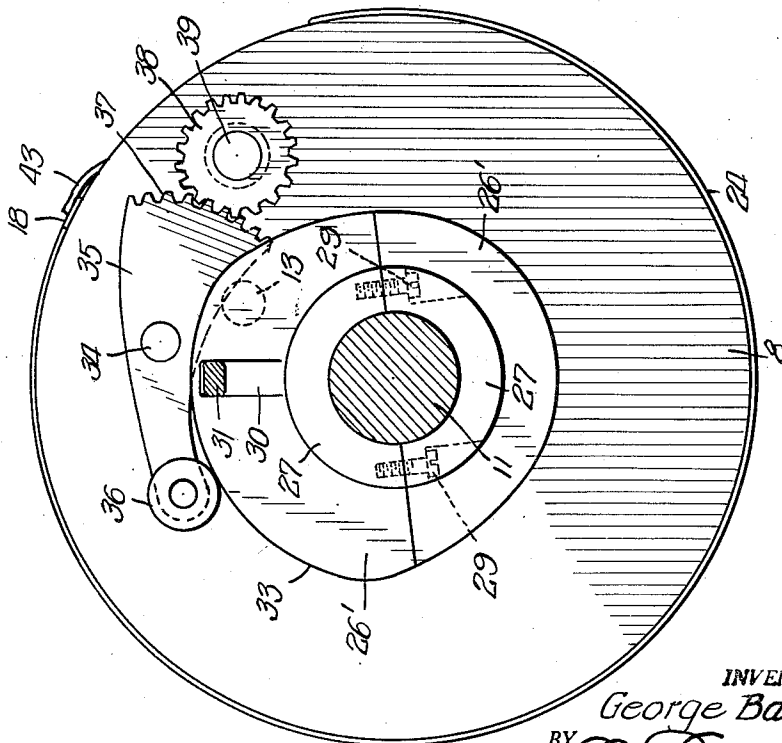


Fig. 2



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## BLANKET CYLINDER CONSTRUCTION FOR PRINTING MACHINES

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3 Claims. (Cl. 101-409)

The present invention relates to printing machines and has for its main object the provision of an improved blanket cylinder.

In printing machines paper sheets are fed between blanket and plate cylinders for the purpose of receiving printing impressions from the plate cylinder while the blanket cylinder presses the paper towards the plate cylinder in order that printing impressions may be transferred from the plate cylinder to the paper sheet. The blanket cylinder carries therearound a lining made of paper which acts as a protective envelope so that when the same becomes spattered with ink a new lining may be substituted. Means are provided within the blanket cylinder for engaging two edges of the lining for maintaining the same in a stretched taut condition around the blanket cylinder.

Normally the blanket cylinder is provided with a plurality of grippers, which, ahead of the contact point between the blanket and plate cylinders, automatically open in order to receive the edge of a paper sheet carried towards and between the cylinders, and which grippers at some distance ahead of the said contact point are adapted to automatically close in order to grip the paper sheet by its edge in order to lift the paper sheet from the conveyor in the printing machine and carry the paper toward and past the contact point between the two cylinders. When the paper sheet has received the printing impressions and has passed the contact point between the two cylinders, the grippers are timed to automatically open in order to release the paper sheet upon which printed impressions have been received.

Therefore, the principal object of the present invention is to generally improve the mechanism for affixing the edge of a paper lining to the blanket cylinder.

Another object of the present invention is the provision in conjunction with the mechanism last hereinabove mentioned of a bar made of a cellulosic material for bearing against the edge of paper lining and pressing it towards the cylinder. A bar made of the material indicated has a degree of compressibility in comparison with rigid material such as metal, and therefore is more efficient in maintaining the edge of a paper lining bound to the cylinder.

Another object of the present invention is to generally improve the construction and operation of the grippers aforesaid.

A still further object of the present invention is provision of grippers having a degree of resiliency and yieldability in order to eliminate tearing of the paper sheets.

