Sept. 14, 1948. J. A. WAUGH ET AL 2,449,349

DEVICE FOR CONNECTING YARN ENDS

Filed July 15, 1947 2 Sheets-Sheet 1

Fig. 1

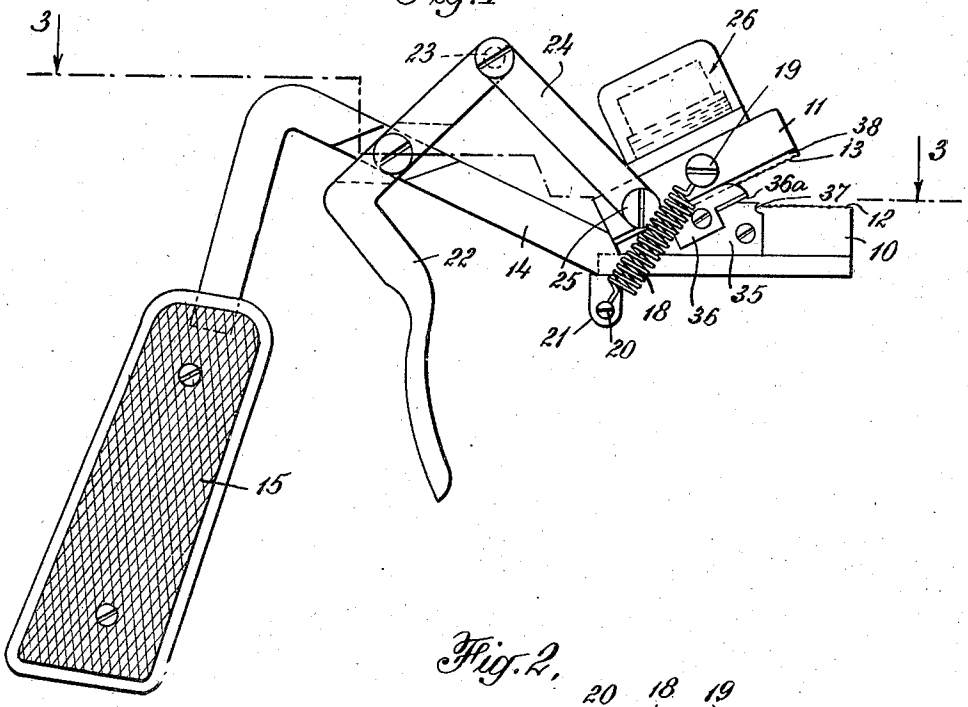


Fig. 2.

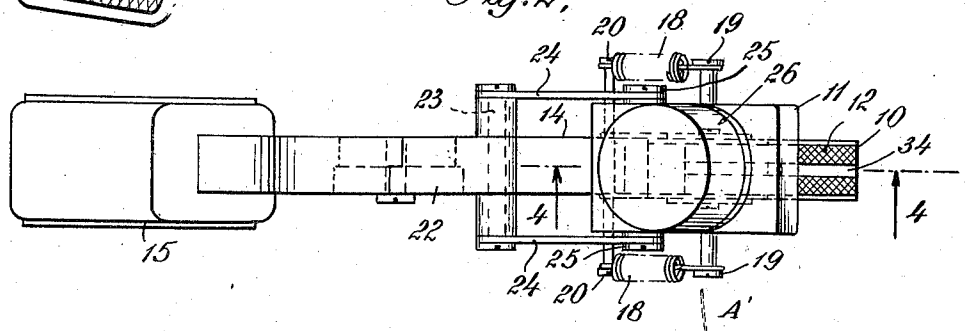
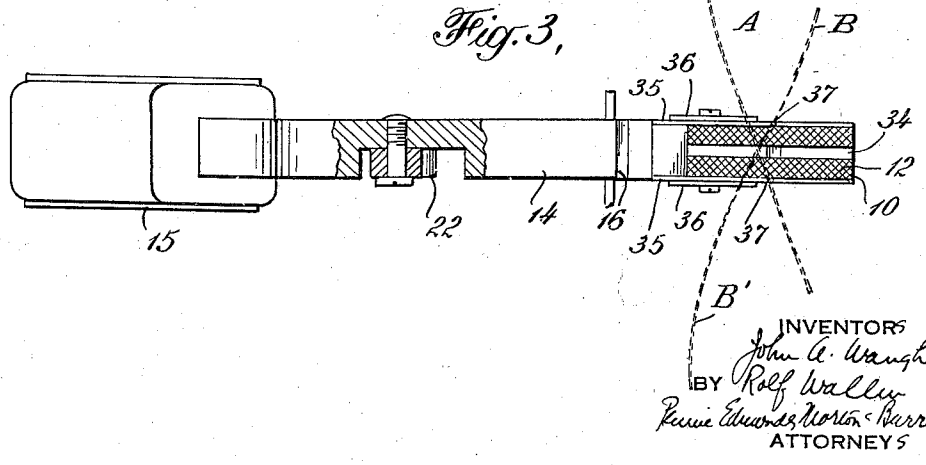


