

June 2, 1942.

A. MARCHEV

2,285,120

PACKAGE-BINDING APPARATUS

Filed Sept. 8, 1939

8 Sheets-Sheet 1

Fig. 1.

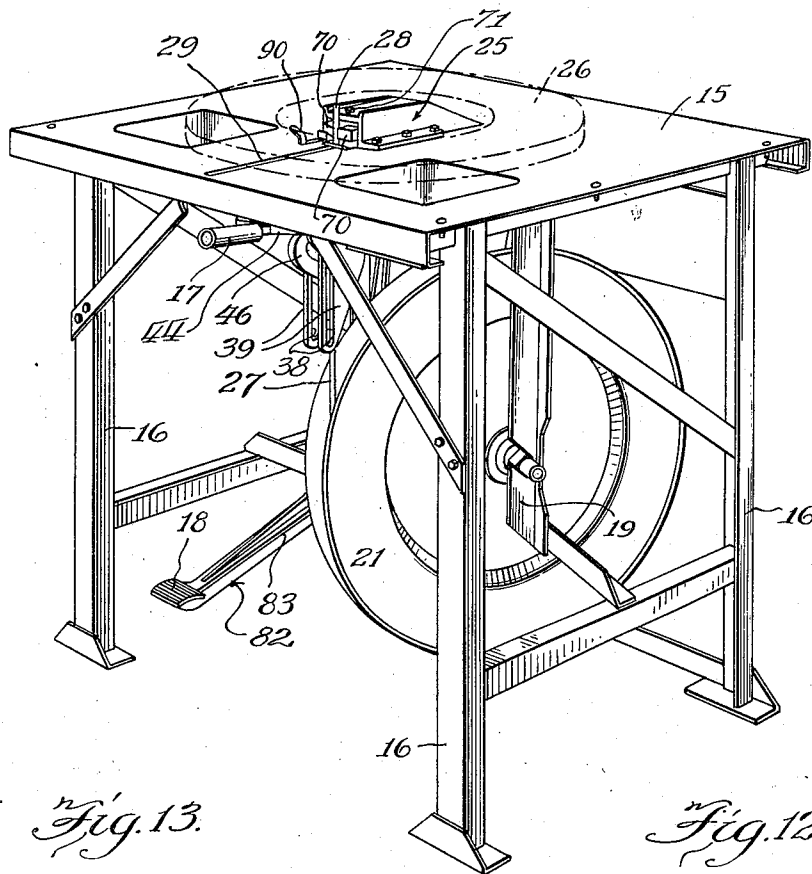


Fig. 13.

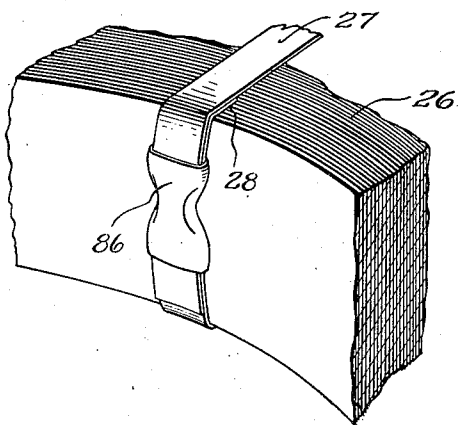
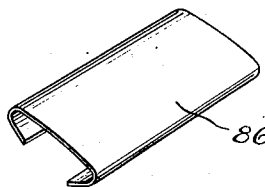


Fig. 12.



Inventor
Alfred Marchev
By
Williams, Bradbury,
McCaleb & Hinkle Attys

June 2, 1942.

A. MARCHEV

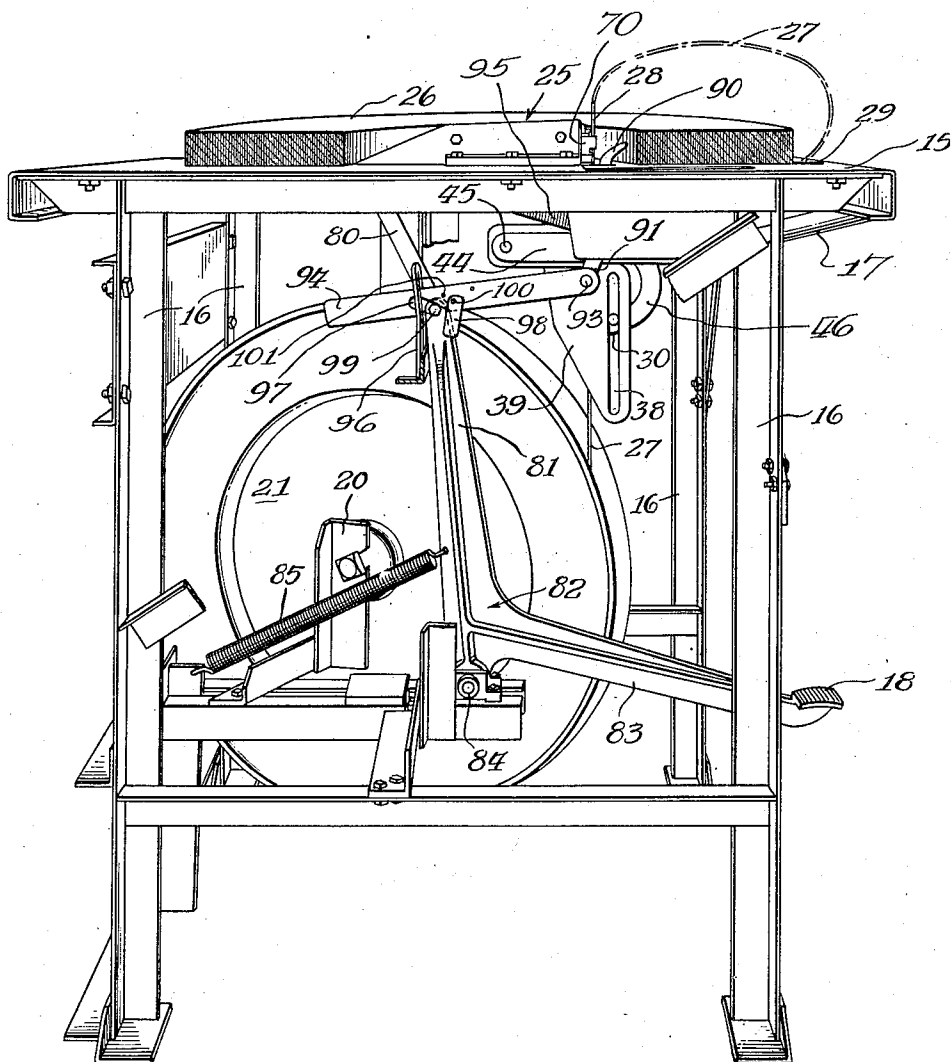
2,285,120

PACKAGE-BINDING APPARATUS

Filed Sept. 8, 1939

8 Sheets-Sheet 2

Fig. 2.



Inventor
Alfred Marchev
By
Williams, Bradbury,
McCaleb & Hinkle. Attys.

June 2, 1942.

