April 6, 1937. H. C. PORTER 2,076,276

PACKAGE BANDING TOOL

Filed Aug. 18, 1932 2 Sheets-Sheet 1

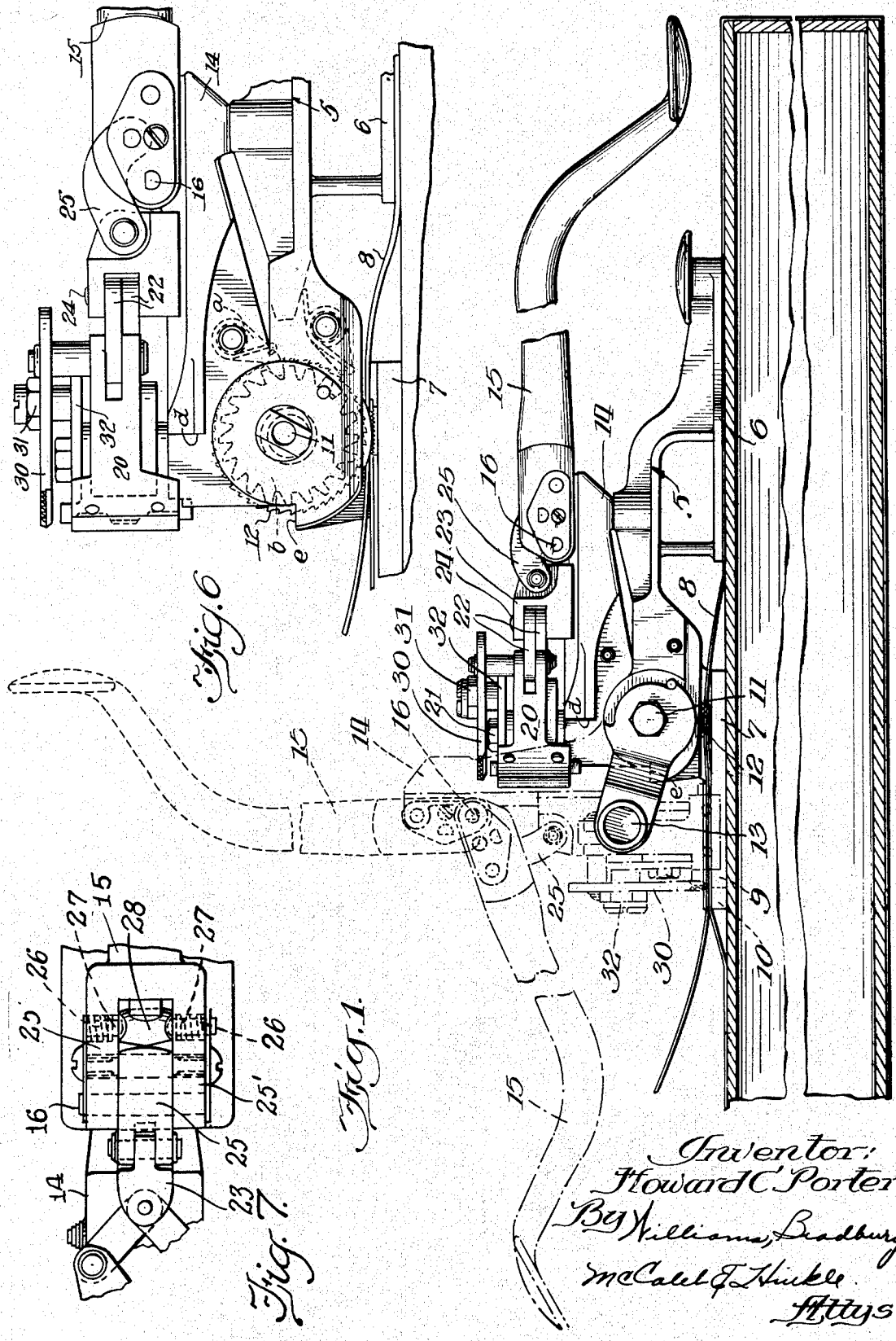


Fig. 6

Fig. 1.

