June 15, 1954

W. C. CHILDRESS

2,680,979

JOINT FORMING TOOL

Filed Aug. 8, 1951

2 Sheets-Sheet 1

Fig. 4.

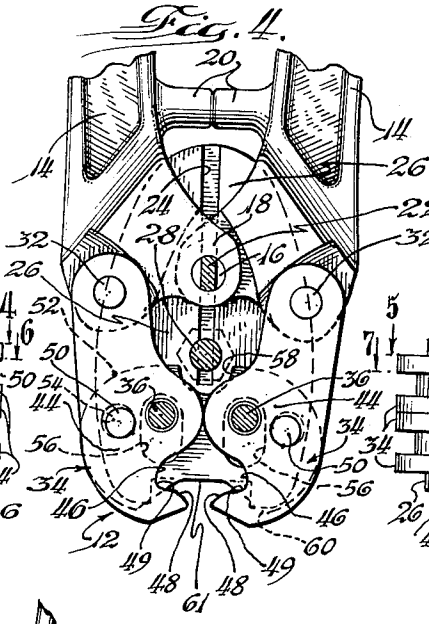


Fig. 2.

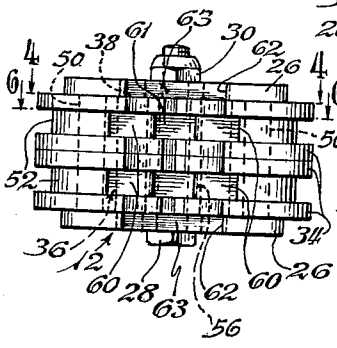


Fig. 3.

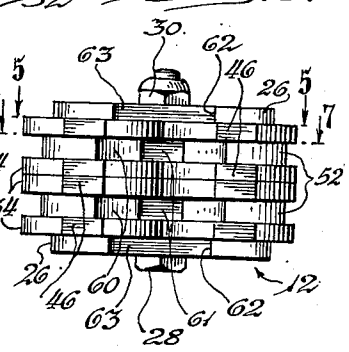


Fig. 1.

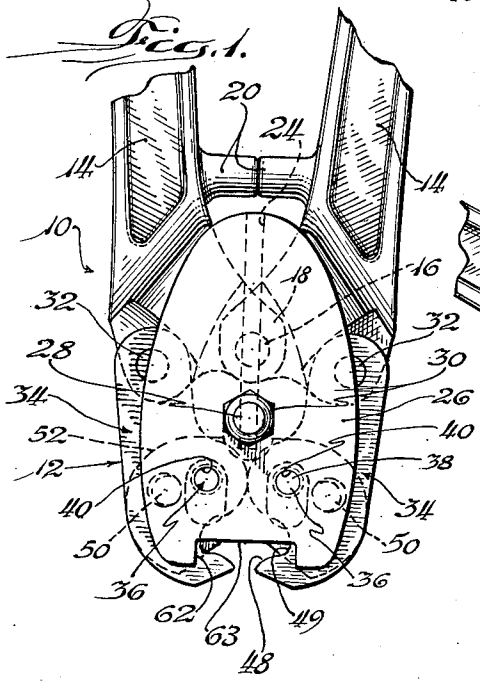
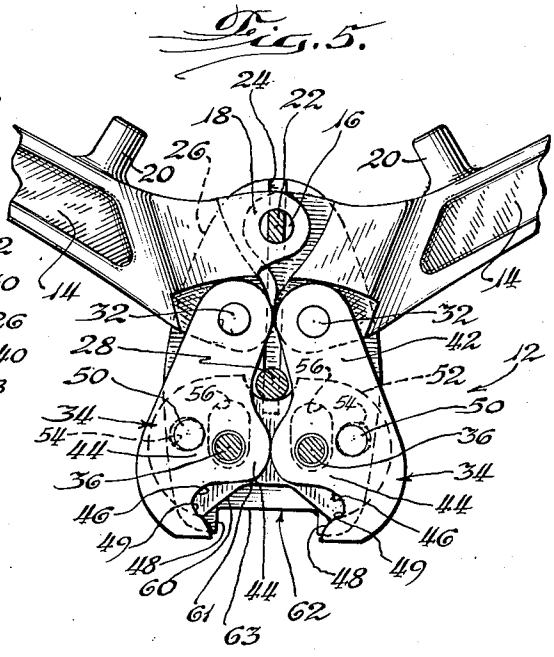


Fig. 5.