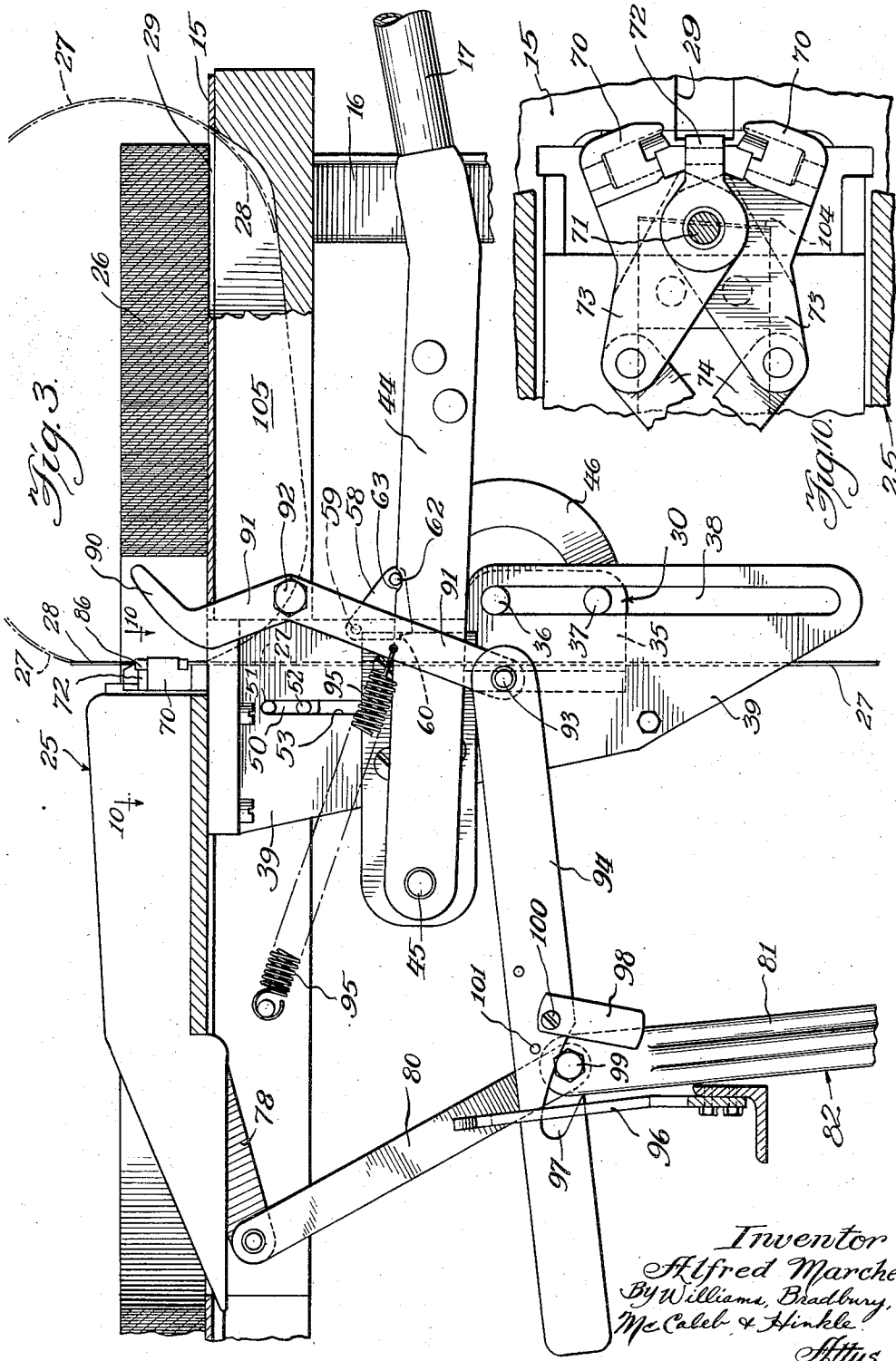
A. MARCHEV

2,285,120

PACKAGE-BINDING APPARATUS

Filed Sept. 8, 1939

8 Sheets-Sheet 3



Inventor
Alfred Marchev
By William Bradbury,
McCaleb & Hinkle
Attys.

June 2, 1942.

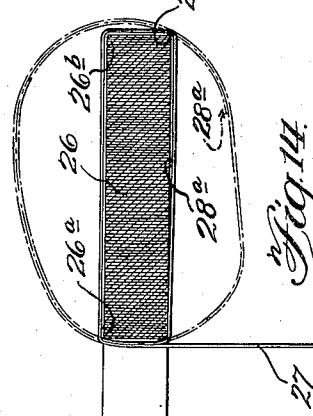
A. MARCHEV

2,285,120

PACKAGE-BINDING APPARATUS

Filed Sept. 8, 1939

8 Sheets-Sheet 4



June 2, 1942.