Fig. 7.

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Fig. 2.

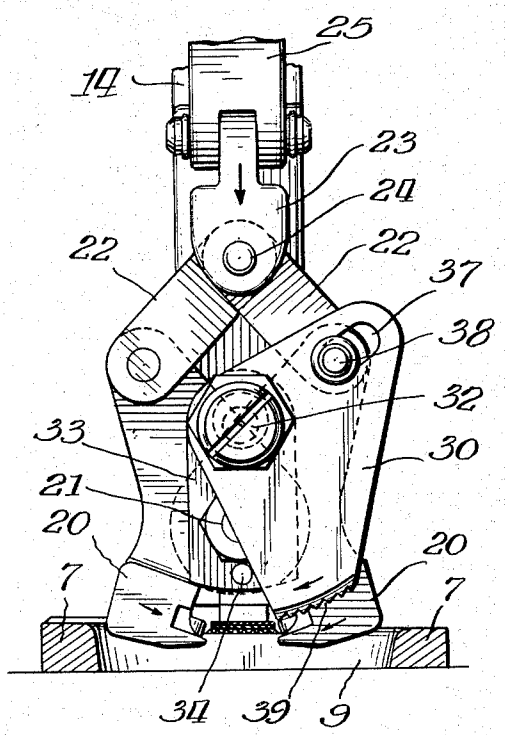


Fig. 3.

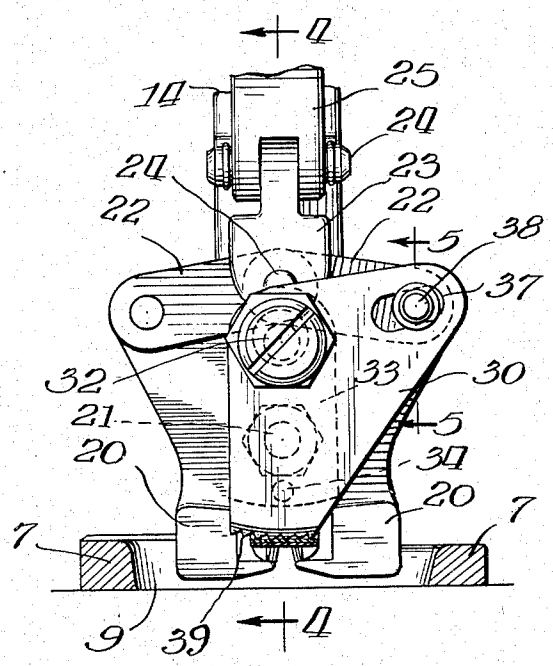


Fig. 4.

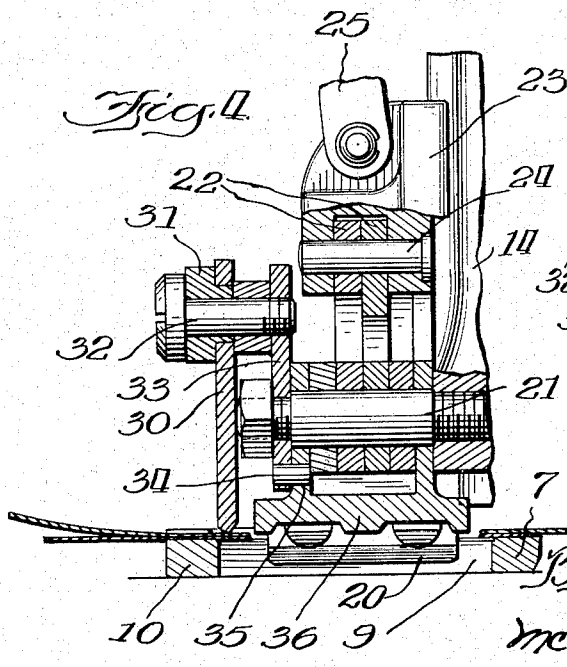
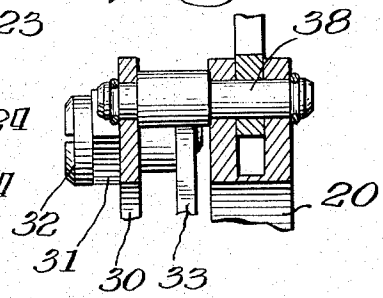


Fig. 5.



