April 5, 1960 M. VAN ANTWERPEN 2,931,275

MACHINE FOR FORMING CUSHIONING TONGUES IN SHOCK ABSORBING STRIPS

Filed March 25, 1958 3 Sheets-Sheet 1

Fig. 1.

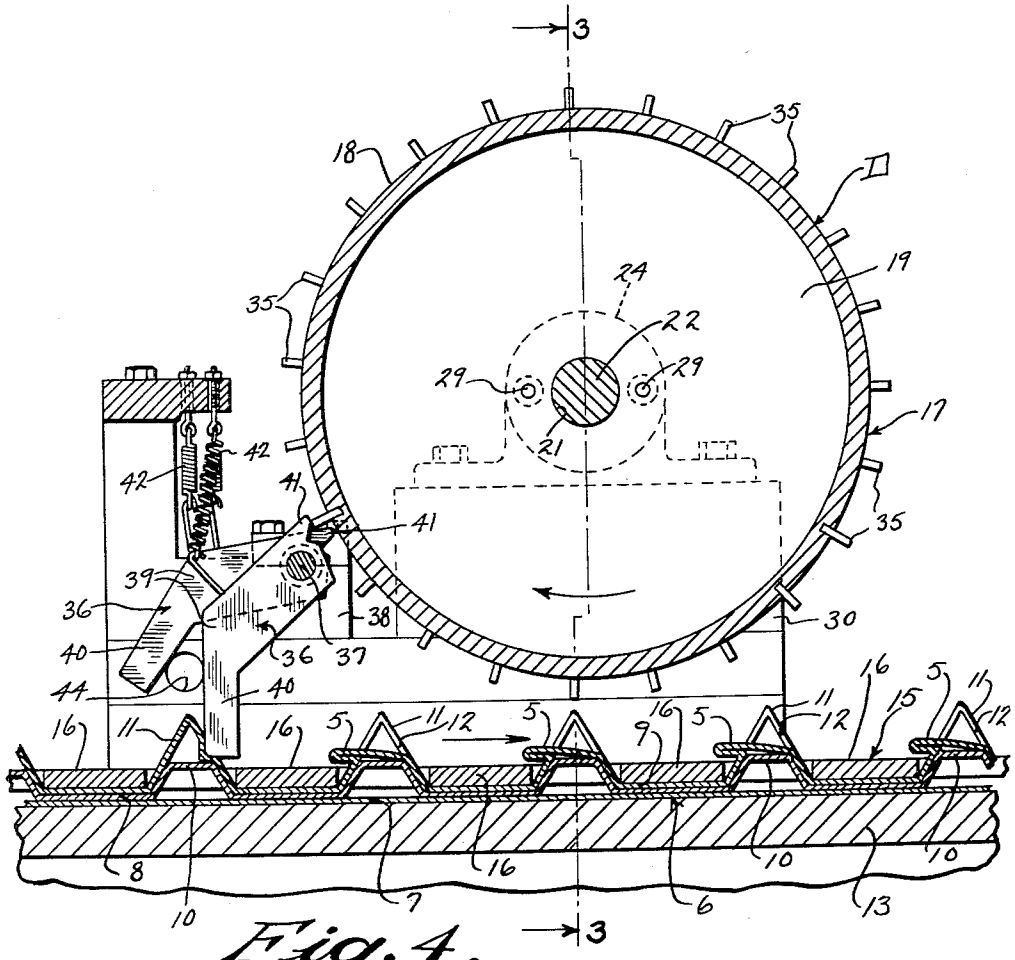
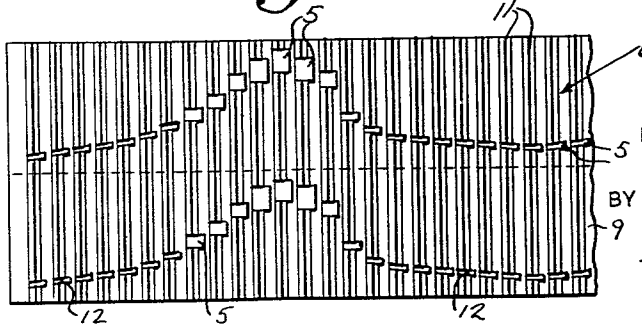


Fig. 4.