A still further object of the present invention is to make the bar hereinabove mentioned to coact with the said grippers so as to increase the pressure upon the paper sheets as the same are gripped by said grippers, simultaneously minimizing the chances of the paper sheets becoming torn or injured.

With the above general objects in view and others that will appear as the invention is better understood, the same consists in the novel construction, combination and arrangement of parts hereinafter more fully described, illustrated in the accompanying drawings and pointed out in the appended claims.

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In the drawings forming a part of this application and in which like designating characters refer to corresponding parts throughout the several views:

Fig. 1 is a side elevational view of a hollow blanket cylinder, longitudinally recessed, with the mechanism for tying paper lining to the cylinder and the mechanism for gripping paper sheets as they are fed towards the contact point between the said cylinder and the plate cylinder, both of said mechanisms being positioned partially within the recess of the roller and partially within the cavity of the cylinder;

Fig. 2 is an end elevational view of the blanket cylinder, illustrating the cam mechanism for actuating the grippers;

Fig. 3 is a cross sectional view through the blanket cylinder, taken substantially on line 3-3 of Fig. 1;

Fig. 4 is a rear elevational view of one of the grippers; and

Fig. 5 is a cross sectional view on line 5-5 of Fig. 1, illustrating the gripper construction.

Referring in detail to the present drawings there is shown a hollow blanket cylinder 6, which is in effect a hollow tube, provided with a longitudinal recess 7. Closing each end of said cylinder 6 is disk 8, of a diameter corresponding to the diameter of said cylinder 6. Each of said disks 8 is provided with outer collar 9 and with inner collar 10. Said collars constitute bearings for supporting therewithin shaft 11, which is keyed to collars 9 by means of screws 12. Said disks 8 are in any suitable manner rigidly affixed to cylinder 6. Thus, when shaft 11 rotates cylinder 6, disks 8 rotate therewith.

Set by its ends within disks 8 is shaft 13, which adjacent the free end of each collar 10, supports arm 14. Said arm 14 adjacent one of its ends has enlarged head 15, which is split as at 16, the resulting bifurcated ends thereof being engaged by screw 17, transversely of shaft 13, for the purpose of adjustably rigidly engaging said arm 14 with shaft 13. The opposite end of said arm 14 is cut away for seating bar 18. The resulting finger 19 projecting from said arm 14 overlies the face of said bar 18 and is rigidly engaged therewith by means of screw 20.

Coacting with each of said arms 14 is lever 21, which is mounted upon shaft 13 and is keyed thereto by means of key 22. The free end of said lever 21 receives transverse screw 23, the free end of which bears against collar 10.

Paper or packing sheet lining 24, for the purpose of protecting cylinder 6 from the spattered ink, is received by one of its ends within the slot defined by the body portion of said blanket cylinder 6 adjacent recess 7 and bar 25. The ends of said bar 25 are either embedded within disks 8, or are otherwise suitably secured thereto. Lining 24 is then wrapped around said cylinder 6 and the opposite end thereof is brought within the space defined by the body portion of said cylinder 6 adjacent said recess 7 and bar 18. When said last mentioned end of lining 24 remains within said last mentioned space, screws 23 are then turned so that the free ends thereof frictionally bear against collars 10. The turning of said screws 23 causes levers 21 to shift away from collars 10. This in turn causes a rotary shifting movement of shaft 13, due to the rigid connection thereof with levers 21 through keys 22, in a counter-clockwise direction as viewed in Fig. 3. Turning of shaft 13 causes arms 14, with their fingers 19, as well as with bar 18, to shift towards the adjacent body portion of cylinder 6 adjacent said recess 7 for clamping the end of lining 24 reposing within the space defined by the said adjacent body portion of said cylinder 6 and said bar 18. By virtue of the arrangement described both ends of lining 24 are firmly tied to cylinder 6 with the body portion of the said lining enveloping the surface of said cylinder 6.