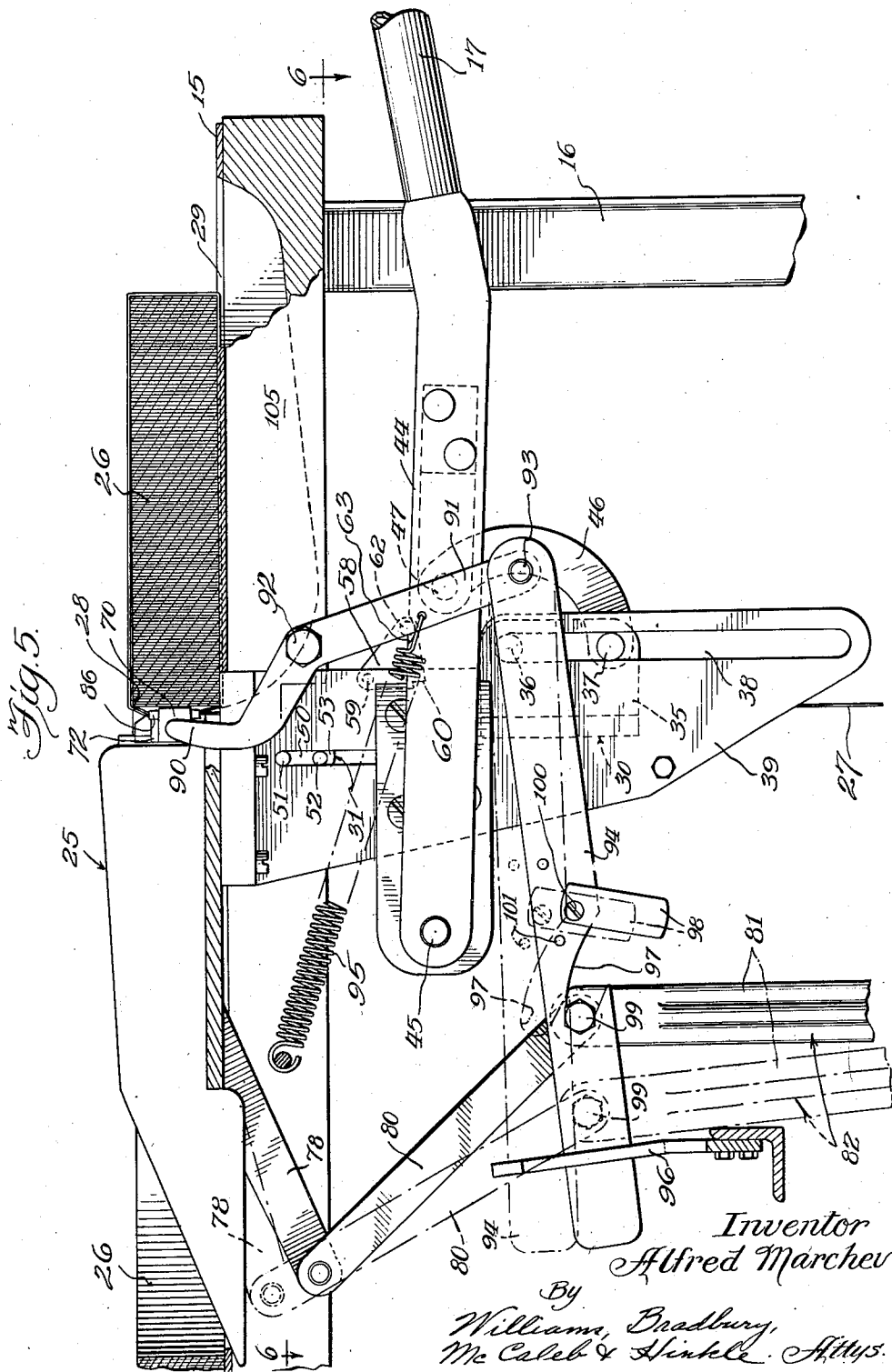
A. MARCHEV

2,285,120

PACKAGE-BINDING APPARATUS

Filed Sept. 8, 1939

8 Sheets-Sheet 5



June 2, 1942.

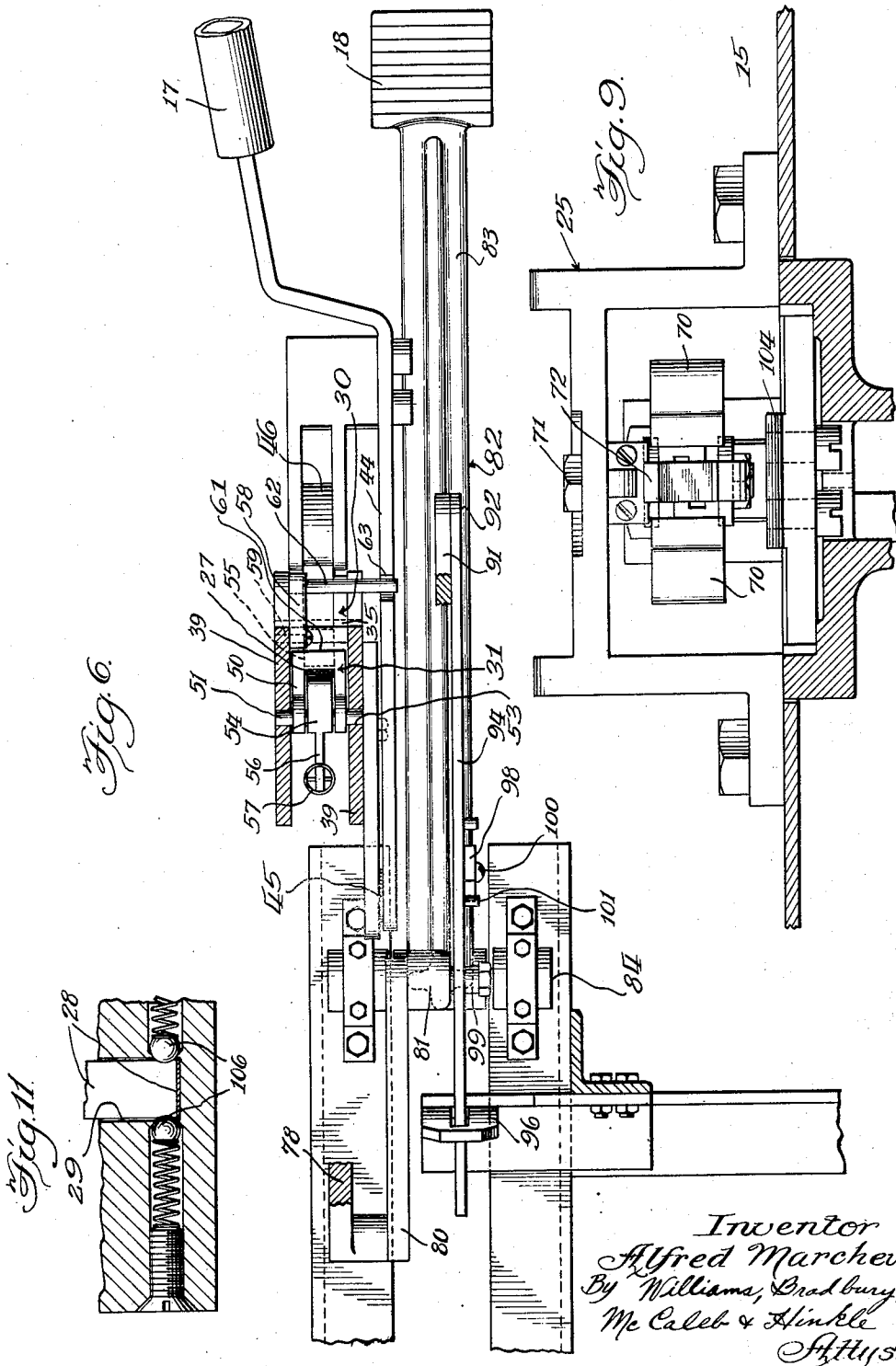
A. MARCHEV

2,285,120

PACKAGE-BINDING APPARATUS

Filed Sept. 8, 1939

8 Sheets-Sheet 6



Inventor
Alfred Marchev
By Williams, Bradbury,
McCaleb & Hinkle
Attys.

June 2, 1942.