INVENTOR
MARTIN VAN ANTWERPEN

BY

Manning and Wright

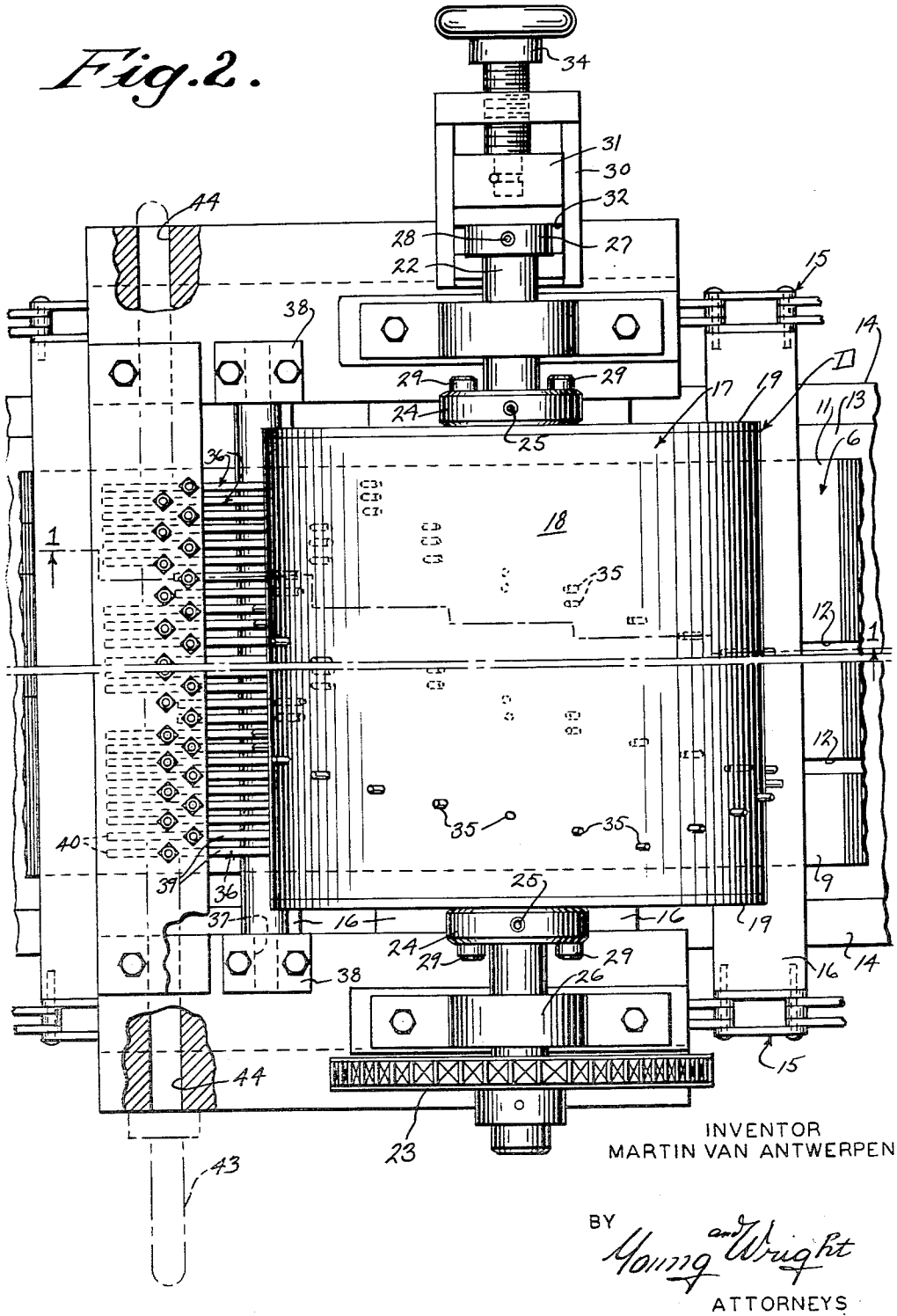
ATTORNEYS

April 5, 1960 M. VAN ANTWERPEN 2,931,275

MACHINE FOR FORMING CUSHIONING TONGUES IN SHOCK ABSORBING STRIPS

Filed March 25, 1958 3 Sheets-Sheet 2

Fig. 2.