Fig. 3.



INVENTORS
John A. Waugh
Ralf Waller
BY Pennie Edmonds, Morton & Barrows
ATTORNEYS

Sept. 14, 1948. J. A. WAUGH ET AL. 2,449,349

DEVICE FOR CONNECTING YARN ENDS

Filed July 15, 1947 2 Sheets-Sheet 2

Fig. 4.

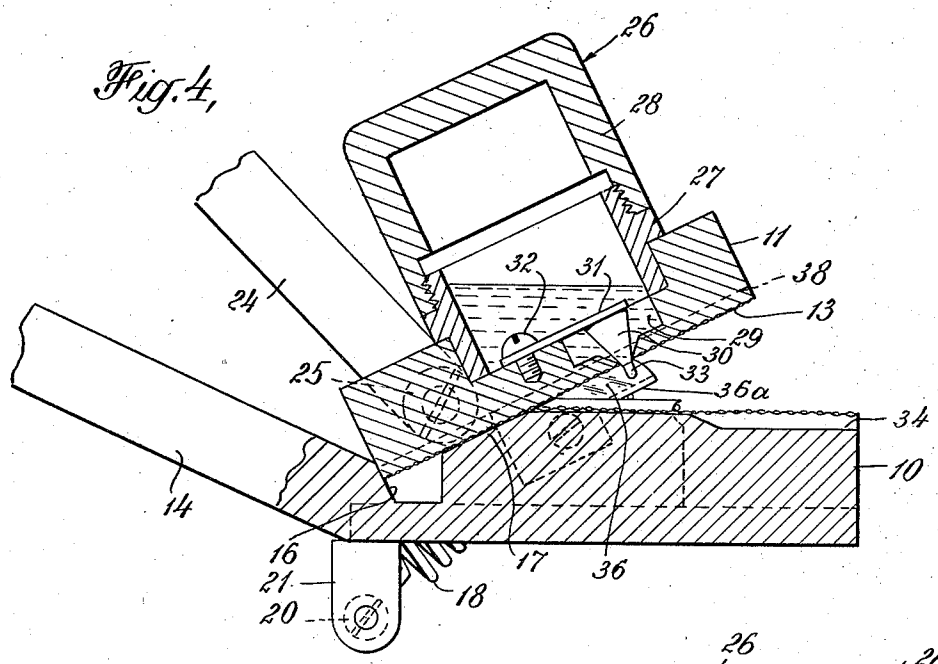
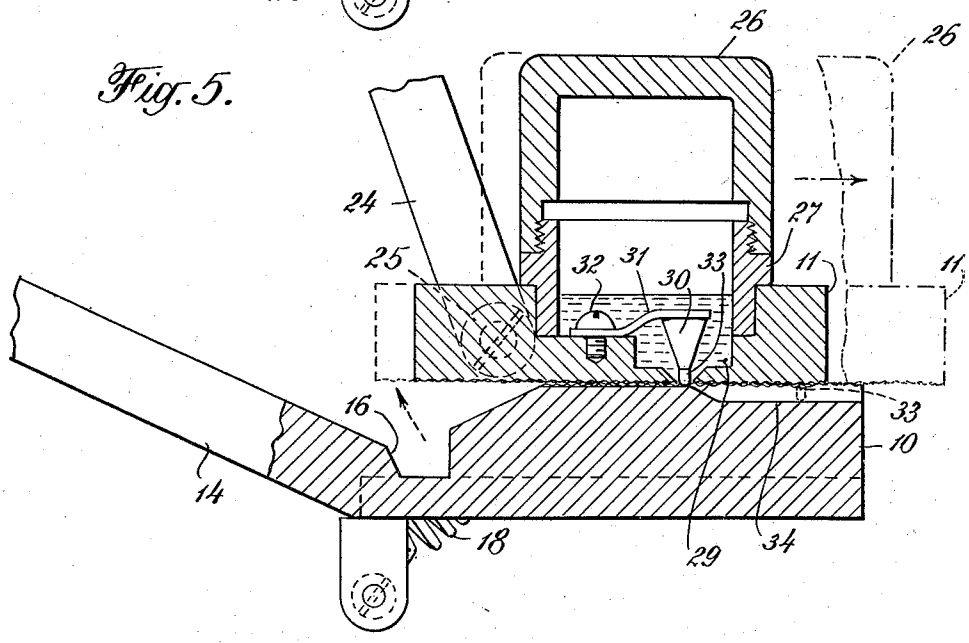