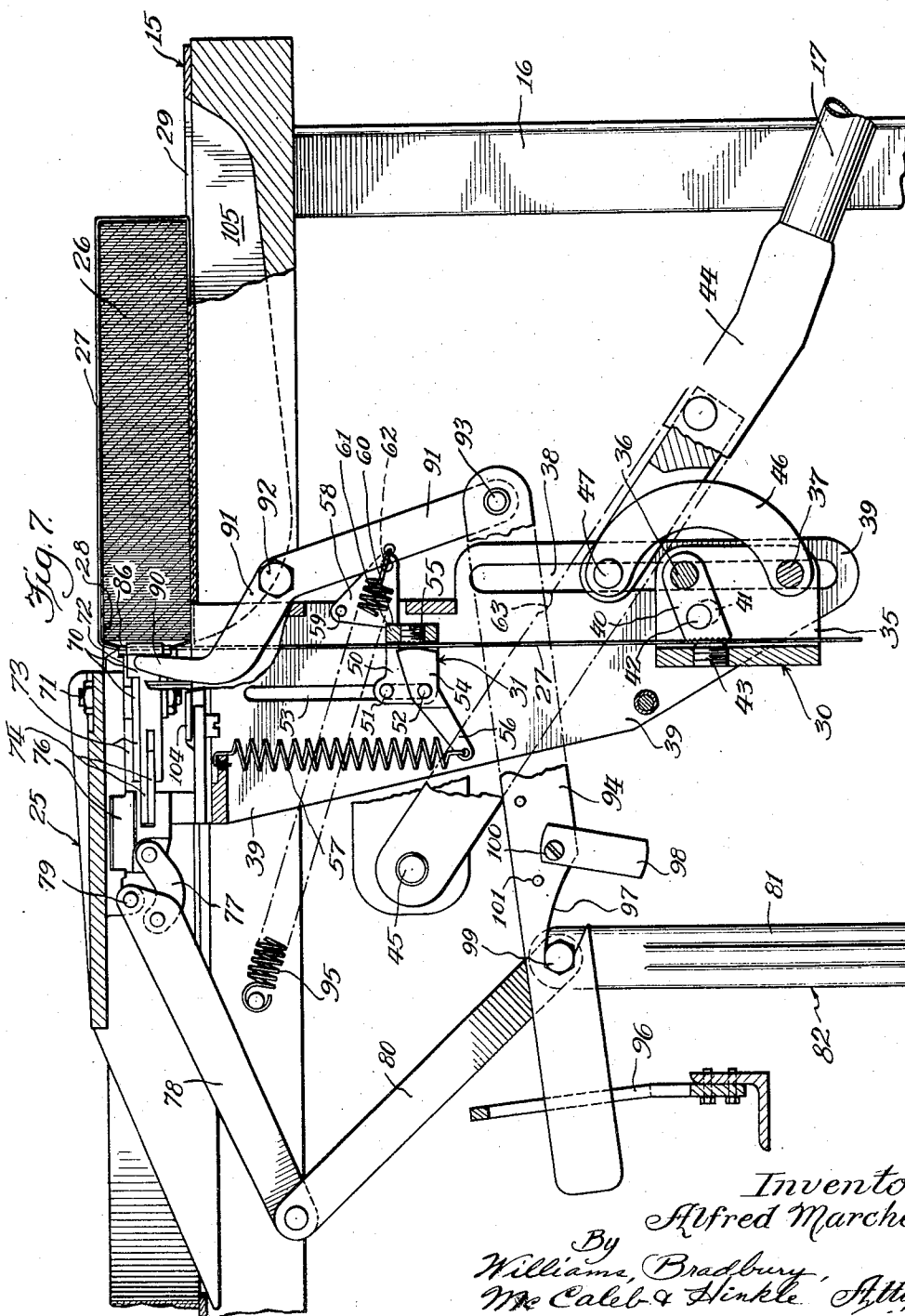
A. MARCHEV

2,285,120

PACKAGE-BINDING APPARATUS

Filed Sept. 8, 1939

8 Sheets-Sheet 7



Inventor
Alfred Marchev.
By
Williams, Bradbury,
McCaleb & Hinkle Attys.

June 2, 1942.

A. MARCHEV

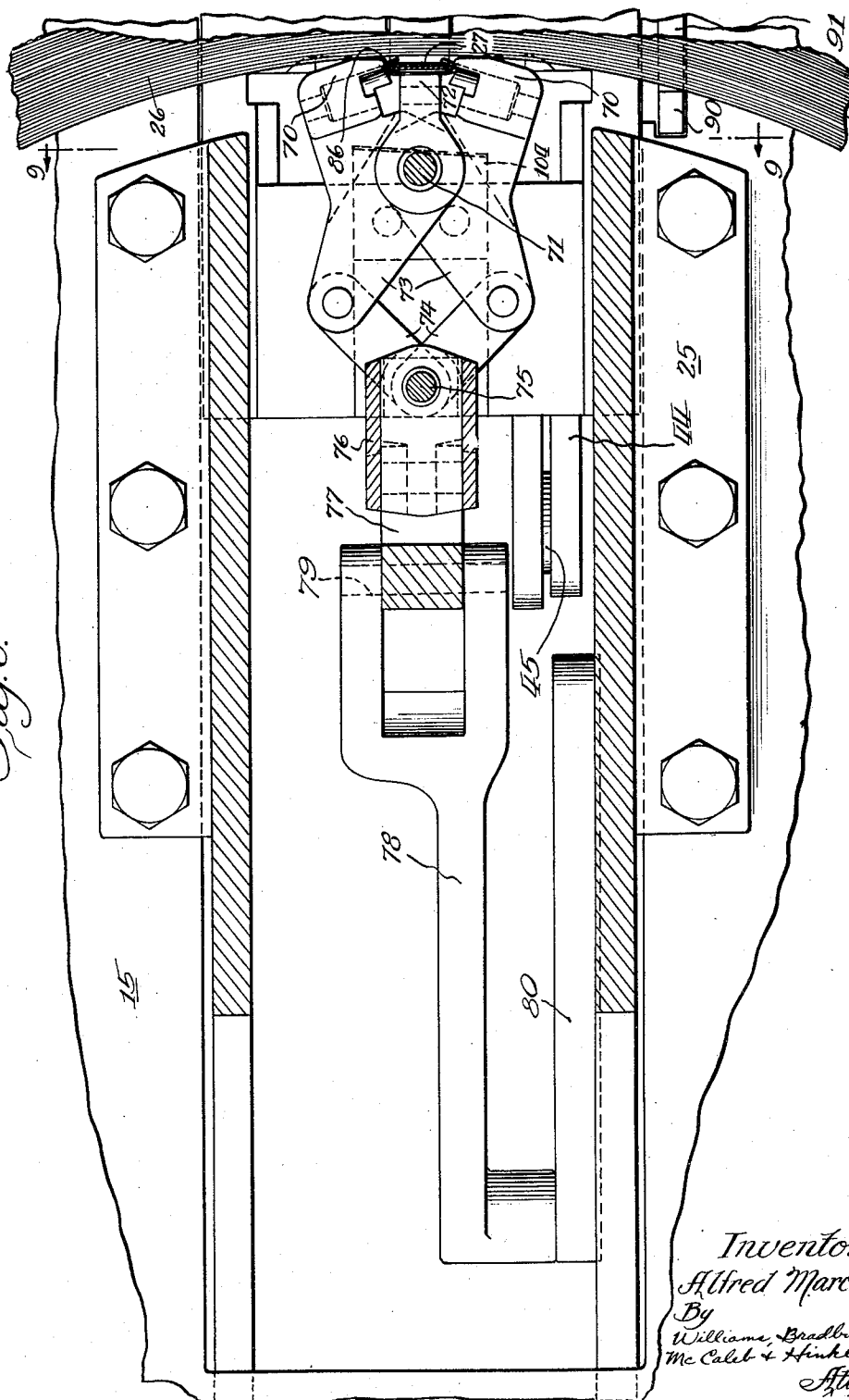
2,285,120

PACKAGE-BINDING APPARATUS

Filed Sept. 8, 1939

8 Sheets-Sheet 8

Fig. 8.