INVENTOR
MARTIN VAN ANTWERPEN

BY Young and Wright
ATTORNEYS

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MACHINE FOR FORMING CUSHIONING TONGUES IN SHOCK ABSORBING STRIPS

Filed March 25, 1958 3 Sheets-Sheet 3

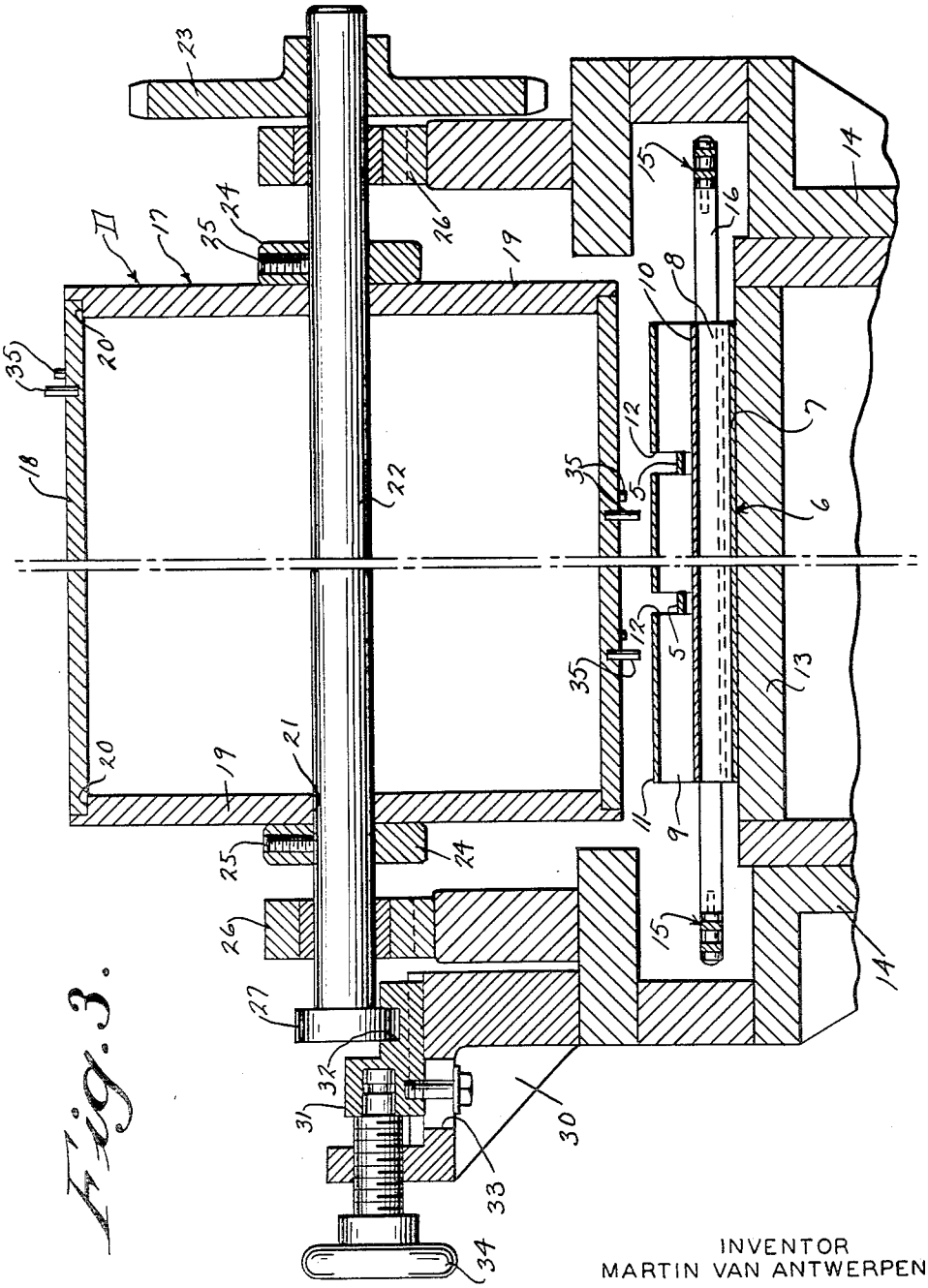


Fig. 3.