Fig. 5.



INVENTORS
John A. Waugh
BY Rolf Wallen
Pennie Edmonds, Morton & Barrows
ATTORNEYS

Patented Sept. 14, 1948

2,449,349

UNITED STATES PATENT OFFICE

2,449,349

DEVICE FOR CONNECTING YARN ENDS

John A. Waugh and Rolf Wallin, Charlottesville, Va., assignors to Wauregan Mills, Incorporated, Wauregan, Conn., a corporation of Connecticut

Application July 15, 1947, Serial No. 760,986

10 Claims. (Cl. 57—22)

1

This invention relates to a device for connecting together the ends of strands, such as yarns and threads, and is concerned more particularly with a novel device, by the use of which the ends of a pair of strands may be secured together in overlapped relation by an adhesive. The new device is of simple, inexpensive construction and compact and light in weight. It is easy to operate and the user may hold it in and actuate it with one hand, thus having the other hand free to handle the strands to be connected. Strand connections made by the use of the new device have the ends of the strands overlapped to a uniform extent and, in the operation of the device, it cuts the ends of the strands cleanly so as to eliminate frayed portions.

The utility of the device of the invention is not limited to the use of any specific adhesive but it may be employed advantageously in connecting strands by means of the adhesives disclosed in the copending applications of William P. Utermohlen, Jr., Serial No. 752,267, filed June 3, 1947, and Serial No. 759,917, filed July 9, 1947. The Utermohlen adhesives are insoluble in water but soluble in dilute alkali solutions. Accordingly, lengths of yarn may be connected end to end with the Utermohlen adhesives by means of the new device and the yarns may then be utilized in the usual way in the production of fabrics. The adhesive may be removed from each connection during subsequent treatment of the fabric involving the use, for example, of an alkaline detergent.