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PACKAGE BANDING TOOL

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5 Claims. (Cl. 81—9.1)

My invention relates to package banding tools such as are employed to tension or stretch a flexible metallic binder looped about a package or group of packages and then join overlapping portions of the binder to render the loop permanent. Such tensioned binders are extensively used to secure or reinforce packages and groups of packages.

In such banding of packages there is often a free end of binder material beyond the joint, which end may project far enough to be objectionable and dangerous, making it desirable or necessary to remove some of the excess. And when the binders are taken from indeterminate lengths of material, such as from a coil or reel, instead of being supplied in approximately proper lengths, it is, of course, necessary to sever the binder between the loop and the supply. In order to eliminate waste and objectionable projecting ends the severing should be close to the joint.

Heretofore it has been the practice to use a separate cutter or, and more often, to bend or kink the protruding end of the binder until the same is broken beyond the joint. The use of a separate cutter consumes time and requires the operator to keep track of an additional tool.

Where the joints are made with the use of sleeves or seals, such for example as set forth in Flora Patent No. 1,252,680 granted Jan. 8, 1918 or Leslie Patent No. 1,445,330, granted February 13, 1923, and particularly if the binder is relatively hard and brittle the bending or kinking method is fairly satisfactory, the seal serving as an abutment to locate the line of break close to the joint and to facilitate breakage by insuring a sharp bend or kink. Where, however, joints are made without seals or if seals are employed and the binder is relatively soft then the proper and ready severing of the free ends of the binder becomes more difficult. It may be necessary to bend or kink the binder back and forth many times before it is broken and the break, even when finally accomplished, may be undesirably far from the joint so as to leave an objectionably long projection. And, in any event, the manual effort and time consumed are considerable and the rough edges of the broken ends of the binders are often troublesome.

One of the objects of my invention is to provide a combined tensioning or stretching and joint forming or sealing tool which will automatically insure the severing of the binder at the proper place, regardless of whether or not a seal is used in forming the joint or the binder is hard and brittle or soft and tough.

Another object is to provide a tool which will save time, and effort and material in the binding of packages.

Another object is to provide a tool which will eliminate the rough sharp edges at the severed ends of the binder.

Another object is to provide a binder scoring or partial cutting attachment for combined stretching and sealing tools.

Other objects and advantages will hereinafter appear.

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

Fig. 1 is a side elevation of a combined stretching and sealing tool including a binder scoring or partial severing device of my invention,

Fig. 2 is a partial front elevation of the tool with the scoring device in normal position,

Fig. 3 is a similar view showing the scoring device in position upon completion of its work,

Fig. 4 is a section on the line 4—4 of Fig. 3,

Fig. 5 is a section on the line 5—5 of Fig. 3,

Fig. 6 is an enlarged vertical section of part of the tool, showing particularly the operation of the tensioning mechanism, and

Fig. 7 is a top plan of the mid portion of the tool to show the details of one type of detachable clutch that may be employed to permit a single actuating handle selectively to operate the tensioning mechanism or the sealing and scoring mechanisms.