INVENTOR
MARTIN VAN ANTWERPEN

BY Morsing and Wright
ATTORNEYS

United States Patent Office 2,931,275 Patented Apr. 5, 1960

2,931,275

MACHINE FOR FORMING CUSHIONING TONGUES IN SHOCK ABSORBING STRIPS

Martin Van Antwerpen, Milwaukee, Wis.

Application March 25, 1958, Serial No. 723,814

3 Claims. (Cl. 93—1)

This invention relates to machines for fabricating cushioning and shock absorbing strips of the type shown in the Van Antwerpen Patent No. 2,504,473, issued April 18, 1950, and more particularly to a device for forming cushioning supporting tongues in the V- or U-shaped peaks of the cushioning and shock absorbing strips.

The strip fabricated by the machine shown in Patent No. 2,504,473 includes a flat base sheet, an intermediate cushioning sheet and an inner supporting face sheet. The inner face sheet is folded to form a series of outwardly projecting, longitudinally aligned, substantially V- or U-shaped peak portions. These portions are in turn provided with longitudinally aligned slots for receiving the peripheral edge of the glass being protected when the strip is placed around the glass. The intermediate cushioning sheet is folded to form a series of longitudinally aligned V- or U-shaped cushioning peaks which lie in the V- or U-shaped peak portions of the face sheets when the sheets are united. The glass being protected rests on the cushioning peaks when the glass is placed in the slots of the U- or V-shaped peak portions of the face sheet.

In the Van Antwerpen Patent No. 2,787,323, issued April 2, 1957, an improved means was shown for facilitating the making of slits in the face sheet to form the slots in the U- or V-shaped peak portions when the face sheet was folded to form such portions.

In the Van Antwerpen Patent No. 2,812,798, issued November 12, 1957, an improved means is shown for facilitating the creasing and/or scoring of the face sheet and the intermediate sheet transversely to facilitate the folding and the correct forming of the U- or V-shaped peak portions in the face sheet and the U- or V-shaped peaks in the intermediate sheet.

In the co-pending Van Antwerpen application Serial No. 565,382, filed February 14, 1956, now Patent No. 2,877,823, an improved means is shown and claimed for holding the sheets in correct assembled position with the peaks of the intermediate sheet properly aligned with the peak portions in the outer sheet and for holding the three sheets in place until the adhesive used for securing the sheets together sets.

The cushioning and shock absorbing strips are utilized for protecting the marginal edges of glass during shipping, as previously set forth, and the glass being protected takes different shapes, i.e., the curved shape for panoramic or wrap-around automobile glass, and hence the slits formed in the peak portions of the face sheet are out of alignment longitudinally and take a sinuous path to conform to the curvature of the glass.

It is one of the primary objects of the present invention to provide a simple and efficient means for folding or knocking down the material lying between the slits in the peak portions of the outer sheet to form cushioning tongues upon which the peripheral edge of the glass rests, and also to provide an exceptionally simple and efficient mechanism for folding or knocking down the material between the slits irrespective of the layout of the slits in said peak portions.

Another salient object of the invention is the provision of a cylinder extending transversely across that portion of the machine shown in the mentioned Van Antwerpen application driven in proper timed relation relative to the travel of the connected sheets over a supporting table, the cylinder carrying peripheral pins arranged in a definite desired pattern for operating desired knock down fingers of a row of fingers extending transversely across the machine, the fingers functioning, when operated to engage the material between the slits to fold and knock down such portions to form the cushioning tongues.

A further important object of my invention is the provision of means whereby cylinders carrying different patterns of peaks or pins can be readily interchanged on the machine so that the desired knock down fingers will be actuated to agree with a predetermined formation of slits in the peak portions of the face sheet.

A still further object of my invention is the provision of means for holding selected known down fingers in an operative position when the pattern cylinder is not being utilized and when the slits are formed in a straight path in longitudinal alignment.

With these and other objects in view, the invention consists in the novel arrangement, construction and formation of parts, as will be hereinafter more specifically described and claimed and illustrated in the accompanying drawings, in which drawings,

Figure 1 is a fragmentary longitudinal sectional view through a portion of the machine showing my novel device connected therewith, the section being taken on the line 1—1 of Figure 2, looking in the direction of the arrows;

Figure 2 is a fragmentary top plan view of the machine showing the improved device incorporated therewith, parts of the view being shown broken away and in section to illustrate structural detail;

Figure 3 is a transverse sectional view taken on the line 3—3 of Figure 1, looking in the direction of the arrows, and

Figure 4 is a fragmentary top plan view of a cushioning and shock absorbing strip showing the sinuous arrangement of the slits formed in the face sheet of the strip.