Inventor:
William C. Childress
By Ahlberg, Wuspper & Gradolph
Attorneys.

June 15, 1954 W. C. CHILDRESS 2,680,979

JOINT FORMING TOOL

Filed Aug. 8, 1951 2 Sheets-Sheet 2

Fig. 8.

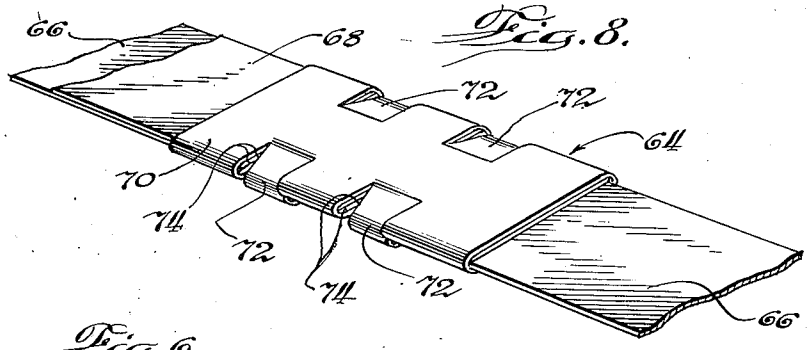


Fig. 6.

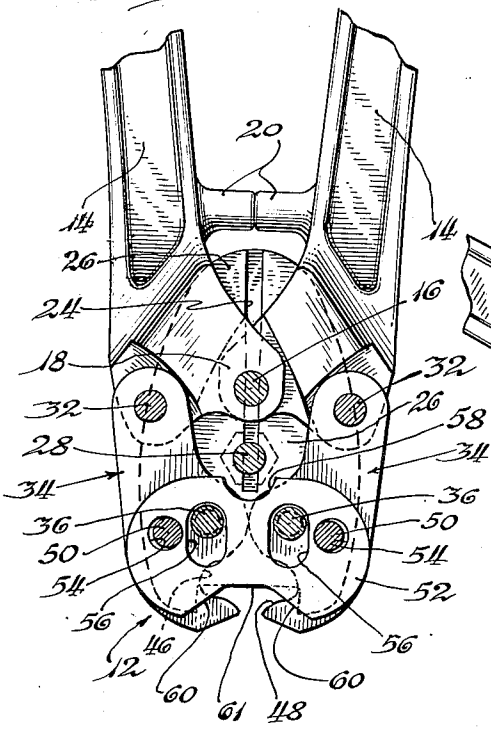
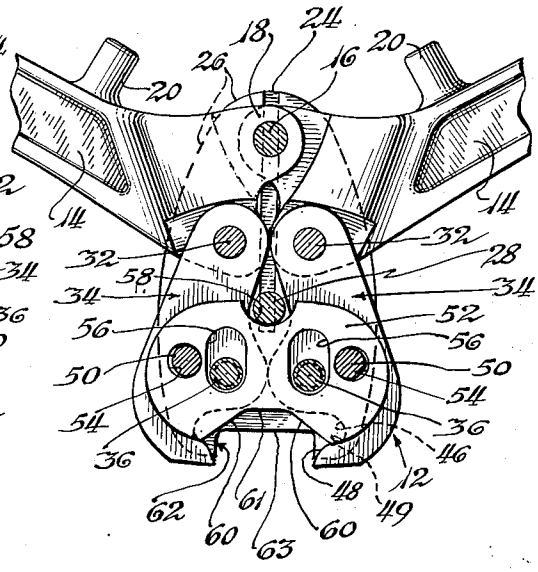


Fig. 7.



Inventor:
William C. Childress
By Ahlberg, Wupperman & Gradolph
Attorneys.

Patented June 15, 1954

2,680,979

UNITED STATES PATENT OFFICE

2,680,979

JOINT FORMING TOOL

William C. Childress, Oak Park, Ill., assignor to Signode Steel Strapping Company, Chicago, Ill., a corporation of Delaware

Application August 8, 1951, Serial No. 240,955

2 Claims. (Cl. 81—9.1)

1

This invention relates to an improved manually operable binder-strip joint forming tool, commonly called a sealing tool.