The new strand connecting device includes a pair of jaws, one stationary and one movable, the jaws having opposed faces and the stationary jaw having a stop, against which the movable jaw is normally held by spring means connecting the jaws. When the movable jaw is against the stop, its face lies at an angle to the face of the stationary jaw, so that the ends of strands to be connected can be placed between the jaws. Manual means are provided for moving the movable jaw away from the stop, and the construction is such that, during its movement, the movable jaw initially rocks to bring its face parallel with that of the stationary jaw, after which, the movable jaw moves along the surface of the stationary jaw. A receptacle for adhesive is mounted on one of the jaws and has an outlet at the face thereof, the outlet being controlled by a valve. During the movement of the movable jaw, the valve is opened to discharge a small amount of adhesive to be taken up by the ends of the strands between the jaws. The movement of the movable jaw away

2

from the stop and then back causes the overlapped ends of the strands to be rolled one upon the other and the adhesive acts to secure the overlapped ends together. The device includes cooperating cutting elements, which function during the movement of the movable jaw to sever a portion from the free end of each strand and thus give the strands clean ends and determine the amount of the overlap.

For a better understanding of the invention, reference may be made to the accompanying drawings, in which

Fig. 1 is a view of one form of the new device in side elevation;

Fig. 2 is a plan view of the device;

Fig. 3 is a sectional view on the line 3—3 of Fig. 1;

Fig. 4 is a sectional view on the line 4—4 of Fig. 2; and

Fig. 5 is a view similar to Fig. 4 but showing the parts in different relative positions.

The device in the form illustrated comprises a stationary jaw 10 and a movable jaw 11, the jaws having opposed working faces 12, 13, which are roughened, as by knurling. A handle 14 is attached to the stationary jaw at one end of the jaw and is provided with a hand grip 15 at its free end. The stationary jaw has a stop normally engaged by one end of the movable jaw, and, in the device illustrated, the stop is provided by a surface 16 on the handle 14.

When one end of the movable jaw engages the stop, the opposite end of the jaw should be separated from the stationary jaw, in order that the strands to be connected may be inserted between the jaws. For this purpose, one of the jaws is formed with a surface, which is inclined to the plane of the remainder of its working surface and, in the device shown, the stationary jaw 10 has such a surface 17 at its inner end adjacent the stop, the surface 17 meeting the face 12 of the jaw along a line extending across the jaw. The movable jaw 11 is normally held against the stop by springs 18, one on each side of the jaws. Each spring is connected at one end to the side of the movable jaw 11 by a screw 19 and its other end is connected by a screw 20 to a bracket 21 attached to the stationary jaw near its inner end and adjacent its connection to the handle.

A trigger 22 is pivotally mounted on handle 14 with one end lying close to the grip 15. At its other end, the trigger carries a pin 23 to the opposite ends of which are pivotally connected the ends of links 24. The other ends of the links are pivotally attached to the sides of the mov-

able jaw 11 by screws 25. With this arrangement, when the trigger 22 is swung, so that its free end approaches the hand grip 15, it moves the movable jaw 11 away from the stop 16 and, in the initial part of its movement, the jaw is rocked by the action of springs 18 about the line of intersection of surface 17 with the face 12 of jaw 10, until the face 13 of jaw 11 engages the face 12 of jaw 10. The movable jaw then moves over the face of the stationary jaw to the limit of movement of the trigger. When the trigger is released, the springs 18 return the moveable jaw 11 along the face of the stationary jaw 10, until jaw 11 becomes overbalanced along the line of intersection of surface 17 with face 12, after which jaw 11 rocks counterclockwise to engage surface 17 and abut stop 16.

A receptacle 26 for adhesive is mounted on one of the jaws and, in the construction shown, the receptacle is carried by the movable jaw 11. The receptacle comprises a bushing 27 seated in a recess in the top of jaw 11 and closed at its outer end by a cap 28 threaded on the end of the bushing. A small recess 29 formed in jaw 11 extends below the end of bushing 27, and an outlet opening is formed through jaw 11 from the bottom of recess 29 to the face 13. The outlet is normally closed by a valve 30 mounted within the receptacle on one end of a leaf spring 31, the other end of which is secured by a screw 32 to the bottom wall of the recess, in which bushing 27 is seated. The valve 30 has an end 33 smaller than the outlet and, when the valve is closed, as shown in Fig. 4, the end 33 extends beyond face 13. The jaw 10 is provided with a longitudinal channel 34, which is of two different depths, with its shallower portion extending from about the middle of the jaw to the inner end thereof. This channel is in position to receive the projecting end 33 of valve 30.