Inventor
Alfred Marchev
By
Williams, Bradbury,
McCabe & Finkle
Attys.

UNITED STATES PATENT OFFICE

2,285,120

PACKAGE-BINDING APPARATUS

Alfred Marchev, La Grange, Ill., assignor to Signode Steel Strapping Company, Chicago, Ill., a corporation of Delaware

Application September 8, 1939, Serial No. 293,994

9 Claims. (Cl. 100—31)

My invention relates to package-binding apparatus.

More particularly, it relates to a machine for supporting a package to be bound, facilitating the manual encirclement of the supported package with a loop of flat-strap binder, tensioning the loop of binder upon the package and securely joining overlapping end portions of the tensioned loop to make the binder permanent.

In general, the apparatus lends itself admirably to the rapid binding of packages of rather small cross section, especially under conditions requiring that binding be done in what is commonly termed "production lines."

It will also be found to be particularly effective in binding packages in the form of annuli such, for example, as coils of metallic strap or strip. It is common practice to bind such annular-shaped packages by binders looped about radially disposed sections thereof, as distinguished from loops encircling the entire coil—either diametrically or circumferentially—but the proper joining of the overlapping ends of the looped binder has heretofore been a serious problem. Even when the hole of the annular-shaped package is large the proper operation of joint-making tools therein is difficult; when the hole is small it is well-nigh impossible. It has therefore heretofore been the general practice to make the binder joints along one of the three external surfaces of such packages, not along the inside surface. And yet, the ideal location for the joint is on the inside surface—within the ring—where it is out of the way and cannot be interfered with by, or interfere with other objects.

One of the objects of my invention is to provide an improved package-binding apparatus.

Another object is to provide an apparatus that is simple, effective, easy to operate, and conducive to greater speed in binding.

A further object is to provide an apparatus that is especially applicable to the binding of annular-shaped packages, because, if desired, it effectively produces joints along the inside surface within the ring.

Other objects and advantages will hereinafter appear.

Because the applicability of the apparatus to the binding of other varieties of packages will be readily apparent from a description of its use in binding annuli-shaped packages, it will be shown and explained only in connection with packages of ring form.

An embodiment of my invention is illustrated in the accompanying drawings wherein:

Fig. 1 is a perspective of the complete apparatus, in the form of a package supporting and binding table, an annular package, such as a coil of strap, being shown in dotted lines in binding position;

Fig. 2 is a perspective with some of the table braces broken away, the better to show the mechanism therebehind;

Fig. 3 is an enlarged vertical section of the mechanism in normal or package-receiving position;

Fig. 4 is an enlarged central vertical section with the package in binding position and loosely encircled with a loop of binder;

Fig. 5 is a section similar to Fig. 4, with the package in binding position and the binder loop tensioned thereabout preparatory to making the joint;

Fig. 6 is a horizontal section on the line 6—6 of Fig. 5;

Fig. 7 is a section similar to Fig. 5, with the tensioning mechanism shown at the end instead of at the beginning of its stroke;

Fig. 8 is an enlarged section on the line 8—8 of Fig. 4;

Fig. 9 is a section on the line 9—9 of Fig. 8;

Fig. 10 is a section on the line 10—10 of Fig. 3;

Fig. 11 is an enlarged section on the line 11—11 of Fig. 4;

Fig. 12 is a perspective of a sleeve such as may be used to advantage to make a stronger joint between the overlapping ends of the tensioned binder loop;

Fig. 13 is a perspective of a portion of a package, such as a coil of strap or strip, showing the section-encircling binder and the joint on the inner surface of the coil, and

Fig. 14 illustrates a modified arrangement of binder loop which may be particularly effective under some conditions.

Referring first to Figs. 1 and 2, the apparatus includes, in general, a table or bench having a flat package-supporting top or platform 15 mounted upon four legs 16, a binder tensioning mechanism actuated by the handle 17, and a sealing or joint-making mechanism actuated by the pedal 18. A pair of notched brackets 19 and 20 provide journal supports for the axle of a binder-strap reel 21.

Probably the detail structure and function of the various parts of the apparatus will be better understood after a brief outline of the general operation. Thus, to explain briefly and generally what takes place in a binding cycle the package to be bound is first laid upon the table top in

front of and tightly against the jaws of a sealer mechanism located in a sealer head 25. If, as shown, the package is annular in shape, such as a coil of metallic strap or strip 26, it is positioned so that the sealer head lies within the hole of the ring against its inside surface as indicated most clearly in Figs. 1 and 2.

The binder-strap 27, which is stored upon and unwound as required from reel 21, normally passes up through an opening in the table top and its free or starting end 28 projects past the sealer head far enough to be readily grasped by the operator. This initial or normal location of the free end 28 of the binder is clearly shown in Figs. 1, 2 and 3.

With the package in the position described, the operator grasps the end 28 of the binder-strap and pulls enough from the reel to encircle the package loosely as shown clearly in Fig. 2. Then the free binder-end 28 is shoved into a slot 29 in the table top and pushed therethrough under the package, as most clearly indicated by the dotted lines of Fig. 3, until it laps past the body of binder at the inner face of the package and projects, within the loop, some distance above the inner upper corner of the package, as indicated by the dotted lines in Fig. 4.

After the end 28 has been thus projected, it is bent sharply down about and upon the inner upper corner of the package as indicated by the full lines of Fig. 4. The snubbing action of this bend in the binder about the inner upper corner of the package serves initially to anchor the free end of the binder and as the loop is shrunk about the package, as will be hereinafter explained, the snubbing action increases and the anchorage becomes more secure as the tension increases.

With the free end of the binder thus anchored, the operator pumps up and down on the tensioner handle 17. These movements of handle 17 cause a tensioning mechanism 30 to reciprocate up and down, resulting in the excess strap in the binder encircling loop being retracted step-by-step until the loop has been shrunk upon and tensioned about the package to the desired degree, as shown in Fig. 5. In the arrangement shown, the strap is retracted to shrink the loop when handle 17 is depressed.

When handle 17 is raised preparatory to an additional step of binder retraction, the binder is prevented from losing the amount taken up—i. e., the tension—by a retainer and initial feed device 31, which will be presently explained. After the tensioner handle 17 has been reciprocated sufficiently to create the desired amount of tension, pedal 18 is depressed, causing the sealing mechanism to deform the overlapping strap portions along the inner side of the package and, after the seal or joint is made, to cut the loop, now permanent, from the source at approximately the level of the table top. Following the cutting of the loop from the source, the elevation of tensioning handle 17 to its extreme upward position results in the free or starting end of the binder being fed up to project above the top of the table for easy grasp by the operator in beginning the next cycle, i. e., to the initial or normal condition shown in Figs. 1, 2 and 3.

Referring particularly to Figs. 4, 6 and 7, the binder tensioner 30 includes a carrier block 35 provided with two studs 36 and 37 which project at opposite ends into vertical slots 38 of parallel brackets 39. Brackets 39 depend from and are suitably attached to the table top. In this

manner the carrier block 35 is mounted for vertical reciprocation between an upper position indicated, for example in Fig. 4, and a lower position about as shown in Fig. 7.