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Bar 18 being made of resilient, cellulosic fibrous material clamps the end of said lining 24 against the body portion of cylinder 6 without tearing or injuring the same.

The mechanism for gripping the paper sheets fed towards the printing rollers and as they approach the latter includes cam 26, which however is made of a pair of sections 26', each of which sections includes integrally formed semi-annular projection 27. The two projections 27 are complementary of each other to define collar 28, through which shaft 11 freely passes and rotates therewithin. A pair of screws 29 maintain the two projections 27 in a rigid mutual relation as well as said sections 26'. Rigidly formed with one of said projections 27 is arm 30 from which horizontal bar 31 projects. The opposite end of said bar 31 is in any suitable manner mounted or rigidly affixed to frame 32. Thus, by the arrangement described cam 26 remains in a stationary condition in respect to said blanket cylinder 6 and shaft 11, permitting the latter to freely rotate therewithin.

Said cam 26 includes rise 33 which extends almost throughout the upper cam section 26', as seen in Fig. 2.

Pivoted upon pivot 34 for rocking movement thereon is lever 35, one end of which carries cam follower 36 which rides upon said cam 26. The opposite end, wider than the first, terminates in toothed rack 37 which meshes with pinion 38 keyed to one end of shaft 39 extending outwardly from one of said disks 8.

The opposite end of said shaft 39 is journalled within the opposite disk 8 for rocking movement. Said shaft 39 is positioned substantially centrally of said recess 7, as is clearly seen in Fig. 3.

Mounted upon shaft 39 in a spaced mutual relation is a plurality of paper gripping devices, each of which includes sleeve 40 rigidly affixable to shaft 39 by means of socket screw 41. Upon loosening screw 41 said sleeve 40 may be shifted either longitudinally of shaft 39 or rotatably with respect thereof. A portion of its periphery is filed off as at 42', defining a flat surface, which, in conjunction with the face of extension 42, integrally formed with and extending from said sleeve 40, defines a facet with which a portion of gripper finger 43 contacts. The free end of said gripper finger 43 extends beyond the free end of extension 42, as is clearly seen in Fig. 5. At the contacting end of said gripper finger 43 aperture 44 is made, through which aperture screw 45 is passed and is engaged with said sleeve 40. The head of said screw 45 is in a spaced relation with said gripper finger 43. Said aperture 44 is of a diameter larger than the diameter of the stem of screw 45 for permitting angular shifting movements of said gripper finger 43 without interference from said screw 45.

Passed through each of said gripper fingers 43 and said extension 42, adjacent the free end of the latter, is screw 46, the head of which contacts with and bears against the adjacent face of gripper finger 43. The opposite threaded end of said screw 46 receives nut 47. Coil spring 48, interposed between said nut 47 and the adjacent face of extension 42 tends to urge the head of screw 46 in contact with gripper finger 43 for maintaining the latter in contactual relation with said extension 42 and the flat surface 42' of said sleeve 40. The degree of tension of spring 48 may be regulated by shifting nut 47 to or away from said extension 42.

Set upon said shaft 39 is collar 49, rigidly affixable and adjustable around said shaft 39 by means of screw 50. Coil spring 51 is set around said shaft 39 in an encompassing relation, and interposed between said collar 49 and the adjacent disk 8. One end of said coil spring 51 is rigidly affixed to and within said collar 49 by means of screw 52. The opposite end of said coil spring 51 is rigidly affixed to said disk 8 by means of screw 53. The degree of tension of said coil spring 51 may be regulated by simply rotatably shifting collar 49 upon loosening of screw 50. After the adjustment of tension

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of said spring 51 has been brought about the screw 50 is driven in engagement with shaft 39 for rigidly locking collar 49 in its adjusted relation with shaft 39. The tendency of coil spring 51 to unwind exerts rocking pressure upon shaft 39 tending to urge the latter to a clockwise direction as viewed in Figs. 2 and 3, that is in the direction which tends to shift gripper fingers 43 away from their clamping position with relation to the outer edge of bar 18. Thus the operation of cam 26 by its rise 33 for actuating lever 35 and shaft 39, the latter to a counter-clockwise direction as viewed in Figs. 2 and 3, is against the tension of said spring 51, overcoming said tension in order to shift gripper fingers 43 toward bar 18 for clamping the edge of the paper sheet.