A pair of cooperating cutting elements are mounted on opposite sides of one of the jaws in such position that one element of each pair is moved relative to the other to effect a cutting action, when the movable jaw rocks to bring its face 13 in contact with face 12 of the stationary jaw. In the device shown, the cutting elements are mounted on the sides of the stationary jaw 10 and each pair comprises a fixed plate 35 secured against the side face of the jaw and a knife member 36 pivotally mounted on the side of the jaw to overlap its associated plate 35. The knife member has a cutting edge 36a on its lower surface. Plate 35 projects beyond the face 12 of jaw 10 to a slight extent and there is a notch 37 serving as a strand stop in the projecting portion of the plate at the outer end thereof. The knife member 36 also projects upwardly above the surface 12 of jaw 10 and its upper edge lies within a longitudinal groove 38 formed along the side edge of the bottom of movable jaw 11.

In the use of the new device to connect the ends of a pair of yarns, the operator holds the device in one hand and inserts the ends of the yarns between the two jaws, as indicated by the lines A, B (Fig. 3). In inserting the yarns, the operator places the yarn A so that its free end A' projects out beyond the jaws at one side and the yarn engages the stop 37 at the opposite side of the jaws. Yarn B is then placed between the jaws in contact with the other stop 37 and with the free end B' projecting out from between the jaws. In this position, the yarns cross at the middle of the stationary jaw above the top of channel 34. The operator then moves trigger

22 clockwise by his finger and this causes the movable jaw 11 to move away from stop 16. In the initial part of its movement jaw 11 rocks clockwise to grip the ends of the yarns between faces 12, 13 of the jaws and, at the same time, the knives 16 swing along the edges of plates 37 and sever the portions of the free ends of the yarn projecting beyond the cutting elements. As jaw 11 approaches the end of its rocking movement, the projecting end 33 of valve 30 engages the bottom of the shallower portion of channel 34, and the valve is pushed out of the outlet, so that a small amount of adhesive is discharged upon the yarns at the point of crossing. As the jaw 11 moves along the face of jaw 10, the ends of the yarns between the jaws are rolled together. Shortly after the movement of jaw 11 along jaw 10 begins, the end 33 of the valve enters the deeper part of channel 34 and the valve is closed by its spring 31. As jaw 11 moves to the limit of its outward movement away from the stop, the rolling together of the ends of the yarns between the jaws continues and the adhesive begins to set.

Upon release of the trigger, jaw 11 is moved back rapidly by the action of springs 18 and the yarns are rolled together in the reverse direction. Ultimately jaw 11 swings away from jaw 10 to release the connected yarns and they are removed from the device. In the backward movement of jaw 11, the end 33 of the valve momentarily engages the bottom of the shallower portion of channel 34 and opens the valve. However, the valve closes again, when jaw 11 starts to rock away from jaw 10 and the sequence of movements occurs so rapidly that little or no adhesive can escape through the outlet during the return movement of jaw 11.

We claim:

1. A strand connecting device, which comprises a stationary jaw and a movable jaw having opposed faces, one of the jaws having a sloping surface at its inner end meeting the face of said jaw along a line transverse to the jaw and the stationary jaw having a stop at its inner end, spring means connecting the jaws and tending to hold the movable jaw against the stop with said sloping surface on one jaw engaging the face of the other jaw and the outer ends of the jaws spread apart, means connecting the jaws near their inner ends and operable to move the movable jaw away from the stop, said jaw, in the initial part of such movement, rocking on said line and then moving with its face parallel to that of the stationary jaw, a vessel for adhesive mounted on one jaw and having an outlet at the face of the jaw and a valve controlling the outlet, and means on the other jaw for opening the valve during the movement of the movable jaw.