A pivoted gripper 40, the active face of which is preferably serrated as shown to increase the gripping action upon the binder, is mounted upon stud 36. The movement of gripper 40 about stud 36 is limited by the engagement of the ends of a slot 41 with a pin 42 carried by block 35. The complementary strap engaging member for gripper 40 is a clutch 43, which for convenience and easy replacement may be in the form of a screw plug threading through an opening in block 35.

The binder strap, in its passage from reel 21 to the slot through the table top, is trained between gripper 40 and clutch 43. The relation is such that when the block 35 is moved from its lower position, such as that shown in Fig. 7, to its upper position, such as shown in Fig. 4, the gripper 40 does not clutch the binder 27, but passes idly thereover. Upon movement of block 35 in the reverse direction, however (i. e., downwardly from Fig. 4 to Fig. 7 positions), gripper 40 pivots about stud 36 to grip the strap between its roughened face end and clutch 43, and the binder is pulled downwardly approximately the amount of such downward movement.

The reciprocatory movements of block 35 are brought about by the up and down reciprocation of handle 17 through a lever 44, which is pivoted to the table frame at 45, and a link 46, the link being connected at one end to lever 44 by a pin 47 and at the other end to block 35 by stud 37.

The retainer and initial feed device 31 includes a carrier block 50 carried by two studs 51 and 52 which extend into vertical slots 53 in brackets 39. Block 50 is thereby arranged to reciprocate vertically between an upper position indicated in Fig. 4 and a lower position indicated in Fig. 7. Block 50 carries a pivoted gripper 54 which cooperates with a clutch 55 to grip and hold the binder trained therebetween.

Gripper 54 has a rearwardly extending arm 56 to which is attached a spring 57. Spring 57 not only biases gripper 54 toward its strap-engaging position, but also biases block 50 toward its top position. The arrangement and relation between gripper 54 and clutch 55 are such that, whereas when block 50 is up they permit the binder to move readily upward therebetween, they prevent the binder from moving upwardly between them when block 50 is down and spring 57 is under extra tension, although the binder can be readily moved between them in a downward direction. Thus, in addition to another function to be later described, the binder retainer 31 prevents retrograde movement of the binder (i. e., movement opposite the direction required for shrinking and tensioning the loop about the package) during the inactive stages of the operation of the tensioning mechanism.

In its extreme lower position block 50 is there retained against the upward bias of spring 57 by a latch 58. Latch 58 is pivoted to brackets 39 at 59 and is biased by its own eccentric weight so as normally to tend to swing clockwise into the position shown in Fig. 7. Thus, its notch 60 will automatically engage the upper inner corner 61 of block 50 when the block is moved to its lower position and thereby the latch will retain block 50 and its grippers in their down position as shown in Fig. 7. The latch 58 may

be moved to release block 50, by swinging tensioning lever 44 upwardly slightly more than its normal stroke, whereupon a pin 62 projecting from latch 58 is struck by the rear wall of a notch 63 in lever 44.

The complementary action of the tensioning and retaining grippers is this: With the parts in normal position, as shown in Fig. 4, the depression of tensioning handle 17 directly moves block 30 downwardly. This downward movement of block 30 first results in gripper 40 pivoting clockwise to more firmly press the interposed binder against clutch 43, a small amount of friction between the binder strap and gripper 40 initiating this pivotal movement. With the binder firmly gripped (and the tighter the tension the firmer the grip) further downward movement of handle 17 results in the binder being pulled back toward the reel to retract the slack in the loop about the package.

The retractile or downward movement of the binder upon the initial down stroke of handle 17 first causes gripper 54 to grip the binder more tightly against clutch 55 and thereafter to carry block 50 and the retainer grippers 54—55 bodily downward. When handle 17 has been moved to its first full down position, the downward movement of the binder occasioned thereby has resulted in block 50 moving downwardly far enough to permit the notch 60 of latch 58 to engage its upper inner corner 61 and hold it there against the upward bias of spring 57. The parts are then in the condition shown in Fig. 7.

Now when handle 17 is moved upwardly, the retracting grippers 40—43 release the strap and with block 35 move upwardly to position to secure a new and advanced hold upon the binder. But block 50 and its retaining grippers 54—55 are prevented from upward movement by latch 58. And in their down position these retaining grippers prevent the strap from moving upwardly, i. e., they retain in the strap loop about the package whatever shrinkage and tension the down movement of handle 17 has effected therein. The operator can now pump handle 17 up and down—being sure not to raise it high enough to trip latch 58—until, step-by-step, all of the slack in the loop has been retracted and the desired tension upon the package has been attained.

With the loop tensioned as desired, the pedal 18 is depressed to make the joint and sever the loop from the supply, as will be presently explained. After the binder has been cut the operator elevates handle 17 far enough to cause the wall of notch 63 in its lever 44 to strike pin 62 on latch 58 to trip the latch and release block 50 therefrom. Thereupon, spring 57 returns block 50 to its upper position and, inasmuch as the binder is clamped between its grippers 54—55, the free end 28 of the binder strap supply is fed upwardly through the table top—the amount of feed being determined by the distance block 50 travels—so as to project thereabove as shown in Figs. 1, 2 and 3, to be readily accessible to the operator for commencing the next binding cycle.

Although the details of the joining or sealing mechanism may vary widely, depending upon the type of joint or seal desired, I have chosen to illustrate those which particularly lend themselves to the production of joints of the general type set forth in Flora Patent No. 1,252,680 dated January 8, 1918. In the main, therefore, the sealing mechanism closely resembles that shown, for example, in Bergstrom Patent No. 1,969,115, dated August 7, 1934, and need not be described

in great detail. It includes a pair of deforming jaws 70, pivotally mounted to the frame on a pivot shaft 71, and an interposed anvil or chair 72. The coaction of these jaws and anvil, when the forward ends of the jaws are forced toward each other, crimps inwardly the edges of interposed overlapping binder strap—and a surrounding metal sleeve if one is used—and otherwise deforms them to produce a tension resisting seal or joint such as pictured in Fig. 13.

The rearward ends 73 of jaws 70 are connected by links 74 to a pin 75 carried by a sliding head 76. Head 76 is connected by a link 77 to a lever 78 that is pivoted to the underside of the table top on a pin 79. Lever 78 is connected by a link 80 to one arm 81 of a bell crank 82, the other arm 83 of which carries the pedal 18. Bell crank 82 is pivoted to the table frame by a pin 84 and is biased counterclockwise by a spring 85 to keep pedal 18 normally elevated.

The depression of pedal 18 rocks bell crank 82 in a clockwise direction which, through link 80 and lever 78, moves head 76 forwardly (i. e., to the right as viewed in Figs. 4 and 7) and effects the closing movement of jaws 70. Upon release of the pedal, spring 85 restores the parts to normal.

If metal sleeves 86, such as shown in Fig. 12, are to be used to reinforce and strengthen the joints, it has been found to be desirable to position the sleeve between the deforming jaws immediately after pulling out of the binder preparatory to looping the package. In other words, to feed out the binder strap through the sleeve. This requires that the sleeve be held stationary while the strap is being pulled therethrough, and it is accomplished automatically, by the placement of a package in binding position, in the following manner.