The purpose of a sealing tool is to unite the overlapping portions of steel binder strapping and an embracing seal blank into a tension resisting joint, thereby preventing the united strap portions from separating, so that the strapping may effectively serve to encircle boxes and bundles of various sorts for binding and reinforcing them and to secure loads or load units into carriers, such as trucks and railway cars. The joint formed by the tool of this invention is made by shearing and deforming the longitudinal edges of the overlapping strap portions and the seal to produce interlocking shoulders and tabs or tongues which resist separation of the ends of the tensioned strapping.

The principal object of the present invention is to provide an improved joint forming or sealing tool which simultaneously folds and holds the seal against the overlapped strap portions and notches the longitudinal edges of the strap portions and the seal to produce the interlocking shoulders and tabs or tongues.

Another object is to provide an improved sealing tool which is easy to operate and which may be manipulated rapidly to form a joint in the overlapped portions of the tensioned strapping.

Another object is to provide an improved sealing tool which has few parts and which may be made at low cost.

Another object is to provide an improved sealing tool that is self stripping, that is, it frees itself from the completed strap joint when its operating handles are manipulated to withdraw the joint forming jaws and cutters or notchers from their joint forming positions.

Another object is to provide an improved sealing tool having sets of folding and holding jaws and cutters or notchers wherein the cutters or notchers advance to shear and deform the strap and seal as the jaws are moved toward each other to fold and hold the seal against the strap portions and the cutters or notchers withdraw as the jaws are separated to release the joint.

A further object is to provide a sealing tool, for producing a joint in the overlapping portions of metallic binder strapping embraced by a metallic seal, having a pair of spaced side plates, a pair of spaced pivot pins held by and bridging between the side plates, a pair of complementary folding and holding jaws, one pivotally mounted on each pivot pin, a pair of notcher pins, one notcher pin being mounted in each jaw and movable about

2

the adjacent pivot pin, a cutter or notcher carried by the notcher pins and arranged to be advanced and retracted thereby, a pair of operating handles, a pivot pin for pivotally interconnecting the operating handles, a pivotal connection between each handle and one of the jaws, and means holding the side plates in place, the side plates overlying and holding in place all of the pivot pins.

Other objects and advantages of this invention will become apparent from the following description taken in conjunction with the accompanying drawings wherein:

Fig. 1 is a plan view of the head of the sealing tool of the present invention, showing the holding and folding jaws in closed position, i. e., the position at the end of a joint forming operation;

Fig. 2 is an end view of the head of the tool looking at the jaws from the open end thereof and showing the jaws in the closed position;

Fig. 3 is an end view similar to Fig. 2 but showing the jaws in open position, i. e., the position to receive the seal and overlapped strap portions for a joint forming operation;

Fig. 4 is a plan sectional view taken along the line 4—4 of Fig. 2 looking in the direction of the arrows, showing the construction and mounting of the folding and holding jaws;

Fig. 5 is a view similar to Fig. 4 but showing the jaws in open position and is taken along the line 5—5 of Fig. 3, looking in the direction of the arrows;

Fig. 6 is a plan sectional view taken along the line 6—6 of Fig. 2 looking in the direction of the arrows, showing the cutter or notcher in its advanced or cutting position;

Fig. 7 is a view similar to Fig. 6 but showing the cutter or notcher retracted and is taken along the line 7—7 of Fig. 3, looking in the direction of the arrows; and

Fig. 8 is a perspective view of a joint formed by the tool of Figs. 1 to 7 in overlapped strap ends and seal blank.

The drawings illustrate a joint forming or sealing tool 10 having a sealing head 12 connected to a pair of identical operating handles 14 which are pivotally interconnected by a pivot pin 16 extending through bearing portions 18. The handles 14 are rotated toward and away from each other to operate the tool, and their movement toward each other in the joint forming direction is limited by inwardly facing abutments or stops 20. The pivot pin 16 is milled at its end to form keys 22 slidable in key slots 24 cut in the inner faces of side plates 26. It will be

observed from a comparison of Figs. 4 and 5 and Figs. 6 and 7 that the pivot pin 16 moves inwardly and outwardly of the sealing head 12, being guided in this movement by the keys 22 sliding in slots 24. The side plates are interconnected by a headed bolt 28 having a nut 30 threaded onto its outer end so that the elements of sealing head 12 and the handles 14 may be secured together as shown in Figs. 2 and 3.