2. A strand connecting device, which comprises a stationary jaw and a movable jaw having opposed faces, one of the jaws having a sloping surface at its inner end meeting the face of said jaw along a line transverse to the jaw and the stationary jaw having a stop at its inner end, spring means connecting the jaws and tending to hold the movable jaw against the stop with said sloping surface on one jaw engaging the face of the other jaw and the outer ends of the jaws spread apart, means connecting the jaws near their inner ends and operable to move the movable jaw away from the stop, said jaw, in the initial part of such movement, rocking on said line and then moving with its face parallel to that of the stationary jaw, a vessel for adhesive

mounted on one jaw and having an outlet at the face of the jaw and a valve controlling the outlet, means on the other jaw for opening the valve during the movement of the movable jaw, and cooperating cutting elements on one jaw operable by the other jaw during the movement of the movable jaw.

3. A strand connecting device, which comprises a stationary jaw and a movable jaw having opposed faces, the stationary jaw having a sloping surface at its inner end meeting the face of the jaw along a line transverse to the jaw, a stop at the inner end of the sloping surface on the stationary jaw, spring means connecting the jaws and tending to hold the movable jaw against the stop with the face of the jaw engaging said sloping surface and the outer ends of the jaws spread apart, means connecting the jaws and operable to move the movable jaw away from the stop, the movable jaw, in the initial part of such movement, rocking on said line and then moving with its face parallel to that of the stationary jaw, a vessel for adhesive mounted on the movable jaw and having an outlet at the face of the jaw, a valve controlling the outlet, and means on the stationary jaw for opening the valve during the movement of the movable jaw.

4. A strand connecting device, which comprises a stationary jaw and a movable jaw having opposed faces, the stationary jaw having a sloping surface at its inner end meeting the face of the jaw along a line transverse to the jaw, a stop at the inner end of the sloping surface on the stationary jaw, spring means connecting the jaws and tending to hold the movable jaw against the stop with the face of the jaw engaging said sloping surface and the outer ends of the jaws spread apart, means connecting the jaws and operable to move the movable jaw away from the stop, the movable jaw, in the initial part of such movement, rocking on said line and then moving with its face parallel to that of the stationary jaw, a vessel for adhesive mounted on the movable jaw and having an outlet at the face of the jaw, a valve controlling the outlet, means on the stationary jaw for opening the valve during the movement of the movable jaw, and cooperating cutting elements on one jaw operable by the other jaw during the movement of the movable jaw.

5. A strand connecting device, which comprises a stationary jaw and a movable jaw having opposed faces, the stationary jaw having a sloping surface at its inner end meeting the face of the jaw along a line transverse to the jaw, a stop at the inner end of the sloping surface on the stationary jaw, spring means connecting the jaws and tending to hold the movable jaw against the stop with the face of the jaw engaging said sloping surface and the outer ends of the jaws spread apart, means connecting the jaws and operable to move the movable jaw away from the stop, the movable jaw, in the initial part of such movement, rocking on said line and then moving with its face parallel to that of the stationary jaw, a vessel for adhesive mounted on the movable jaw and having an outlet at the face of the jaw, a valve controlling the outlet, means on the stationary jaw for opening the valve during the movement of the movable jaw, and pairs of cooperating cutting elements mounted on opposite sides of one jaw and operable by the other jaw during the movement of the movable jaw.

6. A strand connecting device, which comprises a stationary jaw and a movable jaw having

opposed faces, the stationary jaw having a sloping surface at its inner end meeting the face of the jaw along a line transverse to the jaw, a stop at the inner end of the sloping surface on the stationary jaw, spring means connecting the jaws and tending to hold the movable jaw against the stop with the face of the jaw engaging said sloping surface and the outer ends of the jaws spread apart, means connecting the jaws and operable to move the movable jaw away from the stop, the movable jaw, in the initial part of such movement, rocking on said line and then moving with its face parallel to that of the stationary jaw, a vessel for adhesive mounted on the movable jaw and having an outlet at the face of the jaw, a valve controlling the outlet, means on the stationary jaw for opening the valve during the movement of the movable jaw, and pairs of cutting elements on opposite sides of the stationary jaw, one element of each pair having a strand stop at its outer end and the other element of each pair being movable by the movable jaw to cooperate with its associated element to effect a cut.