A trigger 90 is mounted to project through and above the table top in a position to be struck and moved by a package being shoved into binding position against sealer head 25. Trigger 90 forms part of a trigger-lever 91 which is pivoted to the frame at 92 and, at its lower end, is pivotally connected, by a pin 93, to a bar 94. Trigger lever 91 is biased by a spring 95 to rotate in a clockwise direction about its pivot 92 normally to project trigger 90 forwardly in the path of a package being pushed against sealer head 25, as shown most clearly in Fig. 3.

The rear end of bar 94 is retained in and guided by a slotted bracket 96. Bar 94 has a notch 97 which, under certain conditions, may be closed by a pivoted gate 98. The wall of slot 97 cooperates with bolt 99, that hinges link 80 to arm 81 of bell crank 82, to effect a slight preliminary movement of the sealing jaws sufficient to cause them to clamp and hold a sleeve therebetween while the binder is being pulled there-through.

Normally the parts are in the positions indicated in Fig. 3, with trigger 90 advanced and the opening of slot 97 in front of bolt 99. When a package is positioned for binding it is pushed back tightly against the sealing head. During this movement the package strikes trigger 90 and rocks trigger lever 91 counterclockwise about its pivot 92 into the position shown by the full lines in Figs. 5 and 7. As a result of this movement of the trigger lever, bar 94 is advanced toward the right, bolt 99 enters slot 97 and strikes the rear end thereof and then bell crank 81 is rocked slightly counterclockwise and link 80 is pulled to rock lever 78 and, through link 77, head 76 and

links 74 to pivot jaws 70 toward each other upon the interposed sleeves. The movement should be sufficient to enable the jaws tightly to grip and hold the sleeve without appreciably deforming it. Later, after the tensioning has been completed as heretofore described, the pedal 18 is depressed to complete the sealing operation.

During the complete rocking of bell crank 81 to effect the sealing, bolt 99 rides out of slot 97 and reaches a position considerably in advance of and below gate 98, bar 94 being limited in its downward pivoting about pin 93 by bracket 96. Now when the sealer pedal is released and by its biasing spring 85 rotated counterclockwise to normal, bolt 99 strikes the forward edge of gate 98 and rotates it clockwise about its pivot 100 until it strikes a stop pin 101. In this manner the bolt 99 may pass by the normally open slot 97 to permit the sealing mechanism and its pedal to return to normal before the bound package is withdrawn from the binding position wherein the trigger 90 is retracted.

Head 76 also operates a sliding knife 104 which is located below the jaws 70, slightly below the plane of the lower end of a positioned sleeve 86 if the joints are to be made with sleeves. The relation is such that, in the advancing movement of crosshead 76, knife 104 does not reach the strap below the joint location until after the joint has been completed and is able to withstand the strain expected of it. Whereupon the knife advances far enough to cut the loop about the package from the source. Retainer 50—54—55, however, prevents the now free end of the binder strap from dropping down under the table.

In order to facilitate the proper travel of the free end of the binder after it is inserted into slot 29 in the table and while it is being pushed below and around the package, a trough 105 is provided below the table top. The bottom and inner end of this trough are sloped and curved as shown in Fig. 4 to insure that the strap end takes the proper course. A pair of strap guides—in the form of spring-pressed balls 106—are also provided. This arrangement is shown most clearly in Fig. 11. The spring pressure upon guide-balls 106 should be such that they will remain in outward position and keep the binder strap therebelow under any such pressure as may be created by the tendency of the strap to straighten as it is being pushed through the trough. When, however, the starting end 28 of the binder has been fed through and anchored as heretofore described, and the operation of the tensioning mechanism begins effectively to shrink the loop about the package, the pull is sufficient to depress the balls 106 momentarily into their sockets and thus permit the binder to snap free of them and come up against the package.

Briefly now to summarize the operation, let it be assumed that the parts are in normal position with the free or starting end of the binder strap projecting above the table top and sealer head as shown in Fig. 3. Preferably the first operation is for the operator to pull through the slot in the table top a length of strap somewhat in excess of that required completely to loop the package to be bound. If the joint is to include a sleeve 86, it is threaded over the pulled-out free strap end 28 of the strap and allowed to slide down the strap into position between the then open jaws 70. Momentarily deflecting the strap end forwardly will permit the sleeve to drop past the

upper edges of the jaws into proper place between the jaws and in front of anvil 72.

The package to be bound—say a coil of steel strap or strip—is now placed upon the table top, with sealer head 25 through its hole, and shoved back against trigger 90 until it is tight against the sealer head 25. The movement produced in trigger 90 causes jaws 70 to close to a sufficient extent tightly to grip the sleeve. Now the operator inserts the free end of the strap into slot 29, pushes the strap into the slot until the free end 28 again passing through sleeve 86 appears well above the inner upper corner of the package, as shown by the dotted lines in Fig. 4. The end is then bent sharply down upon and around the corner of the package as shown by the full lines of Fig. 4. The end of the binder is now temporarily anchored sufficiently to withstand the initial stages of tension.

The operator next pumps tensioner handle 17 up and down to cause the tensioning mechanism 30—40—43 alternately to move downwardly (to pull strap back from the loop) and upwardly (to obtain a new and advanced grip upon the strap) to retract strap from the loop and shrink it step-by-step toward the package.

As previously described, the first downward movement of handle 17 caused the strap to move retainer mechanism 50—54—55 downwardly where it will be thereafter held by latch 58 and prevent retrograde movement of strap toward the package during the upward and non-pulling movements of handle 17.

As the loose loop shrinks upon the package it tightens down upon the end 28 which, as stated, was bent around the package corner and thereby the snubbing action is increased to afford an effective anchorage against such tension as may be required. When the binder loop has been shrunk upon the package with the desired tension, the operator, still holding tensioning handle 17 where that desired tension was attained, steps upon and depresses pedal 18. The depression of pedal 18 rocks bell crank 82 still further to effect first the formation of the joint by jaws 70 and immediately thereafter the severing of the strap below the joint by knife 104.

As soon as the loop encircling the package is separated from the source, the package may be removed. The withdrawal of the package from trigger 90 permits spring 95 to rock trigger arm 91 to effect full opening of the jaws and then the operator brings the tensioning handle 17 up to its extreme top position. The complete elevation of handle 17 causes its lever 44 to strike pin 62 of latch 58 with the result that latch 58 trips and releases the depressed retainer mechanism 50—54—55, enabling spring 57 to return that mechanism to normal raised position. The upward movement of the retainer mechanism 50—54—55 pushes the free or starting end 28 of the binder strap up above the level of the sealer head and the apparatus is ready to begin another cycle.

Since, for example, the outer corners of packages, such as annuli, are most exposed to damage it may be desirable to reinforce them with an additional thickness of binder strap. The apparatus heretofore explained lends itself well to this treatment of packages as will be clear from an examination of Fig. 14.