Each handle 14 is connected by a pivot pin 32 to one end of a plurality of folding and holding jaws 34 which are pivotally mounted in the sealing head on pins 36. Each pin 36 has outer ends 38 of smaller diameter which form shoulders with the larger diameter central bearing portion, and these shoulders abut against the inner face of the side plates 26 with the smaller diameter end portions extending into apertures 40 in the side plates so that the outer faces thereof are flush with the outer faces of the side plates 26.

The shape of the folding and holding jaws 34 is best seen in Figs. 4 and 5, which show that each jaw has an inner end part 42 through which the pivot pin 32 extends for pivotally and movably connecting the jaw 34 to its handle 14. Adjacent the outer end the jaw 34 is provided with an enlarged portion 44 in which is provided an opening through which the pivot pin 36 extends. At the inner edge of its outer end each jaw is notched at 46, so that facing pairs of jaws may receive and hold the overlapped strap edge portions and the seal. Each jaw has an inwardly curved edge 48 blending in a short reverse curve 49 into the base of the notch 46. As the jaws are pivoted from the open seal receiving position of Fig. 5 to the closed joint forming position of Fig. 4, the curved edge 48 contacts the seal flange to fold it against the under face of the strap portions. The edge of the seal is held or clamped in the short reverse curve 49 of the notch 46 as will be hereinafter described.

Each set of holding and folding jaws 34 carries a notcher pin 50 outside of the pivot pins 36, so that as the holding and folding jaws 34 are pivoted the pins 50 move in short arcs about the pins 36. The pins 50 carry a cutter or notcher plate 52 thereon (Figs. 6 and 7). Each pin 50 extends loosely through one of a pair of circular openings or apertures 54 in the notcher plate 52, and each of the openings 54 is about .015 inch larger in diameter than the diameter of the pin 50 in order to permit the pin 50 to travel an arcuate path while moving the notcher plate in a straight line inwardly and outwardly or up and down as shown in Figs. 6 and 7. The notcher plate 52 has a pair of slots 56 cut therein to receive the jaw pivot pins 36 so that the plate 52 may be freely moved between its advanced and retracted positions. At its rear edge the notcher plate 52 is formed with an arcuate recess 58 to accommodate the sealing head assembly holding bolt 28.

The working face or edge of the notcher plate 52 has a pair of tab cutting edges 60 arranged at an angle of about 55° to the longitudinal axis of the sealing head, which when moved from the position shown in Fig. 7 to that of Fig. 6 cut or shear the longitudinal edges of the strap and seal and bend the sheared portion downwardly to form tabs or tongues of seal and strap portions thereby providing interlocking shoulders which resist pull or tension on the strap joint. The diagonal cutting edges 60 terminate in a connecting transverse straight edge 61 the function of which will appear hereinafter.

Each of the side plates 26 is provided at its outer end with a shallow rectangular recess 62 wide enough to receive the strap portions and the seal blanks. The recess has a straight bottom edge 63 against which the back of the seal is held during the joint forming operation and which acts to strip the formed joint from the tool at the end of the joint forming operation. Figs. 5 and 7 show that the jaws 34 and the notcher 52 are clear of the recess when the handles 14 are moved to their extreme separated positions.

The end views, Figs. 2 and 3, show the face to face positioning of the jaws 34, notcher plates 52, and side plates 26; they also show that the center pair of jaws 34 is twice as wide as the side set, each of the center pair being made of two jaw blanks. As all the jaw blanks are identical, manufacturing costs are thus minimized. The alternate and face to face arrangement of the holding and folding jaws 34 and notchers 52 ensures that the seal and overlapping strap portions are tightly clamped by the jaws adjacent the shear lines as the notchers are moved outwardly to shear the seal and strapping. The tool illustrated has three pairs of holding jaws and two notchers; it is obvious that the number of jaws and notchers may be increased or reduced according to tool size and the size of seal and strapping with which the tool is to be used.

In Fig. 8 there is shown a joint 64 formed in overlapping strapping portions embraced by a seal 70. The seal and strapping have been sheared and deformed to provide tongues 72 in the marginal edges thereof in such fashion that the tongues 72 and the adjacent joint portion have interlocking tension and separation resisting shoulders 74.