The package banding tool in which my present invention has been embodied is, in general, of the type set forth in Kool and Van Duyn Patent No. 1,778,530, granted October 14, 1930, and my copending application, Serial No. 599,694, filed March 18, 1932 (Patent No. 1,905,052 granted April 25, 1933). It includes a frame 5 having a pair of supports or feet 6 and 7 which are adapted to rest upon the surface of a package, as shown in Fig. 1. Forward foot 7 is connected to the frame along only one side (the rear side as viewed in Fig. 1) so that the front side of the tool is open in order that the binder 8 may be inserted laterally to pass thereover and rest thereon, as shown clearly in Fig. 1. Foot 7 is provided with an opening for receiving the tips of the seal forming jaws and enable them to embrace and work upon the overlapped strap portions, as will be hereinafter described. The forward wall 10 of the foot 7 serves as an anvil for the binder scoring mechanism, as will be presently explained.

Frame 5 is bifurcated and provides spaced journals for an eccentric shaft 11, which shaft carries a pair of parallel feed wheels 12 rotatably mounted thereon. A grip control handle 13 rigidly mounted on shaft 11 to rotate the same serves to move the feed wheels toward and from foot 7. Shaft 11 also supports and journals an oscillating frame 14 which carries a spring pressed actuating pawl *a* engageable with a ratchet wheel *b* rigidly secured to feed wheels 12. Reverse rotation of the feed wheels is prevented

by a spring pressed holding pawl *c* which is pivotally mounted on the frame and engages the ratchet wheel. These details are not shown in greater detail because they form no part of the present invention; they are illustrated and explained in detail in my aforesaid application and the Kool and Van Duyn patent. Here it is sufficient to say that the oscillation of frame 14 about shaft 11 causes the cumulative rotation of the feed wheels to advance the superposed portion of binder upon and past the lower portion to effect the tensioning of the binder about the package. The oscillations of the frame 14 are effected by manipulating a handle 15 which is pivotally connected to frame 14 by a pivot 16. Handle 15 is, during the stretching or tensioning operation, retained rigidly in alignment with frame 14 so that the oscillating frame moves in unison with and, in effect, forms a part of the handle, as indicated by the full and dotted positions shown in Fig. 1. Thus the oscillations of the handle between the dotted and full line positions shown in Fig. 1 causes actuating pawl *a* to rotate the ratchet and feed wheels in a clockwise direction,—the rotation of the wheels and consequently the advance or feed of the upper strap portion being cumulative because of the retaining effect of holding pawl *c*.

The sealing or joint forming mechanism includes a pair of jaw levers 20 which, intermediate their ends, are pivotally mounted upon oscillating frame 14 by a pivot bolt 21. A pair of links 22 are pivotally connected respectively at one end to the upper ends of jaw levers 20 while the other ends are connected to a sliding block 23 by a pin 24. Block 23 is mounted to slide upon oscillating frame 14 and is connected to handle 15 by a link 25. A disconnectible clutch (the details of which are most clearly shown in Fig. 7) serves to hold handle 15 in alignment with frame 14 until the sealing mechanism is moved into operative position over the binder and then the additional force to effect joint or seal formation is exerted upon the handle. Under such conditions the clutch permits handle 15 to pivot upon its pivot 16, as shown by the dot-dash lines of Fig. 1, whereupon the sliding block and linkage heretofore mentioned causes jaw levers 20 to pivot about bolt 21 to bring the lower ends of the jaws together as shown most clearly in Fig. 3. Fig. 2 shows the sealing mechanism positioned over the binder but with the jaws open.

The specific structure of this detachable clutch between handle 15 and auxiliary oscillatable frame 14 forms no part of the present invention and may be varied as desired. For the purpose of this disclosure I have chosen to show the clutch illustrated and described in my aforesaid Patent No. 1,905,052. As shown most clearly in Fig. 7, the forward end of handle 15 is formed with furcations 25' through which pivot pin 16 passes. The furcations 25' are provided with spring pressed plungers 26 which are adapted to enter recesses 27 in the opposite side faces of a boss 28 of frame 14 when the same align. As long as the ends of the plungers are in recesses 27, the handle and frame 14 are held rigidly in alignment and move together. Such is the relationship during the tensioning operation. When however, the auxiliary frame 14 is prevented from moving, as when the stops *d* and *e* engage when the auxiliary frame is moved to bring the sealing jaws into active relationship on opposite sides of the binder, then further movement of handle 15 in a clockwise direction, as viewed in Fig. 1, causes the spring pressed plungers to be released, disconnecting the clutch and permitting the handle to fulcrum about pivot 16, as shown by the dot-dash lines of Fig. 1, to carry out the sealing or joint-forming operation and to score or cut the band, as will be hereinafter described.