Referring to the drawings in detail, wherein similar reference characters designate corresponding parts throughout the several views, the letter D generally indicates the novel mechanism for folding and knocking down cushioning tongues 5 in a fabricated shock absorbing and cushioning strip 6 as made on the Van Antwerpen patented machine No. 2,504,473. This strip 6 includes a base sheet 7, an intermediate sheet 8 and a face sheet 9. The intermediate sheet is folded to form transversely extending equidistantly spaced U- or V-shaped peaks 10 and the face sheet 9 is folded to form equidistantly spaced transversely extending U- or V-shaped peak portions 11 which receive the peaks 10. The peak portions 11 are provided with pairs of slits 12 in which the peripheral edge of the glass to be protected is received so that the glass edge can rest on the peaks 10 of the intermediate sheet 8. The sheets are creased and folded on other parts of the patented machine. In accordance with this invention, the material lying between the pairs of slits 12 in the face sheet 9 is folded and knocked down over the peaks 10 of the intermediate sheet 8 to form the cushioning tongues 5. As illustrated in Figure 4, the slits 12 take a sinuous path along the length of the strip 6.

The novel mechanism D is associated with that particular part of the machine shown in the co-pending Van Antwerpen patent application above mentioned, and hence

the strip 6 travels over a flat supporting magnetic hold down and drying table 13. This table is mounted on a suitable longitudinally extending frame 14. The strip 6 is advanced in the desired rate over the table by an endless conveyor belt 15. The belt 15 includes a plurality of equidistantly spaced transversely extending flights or hold down bars 16 which lie between the peaks 11 of the face sheet 9. These bars 16 are held and drawn down by the magnetic table 13, as brought out in the copending application.

The device D comprises a rotatable cylinder 17 which extends transversely across and above a desired portion of the table 13. This cylinder 17 includes a cylindrical shell or peripheral rim 18 detachably carried by end disc shaped plates 19. The inner edges of the plates 19 adjacent to their peripheries are rabbeted to provide circular shoulders 20 on which the opposite ends of the shell or rim 18 rest. The plates 19 are provided with axially aligned openings 21 through which freely slides a drive shaft 22 that extends transversely of the table 13. One end of the shaft has keyed thereto, a sprocket wheel 23 for receiving a drive chain. The shaft 22 is driven in proper timed relation to the belt 15 from an appropriate adjacent part of the machine (not shown). The cylinder 17 is detachably secured to the shaft 22 for rotation therewith by collars 24. The collars 24 are held in gripping engagement with the end plates 19 by set screws 25 which impinge against the shaft 22. The frame 14 on each side of the table 13 carries transversely aligned bearings 26. The shaft 22 is rotatably supported by the bearings 26 and the shaft can be pulled, for a purpose which will later appear, out of the bearings, the cylinder 17 and the collars 24 upon the loosening of the set screws 25. To rotatably hold the shaft 22 in its operative position, the end of the shaft opposite to the sprocket wheel 23 is provided with a removable collar 27 and this collar is ground smooth and is secured to the shaft 22 by means of a set screw 28. At this point, it is to be noted that the collars 24 can carry set screws 29 for engaging the outer surface of the end plates 19 of the cylinder 17. Slidably carried by a bracket 30 secured to the frame 14 is an adjustable block 31. The block is mounted in suitable guideways formed on the bracket 30 and the block is provided with a seat 32 for rotatably receiving the ground collar 27. The bracket 30 is provided with a longitudinal slot 33 and an adjusting bolt is fitted in said slot and carried by the block. The block is adjusted back and forth by means of a hand screw 34 threaded into the bracket and the inner end of this screw is rotatably carried by the block and is held connected with the block against longitudinal movement. By rotating the hand screw, the cylinder can be shifted to an exact desired adjusted position. The collar 27 fitting in the seat 32 normally prevents lateral shifting of the shaft. The cylinder has secured to its periphery a plurality of radially extending pegs or pins 35 and these pins are arranged in an exact formation around the periphery of the cylinder according to the arrangement of the slits in the strip 6.