7. A strand connecting device, which comprises a stationary jaw and a movable jaw having opposed faces, the stationary jaw having a sloping surface at its inner end meeting the face of the jaw along a line transverse to the jaw, a stop at the inner end of the sloping surface on the stationary jaw, spring means connecting the jaws and tending to hold the movable jaw against the stop with the face of the jaw engaging said sloping surface and the outer ends of the jaws spread apart, means connecting the jaws and operable to move the movable jaw away from the stop, the movable jaw, in the initial part of such movement, rocking on said line and then moving with its face parallel to that of the stationary jaw, a vessel for adhesive mounted on the movable jaw and having an outlet at the face of the jaw, a valve normally closing the outlet and having a part projecting beyond the face of the movable jaw, the stationary jaw having a longitudinal slot in its face for receiving the projecting part of the valve, and means in the slot engaging said part and opening the valve during the movement of the movable jaw.

8. A strand connecting device, which comprises a stationary jaw and a movable jaw having opposed faces, the stationary jaw having a sloping surface at its inner end meeting the face of the jaw along a line transverse to the jaw, a stop at the inner end of the sloping surface on the stationary jaw, spring means connecting the jaws and tending to hold the movable jaw against the stop with the face of the jaw engaging said sloping surface and the outer ends of the jaws spread apart, a lever connected to the stationary jaw, a link connecting one end of the lever to the movable jaw, the lever being operable through the link to move the movable jaw away from the stop, the movable jaw, in the initial part of such movement, rocking on said line and then moving with its face parallel to that of the stationary jaw, a vessel for adhesive mounted on the movable jaw and having an outlet at the face of the jaw, a valve controlling the outlet, and means on the stationary jaw for opening the valve during the movement of the movable jaw.

9. A strand connecting device, which comprises a stationary jaw and a movable jaw having opposed faces, the stationary jaw having a sloping surface at its inner end meeting the face of the

jaw along a line transverse to the jaw, a stop at the inner end of the sloping surface on the stationary jaw, spring means connecting the jaws and tending to hold the movable jaw against the stop with the face of the jaw engaging said sloping surface and the outer ends of the jaws spread apart, a handle connected to the inner end of the stationary jaw, a lever pivoted on the handle, a link connecting one end of the lever to the movable jaw, the lever being operable through the link to move the movable jaw away from the stop, the movable jaw, in the initial part of such movement, rocking on said line and then moving with its face parallel to that of the stationary jaw, a vessel for adhesive mounted on the movable jaw and having an outlet at the face of the jaw, a valve controlling the outlet, and means on the stationary jaw for opening the valve during the movement of the movable jaw.

10. A strand connecting device, which comprises a stationary jaw and a movable jaw having opposed faces, the stationary jaw having a sloping surface at its inner end meeting the face

of the jaw along a line transverse to the jaw, a stop at the inner end of the sloping surface on the stationary jaw, spring means connecting the jaws and tending to hold the movable jaw against the stop with the face of the jaw engaging said sloping surface and the outer ends of the jaws spread apart, means connecting the jaws and operable to move the movable jaw away from the stop, the movable jaw, in the initial part of such movement, rocking on said line and then moving with its face parallel to that of the stationary jaw, a vessel for adhesive mounted on the movable jaw and having an outlet at the face of the jaw, a spring-pressed valve controlling the outlet and having a part projecting beyond the face of the movable jaw, the stationary jaw having a slot in its face into which said part projects, and means in the slot engaging said part and causing the valve to open during the movement of the movable jaw.

JOHN A. WAUGH.
ROLF WALLIN.