Briefly, the operation of the mechanism thus far described is as follows:

The tool is set upon the package and the encircling binder looped about the package. The overlapping binder portions are inserted between foot 7 and feed wheels 12 and handle 13 is rocked to bring the feed wheels tightly down upon the upper strap portion. Now to tension the binder handle 15 is oscillated to rotate the feed wheels and thereby force the upper strap portion past the lower portion which is held stationary by foot 7. This operation continues until the cumulation of strap movements effects the desired tension in the loop of binder encircling the package. When the desired tension has been produced handle 15 is moved to the position shown by the dotted lines of Fig. 1 which carries the sealing mechanism into operative position with the deforming faces of the jaws on opposite sides of the binder. Stops *d* and *e* on the oscillating and main frame respectively prevent the jaws from being further moved in the vertical plane about shaft 11, but additional pressure upon the handle to the left or in a counterclockwise direction causes the clutch between the handle and oscillating frame 14 to become disengaged as heretofore described, whereupon handle 15 then pivots about its connection 16 (as indicated by the dot-dash lines of Fig. 1) causing the block 23 to move down its slide on frame 14 and, through links 22 rock the jaws about common pivot 21 to bring the working faces of the jaws together and deform the overlapping binder portions into a seal-joint.

The binder scoring or partial severing mechanism comprises a cutter blade 30 which is oscillatably mounted upon a sleeve 31. Sleeve 31 is eccentrically journaled upon a pivot screw 32. This eccentric mounting of the cutter blade affords adjustment for varying the depth of cut. Pivot screw 32 threads into and is carried by a plate 33. This plate is carried by the jaw pivot bolt 21 and is prevented from rotating thereabout by a pin 34 which extends through an opening in the plate into a socket 35 in the stationary anvil or chair 36 of the sealing mechanism. The upper end of blade 30 is provided with a slot 37 which receives one of the pivot pins 38 employed to connect one of the links 22 to one of the jaw levers 20. The cutting edge of blade 30 may be provided with serrations or teeth 39 to facilitate its action upon the binder.

In operation the final or sealing stage of movement of handle 15 (i. e., about pivot 16 to bring the jaws together) causes the connection between link 22 and blade 30 to move the cutter blade transversely across the binder from the position shown in Fig. 2 to the position shown in Fig. 3. The effective length of the blade from its pivot to curved cutting edge is preferably adjusted so that the upper binder portion only is engaged and even that portion is only scored or partially severed. In the cutting operation the forward wall 10 of the foot acts to hold the binder to the blade. After the joint is completed and the scoring of the binder accomplished handle 15 is returned toward the right to its normal posi-

tion, as shown by the full lines of Fig. 1, carrying with it the sealing and cutting mechanism.

Now, by actuating handle 13 to separate the feed wheels from the stationary foot, the tool is released from the binder and may be removed. Either before or after the tool is removed the free end or upper portion of the binder may be easily and quickly completely severed by bending it at the score or cut made by the cutter blade.

I believe it is ordinarily the better practice to adjust the blade, by means of its previously described eccentric mounting, so that it only scores or partially severs the free end of the binder rather than completely severing it. The reason is that the operator, if the binder is being taken from a reel or other indeterminate source of supply, is compelled to grasp the binder between the joint and the source in order to bend it to effect complete severance. In this way the end of the binder for the next package is held by the operator ready for use, it is unnecessary for him to find the end preparatory to binding the next package and time and effort are saved thereby. Of course, if desired, the adjustment may be such that the blade completely cuts through and severs the free end or top binder portion.