Fig. 14 shows a cross section of a ring-shaped package 26. Instead, however, of the free end 28 of the binder 27 embracing the inner upper corner 26a, as previously explained, a sufficient

length of binder has been pushed through the table top slot 29 to cause the free end 28a to pass on—inside the package encircling loop—past the two outer corners 26b and 26c, as indicated by the dot-dash lines. Now, when the tensioning mechanism is actuated to retract the excess strap and shrink the loop upon the package the free end 28a is bound tightly around the lower outer package corner 26c and a double layer of tensioned strap lies about both outer corners, as indicated by the full lines.

Having thus illustrated and described the nature and preferred embodiment of my invention, what I claim and desire to secure by United States Letters Patent is as follows:

1. A package binding apparatus comprising a support for the package being bound, said support having an opening therethrough for the passage of binder in front of a package in binding position and a trough through which the end of the binder after being passed partly about a bundle may be pushed to complete the encirclement of the package, and again pass through the opening in the support to provide overlapping binder portions after the package has been looped by binder, manually actuated mechanism for retracting binder through the opening in the support to shrink and tension the loop thereof about the package, a binder retainer movable toward and away from the opening in the support, said retainer having grippers that cause it to grip the binder and be moved thereby away from the opening in the support upon the first retraction of binder, a latch to hold the retainer in its position away from the opening in the support where the grippers retain the retracted binder against any tendency to move toward the bundle, means for moving the retainer toward the opening in the support to feed a starting end of binder therethrough when the latch releases the retainer, sealing and binder cut off mechanism located above the opening in the support, and means for actuating the sealing and cut off mechanism.

2. A package binding apparatus comprising a support for the package being bound, said support having an opening therethrough for the passage of binder-strap from a source therebelow up past the face of a package in binding position and a trough opening into a slot in the support over which a package lies when in binding position, said trough acting to guide the end of the binder in looping it about the package so that the end overlaps the body of binder at the side of the package above the opening through the support, manually actuating mechanism for retracting binder step-by-step through the opening in the support to shrink and tension the loop of binder about the package, a binder retainer reciprocable below the support toward and away from the support, said retainer including grippers that hold the binder against movement reverse to that produced by the tensioning mechanism, means for holding the retainer in its position away from the support, binder sealing mechanism for joining together overlapping portions of binder at the side of a package above the support, a binder cut off for severing the binder between the joint and the source, manually actuated means for operating the sealing mechanism and the cut off, and a trip for enabling the binder retainer to move toward the support after the binder has been severed to feed a starting end of binder through the opening in the support.

3. A package binding apparatus comprising a support for the package being bound, said support having an opening therethrough through which binder-strap may be fed past a vertical face of a package in binding position and also having a slot therethrough over which a package lies in binding position, wire guiding means below the slot in the support to guide the end of the binder about the underside of the package and again past the vertical side of the package in overlapping relation to the body of binder looped about the package, binder tensioning means for retracting the looped binder step-by-step to shrink and tension the loop thereof upon the package, a sealing mechanism located at the region the binder overlaps at one vertical side of the package to join the overlapping binder portions adjacent the vertical side of the package, a binder cutter for severing the looped binder between the joint and the source of binder supply, means for actuating the sealing mechanism and the cutter, and means for feeding the severed end of the binder up through the support past the sealing mechanism to provide an accessible starting end for a new binding cycle.

4. A package binding apparatus comprising a support for the package being bound, said support having an opening therethrough through which binder-strap may be fed past a vertical face of a package in binding position and also having a slot therethrough over which a package lies in binding position, wire guiding means below the slot in the support to guide the end of the binder about the underside of the package and again past the vertical side of the package in overlapping relation to the body of binder looped about the package, binder tensioning means for retracting the looped binder step-by-step to shrink and tension the loop thereof upon the package, sealing mechanism located at the region the binder overlaps at one vertical side of the package to join the overlapping binder portions adjacent the vertical side of the package, a binder cutter for severing the looped binder between the joint and the source of binder supply, means for actuating the sealing mechanism and the cutter, and means for feeding the severed end of the binder up through the support past the sealing mechanism to provide an accessible starting end for a new binding cycle, said means being controlled by the binder tensioning means.

5. A package binding apparatus comprising a support for holding a package in binding position, said support having an opening for the passage of binder strap therethrough from a source therebelow up past a vertical face of a package in binding position, means for guiding the free end of the binder after it has been partly looped about the package to cause the same to continue about the package to complete the loop thereabout and overlap the body of binder at the vertical side of the package, tensioning means for retracting binder to shrink and tighten the same upon the package, sealing means for joining the overlapping portions of the binder along the vertical side of the package, cutting means for severing the binder between the joint and the source, and means for gripping and advancing the severed end of the binder to a position above the level of the sealing means.

6. A package binding apparatus comprising a support for holding a package in binding position, said support having an opening for the passage of binder strap therethrough from a source

therebelow up past a vertical face of a package in binding position, means for guiding the free end of the binder after it has been partly looped about the package to cause the same to continue about the package to complete the loop thereabout and overlap the body of binder at the vertical side of the package, tensioning means for retracting binder to shrink and tighten the same upon the package, sealing means for joining the overlapping portions of the binder along the vertical side of the package, cutting means for severing the binder between the joint and the source, binder advancing means for gripping the binder and moving the severed end thereof to a position above the level of the sealing means, and a latch for preventing the binder moving action of the binder advancing means, said latch being trippable by the tensioning means.

7. A package binding apparatus comprising a table having a slotted top for supporting a package in binding position, the slot serving to permit the passage of binder through the table top from a source therebelow, a binder guide below the table top for guiding into a loop about a package in binding position the free end of a binder fed from the source through the slot in the table top, binder tensioning mechanism for retracting binder through the slot in the table top toward the source to shrink the loop of binder about a package in binding position, and binder advancing means acting automatically upon the restoration to normal of the tensioning mechanism to feed a short length of binder through the slot in the table top to provide a free end of binder for easy grasp by the operator to commence the next binding cycle.

8. A package binding apparatus having a slotted package support for holding a package in

binding position, the slot serving to permit binder to be passed from a source below the package support and looped about the package with portions threaded through a seal and overlapping at a side of the package to be there joined with the aid of the seal, and having sealing jaws for deforming the seal and overlapped portions of binder to form a loop-retaining joint, characterized by a lever engageable and movable by a package being placed in binding position on the package support, and operative connections between said lever and the sealing jaws whereby the jaws are moved to grip and hold a seal at the side of the package while the binder is being threaded therethrough during the binder-looping of the package.

9. A package in binding apparatus having a package support for holding a package in binding position so that a binder may be looped thereabout with portions of the binder threading through a channel shaped seal and overlapping at a side of a package in binding position on the support and having cooperating sealing jaws for closing upon the seal and the overlapped binder portions therein to form a loop-retaining joint, characterized by a lever engageable and movable by a package being placed in binding position on the package support, and connections between said lever and at least one of the sealing jaws whereby movement of the lever by the placement of a package in binding position causes relative movement of the sealing jaws toward each other to grip and hold a seal therebetween against displacement while the binder is being threaded therethrough during the binder-looping of the package.

ALFRED MARCHEV.