As can be inferred from the hereinabove description of the action of spring 51, the sole and only purpose of said spring 51 is to urge the end of lever 35 which carries follower 36 in the direction of shaft 11, for the sole purpose of maintaining follower 36 at all times in contact with the rim of cam 26 as the same rides thereon during the rotation of blanket cylinder 6.

From the hereinabove description it will be readily seen that when said follower 36 rides upon rise 33 of cam 26 the end of said lever 35 carrying said follower 36 is shifted in an upward direction as viewed in Fig. 2, with the consequent downward shifting movement of rack 37 for rotating pinion 38 to a counter-clockwise direction as viewed in Fig. 2. This action of pinion 38 shifts shaft 39 to the same direction, thereby shifting gripper fingers 43 in contact with bar 18. When said follower 36 rides upon the reduced portion of cam 36 the opposite shifting movements of the parts hereinabove mentioned take place, with the consequent angular shifting movement of gripper fingers 43 to the open position, that is in a spaced relation from bar 18. The two shifting movement operations last hereinabove described are so timed that gripper fingers 43 open ahead of the contact point between the blanket and plate cylinders in readiness to instantaneously fall upon the edge of the paper sheet to be printed as the same has advanced opposite to the operative outer edge of bar 18 in order to clamp the same and carry the same past the contact point between the said two cylinders in order that the paper sheet may receive printing impressions from the plate cylinder. Once the printing impressions have been transferred to the paper sheet from the plate cylinder the gripping fingers continue to hold the paper sheet until it has completely cleared the contact point between the said two cylinders. Once the paper has cleared the said contact point, with the printing impressions transferred to the paper sheet, grippers 43, due to the timing operation of cam 26 and its action upon lever 35 hereinabove described, shift to the inoperative position, that is away from bar 18, thereby releasing the hold upon the edge of the printed paper sheet in order to deposit the same on a stack of printed sheets.

From the hereinabove description it will be apparent that the degree of pressure of the gripper fingers 43 upon the edge of a paper sheet is subject to most fine regulations and adjustment. The rougher adjustment is accomplished by rotatably shifting sleeve 40 around shaft 39 upon loosening screw 41. A further, finer adjustment is brought about by turning nut 47 in one or the opposite direction in order to regulate the degree of pressure of coil spring 48. As gripper fingers 43 come in contact with the outer edge of bar 18 the former may angularly shift away from extension 42, and against the pressure of coil spring 48, further compressing the latter, and upon their pivots, which are screws 45. Apertures 44 permit the angular shifting movement of gripper fingers 43 without interference from said screws 45.

The adjustments aforesaid regulate the clamping pressure upon the paper sheets engendered between said bar 18 and the said gripping fingers 43. The need of adjustment of pressure therebetween depends in a large measure

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upon the quality, thickness, weight and toughness of the paper sheets periodically gripped by said gripping fingers 43 for carrying the same through the contact point of the said blanket and plate cylinders. The primary purpose of making the said adjustments is to prevent injury to or tearing of the paper sheets. Gripper fingers 43 as they come into the operative gripping condition by the operation of cam 26 do it with considerable impact. Metallic bar equivalent to bar 18 oftentimes does not absorb such impact. Hence, the utilization of cellulosic or fibrous material in bar 18, which has degree of resiliency as well as shock and impact absorbing qualities.