The joint forming tool of this invention is easy to use. After the strap has been placed about the bundle or fastened in a vehicle it is properly tensioned by a tensioning or stretching tool. A flanged seal blank of either the "snap-on" or "thread on" type is positioned over the overlapping strap ends 66 and 68. The seal and the overlapped portions of the strap are inserted into the open sealing tool (Figs. 5 and 7) so that the seal back rests against the bottoms 63 of the rectangular recesses in the side plate 26. The handles 14 are moved together, thereby rotating the jaws 34 about the pivot pins 36 to bring the outer ends of the jaws together folding the flange portions of the seal against the under side of the overlapped strap portions 66 and 68 and tightly clamping the seal and strapping against the recess edges 63. The swinging movement of the jaws carries the notching pins 50 in their short arcs about the pivot pins 36. The notcher pins 50 advance the cutter or notcher plate 52 outwardly of the sealing head to the position shown in Figs. 1, 4 and 5. As the notcher plate moves outwardly of the sealing head the angular cutting edges 60 thereof contact the longitudinal edges of the seal and overlapping strap ends between the jaws 34, shear the tongues 72 from these portions, and depress the tongues 72 downwardly to the positions shown in Fig. 8, thereby forming the interlocking shoulders 74. Inward buckling of the joint is prevented by the transverse straight edges 61 of the notchers which are coplanar with the bottoms 63 of the recesses when the notchers are fully advanced. After the joint has been completed, the handles are separated to withdraw the jaws 34 from clamping position and to retract the notcher plates. This

action strips the joint from the tool against the bottom of the side plate recesses since the jaws and notchers are clear of the recess when the tool is fully open.

While a preferred embodiment of the joint forming or sealing tool constituting this invention has been shown and described, it will be apparent that numerous modifications and variations thereof may be made without departing from underlying principles of the invention. It is, therefore, desired by the following claims to include within the scope of the invention all such variations and modifications by which substantially the results of this invention may be obtained through the use of substantially the same or equivalent means.

What is claimed as new and desired to be secured by United States Letters Patent is:

1. A sealing tool for producing joints between overlapping portions of metallic binder strapping which are embraced by a metallic seal having a pair of spaced side plates, a pair of spaced pivot pins held by and bridging between said side plates, a pair of complementary folding and holding jaws, one pivotally mounted on each pivot pin, a pair of pivotally interconnected operating handles, a pivotal connection between each handle and one of said jaws, a pair of notcher pins, one mounted in each of said jaws and movable therewith about and outside of the adjacent pivot pin, and a notcher carried by said notcher pins for rectilinear movement and arranged to be advanced and retracted thereby, characterized in that said side plates are formed with shallow strap and seal receiving recesses in their outer ends against the bottom of which said folding and holding jaws clamp the seal and embraced strapping, said notcher is formed with diagonal tab cutting edges, and said notcher pins are so positioned relative to said pivot pins that they are movable through a plane passing through the center lines of said pivot pins as the tool is operated so that when said notcher is moved to retracted position said cutting edges are clear of said recess, whereby a completed joint may be stripped from the tool by moving said handles in such direction that said jaws are pivoted from holding position and simultaneously retract said notcher.

2. A sealing tool for producing joints between overlapping portions of metallic binder strapping which are embraced by a metallic seal having a pair of spaced side plates, a pair of spaced pivot pins held by and bridging between said side plates, a pair of complementary folding and holding jaws, one pivotally mounted on each pivot pin, a pair of pivotally interconnected operating handles, a pivotal connection between each handle and one of said jaws, a pair of notcher pins, one mounted in each of said jaws and movable therewith about and outside of the adjacent pivot pin, and a notcher carried by said notcher pins for rectilinear movement and arranged to be advanced and retracted thereby, characterized in that side plates are shaped at their outer ends so as to receive and guide the seal and overlapping strapping portions so that said folding and holding jaws clamp the seal and embraced strapping against said shaped ends of said side plates, said notcher is formed with tab cutting edges, and said notcher pins are so positioned relative to said pivot pins that they are movable through a plane passing through the center lines of said pivot pins as the tool is operated so that when said notcher is moved to retracted position said cutting edges are withdrawn behind and clear of said shaped side plate ends, whereby a completed joint may be stripped from the tool by moving said handles in such direction that said jaws are pivoted from holding position and simultaneously retract said notcher.

References Cited in the file of this patent

UNITED STATES PATENTS

Number	Name	Date
1,920,413	McGary	Aug. 1, 1933
1,924,844	Edwards	Aug. 29, 1933
1,974,913	Childress	Sept. 25, 1934
2,049,049	Carlson	July 28, 1936
2,432,306	Gerrard et al.	Dec. 9, 1947