Cooperating with the pins 35 on the cylinder are a plurality of closely arranged knock down fingers 36. The fingers are all rockably mounted for independent movement on a transversely extending supporting rod 37. This rod 37 extends across the machine in front of the cylinder and directly above the table 13. The rod is supported on suitable brackets 38 carried by the frame 14 of the machine. All of the knock down fingers are of identical construction and each includes a flat body portion 39 having a depending angularly extending leg 40. The fingers 36 are preferably formed from non-magnetic material, so as not to be affected by the table 13. Each finger is rockably mounted on the rod 37 adjacent to its upper end and each finger is provided with a nose 41. The pins 35 during the rotation of the cylinder 17 are adapted to strike the noses of certain of the fingers 36 for operating the fingers, as will be later brought out. Normally, all of

the fingers are held in a raised elevated non-operating position by means of contractile coil springs 42. The springs 42 are attached at their opposite ends respectively to the fingers and to a part of the bracket 38.

In operation of the improved device, the cylinder is rotated in timed relation to the travel of the strip 6, as heretofore stated, and the cylinder selected is provided with a pin formation corresponding to the particular sinuous pattern of the slits in the strip. As best shown in Fig. 1, the cylinder rotates in a clockwise direction, and as the noses 41 are in the path of the pins 35 the desired fingers will be operated by the pins. As the pin engages a nose of a finger, the finger is swung on its rod and its leg 40 is moved down to a position for engagement with the material between a pair of slits in the strip. By again referring to Figure 1, it can be seen that the strip is moving to the right and hence, as the strip moves past an operated finger, the leg of such finger will egage the material and fold and knock down the material between the slits to form the desired cushioning tongue. It can be seen that as the pin passes the nose the spring 42 will tend to immediately return the finger 36 to its raised inoperative position. However, as the strip is moving toward the right (Figure 1), the finger will engage the material between the slits and be held in its lowered operative position by such material until the material has been knocked down and the peak passes the finger. At that time the finger will return to its raised inoperative position by its spring.

While the pins 35 could be arranged in different patterns on the cylinder 17, it is preferred to provide different cylinders with a desired arrangement of pins for each formation of slits in a strip. To change cylinders having different patterns of pins, it is merely necessary to loosen the set screws 25 of the collars 24 and the set screw 28 of the collar 27. The shaft 22 can now be pulled to the right (see Figure 3), out of the collars and the cylinders. A new cylinder can now be placed in position and the shaft returned to its operative relationship relative to the new cylinder. In actual practice, the discs 19 are spread apart, and the rim 18 is removed from the same and then another rim with a different pattern of pins is placed between the end plates.

In certain instances, the pairs of slits in the strip are arranged in a straight path in longitudinal alignment and in such instance, the use of the cylinder is not necessary and the cylinder can be removed. In this instance, the selected finger or fingers 36, are lowered against the tension of the spring 42 and a rod 43, indicated in dotted lines in Figure 2, is slipped through aligned openings 44 in the brackets 38 in rear of the lowered finger or fingers. This holds the selected finger or fingers in a lowered operative position.

Various changes in details may be made without departing from the spirit or the scope of this invention, but what I claim as new is:

1. In a device for folding and knocking down cushioning tongues for glass, a table for supporting the strip, means for advancing the strip at a predetermined rate over the table, a plurality of knock down fingers arranged in a transverse row across the table and above the table, means supporting the fingers for free independent rocking movement, each of said fingers including a flat body portion, an angularly extending leg and an upper nose above the supporting means, means independently holding each finger in a raised position with the leg above the strip, and a rotatable cylinder disposed in front of said fingers and above said table, said cylinder extending across said table and having a plurality of radially extending pins arranged in a predetermined formation relative to one another around the periphery of the cylinder, the pins being disposed for engagement with the noses of selected fingers for rocking said selected fingers on the supporting means with the legs in a lowered position and in the path of said peaks, for engagement with the ma-

terial between the slits in said peaks upon the advancement of the strip.

2. In a device as defined in claim 1 and said cylinder being rotatable at a predetermined speed relative to the rate of travel of the strip over the table.

3. In a device, as defined in claim 1, and said cylinder including a rim carrying the pins, side plates detachably supporting the rim, and a removable shaft supported

above the table slidably extending through said plates, whereby said shaft can be withdrawn to disassemble the same.

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