From the hereinabove description it will be readily seen that the several adjustments of pressure of gripper fingers 43 through the medium of screw 41 and spring 48 as well as the cushioning action of bar 18 due to its being made of cellulosic or fibrous material, taken in connection with the inherent resilient nature of gripper fingers 43, all adds to the overall efficiency of firm and positive gripping of the paper sheet without injuring or tearing the same or without leaving upon the paper sheet the unsightly indentations or impressions ordinarily left upon the paper sheet.

It is further observed that the access to the several parts for adjusting spring 51 or the degree of tension of gripper fingers 43 is had through recess 7.

In order to adjust blanket cylinder 6 relative to shaft 11 in order to time the operative or inoperative action of gripper fingers 43, all that needs to be done is to unscrew screws 12 in order to bodily rotatably shift cylinder 6 and its appurtenances around shaft 11 and relatively to the contact point between said cylinder and the plate cylinder, and of course to thereby shift follower 36 relatively to cam 26.

While there is described herein preferred embodiments of the present invention, it is nevertheless to be understood that minor changes may be made therein without departing from the spirit and scope of the invention as claimed.

What I claim as new is:

1. In combination with a printing blanket cylinder having a recess, a packing sheet disposed on the surface of said cylinder with one of its ends extending into said recess, a bar composed entirely of resilient material mounted within said recess in position to clamp said end of the packing sheet against a marginal body portion of said cylinder bordering said recess, a shaft mounted within said recess, a plurality of gripper units mounted on said shaft, and means for oscillating said shaft in timed relation to the rotation of said cylinder to actuate said gripper units, each of said gripper units including a sleeve attached to said shaft and having a substantially flat surface portion, a gripper finger having a forward portion for cooperating with said resilient bar in the gripping of paper sheets being printed upon and a rear portion normally resting upon said flat surface portion of said sleeve, said rear end portion having two holes therethrough, a first screw passing loosely through one of said holes in said rear portion near said forward portion and into said sleeve, a spring cooperating with said first screw to urge said rear portion toward engagement with said flat surface

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portion, the magnitude of the force exerted by said spring being adjustable by manipulation of said first screw, and a second screw passing loosely through said rear portion on the opposite side of said first screw from said forward portion and into said sleeve, whereby said gripping finger is resiliently secured to said sleeve so as to permit rocking movement thereof about its longitudinal axis as well as about an axis parallel to the axis of said sleeve to ensure effective gripping engagement between the forward portion thereof and said resilient bar.

2. In combination with a blanket cylinder adapted to carry a packing sheet on its periphery and having a recess extending inwardly from the periphery thereof, a bar positioned within said recess adjacent the marginal body portion of the cylinder bordering said recess, means for supporting said bar, one end of the packing sheet being receivable between said bar and said marginal body portion of said cylinder, means for shifting said bar into clamping engagement with said marginal body portion of the cylinder for engaging said end of the packing sheet, a shaft mounted within said recess, a gripper unit mounted on said shaft and including a gripper finger adapted to be moved into and out of gripping relationship with said bar, and means for oscillating said shaft in timed relation to the rotation of said cylinder to move said gripper finger, the entire face of said bar bearing against the packing sheet and the face of said bar cooperating with said gripper finger being made of a resilient material.

3. In combination with a blanket cylinder having a permanent recess extending inwardly from the periphery thereof, a packing sheet disposed on the surface of said cylinder with one of its ends extending into said recess, a bar composed entirely of resilient material and being positioned within said recess adjacent the marginal body portion of the cylinder bordering said recess, means for supporting said bar, means for shifting said bar into clamping engagement with said marginal body portion of the cylinder for engaging said end of the packing sheet, a shaft mounted within said recess, a plurality of gripper units mounted on said shaft and including gripper fingers adapted to be moved into and out of gripping relationship with said resilient bar, and means for oscillating said shaft in timed relation to the rotation of said cylinder to move said gripper fingers.

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