With this cutting or scoring mechanism the binder is automatically prepared for ready separation, when separation is desired, simultaneously with an essential operation of the tool. And the place of separation is uniformly where waste is avoided. If only partial separation or scoring is initially desired the final complete separation may be subsequently effected with ease and speed. The upper edges of the severed ends of the binders are cut, preferably at a bevel so that the burrs and roughness incident to complete severance by bending are avoided.

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

1. A package banding tool comprising a frame for resting on a package to be bound, a binder tensioning mechanism carried by the frame and operable upon overlapping portions of binder to effect relative movement therebetween to exert a pull upon the loop of binder encircling the package, sealing mechanism carried by the frame and for deforming the overlapping portions of binder to form a seal-joint therein, a single handle operable selectively to actuate the tensioning mechanism and to move the sealing mechanism into cooperative relationship with the binder and there actuate the same to form the seal joint, and a cutter pivotally mounted on the sealing mechanism to be carried thereby into a position over the binder and then operated thereby to cut the upper only of the overlapping binder portions beyond the joint.

2. A package banding tool comprising a frame for resting upon a package to be bound by an encircling binder, binder tensioning mechanism carried by the frame, sealing mechanism carried by the frame to be movable to and from an operative position adjacent and in coacting relationship with respect to the binder in which relationship the sealing mechanism may act upon overlapping portions of the binder to deform the same into a seal-joint therebetween, a single handle operable selectively to actuate the tensioning mechanism and also to actuate the sealing mechanism, first to move the latter to operative position and coactive relationship relative to the binder and then to deform overlapping portions of the binder to produce a seal-joint therebetween, and a cutter carried by the sealing mechanism to be moved thereby into cutting relation to the binder when the sealing mechanism is moved to operative position and then to cut the upper only of the overlapping binder portions beyond the joint.

3. A package banding tool comprising mechanism for tensioning a flexible binder about a package, sealing mechanism for producing a joint between overlapping portions of the binder, a single handle for actuating both the tensioning and sealing mechanisms, operative connections between the handle and sealing mechanism permitting movement of the handle to bring the sealing mechanism into and out of an effective relationship with the binder, other operative connections between the handle and sealing mechanism active only when the sealing mechanism has been moved into effective relationship with the binder to permit movement of the handle to actuate the sealing mechanism to produce a joint in the binder, a binder cutter carried by the sealing mechanism into effective relationship to the binder when the sealing mechanism is moved into such relationship, and operative connections between the handle and cutter to actuate the cutter by the handle.

4. A package binding tool comprising a frame, binder tensioning mechanism carried by the frame, joint producing mechanism, means movably mounting the joint producing mechanism on the frame to enable the joint producing mechanism to be moved bodily toward and to a position adjacent the binder where its subsequent actuation can produce a joint in the binder and away from and to a position relatively remote from the binder where it is out of the way during the tensioning operation, a single operating handle, operative connections between the handle and the tensioning mechanism to enable the handle to actuate the tensioning mechanism, other operative connections between the handle and the joint producing mechanism to enable the handle to move the joint producing mechanism to its positions adjacent to and remote from the binder and to actuate the same to cause it to produce a joint, a binder cutter carried by the joint producing mechanism and movable with it to positions adjacent to and remote from the binder, and operative connections between the handle and cutter to enable the handle to actuate the cutter to cut the binder beyond the joint.

5. A package banding tool comprising a frame for resting on a package, band tensioning mechanism carried by the frame, a handle pivoted to the frame, means carried by the handle for actuating the tensioning mechanism, joint forming mechanism carried by the handle, and bodily movable by it to positions adjacent to and remote from the binder, operative connections between the handle and the joint forming mechanism to enable the handle to actuate the joint forming mechanism when the same has been moved adjacent the binder, a binder cutter movable with the handle to positions adjacent to and remote from the binder, and operative connections between the handle and the cutter to enable the handle to actuate the cutter when the same has been moved adjacent the binder.

HOWARD C. PORTER.