

April 14, 1942.

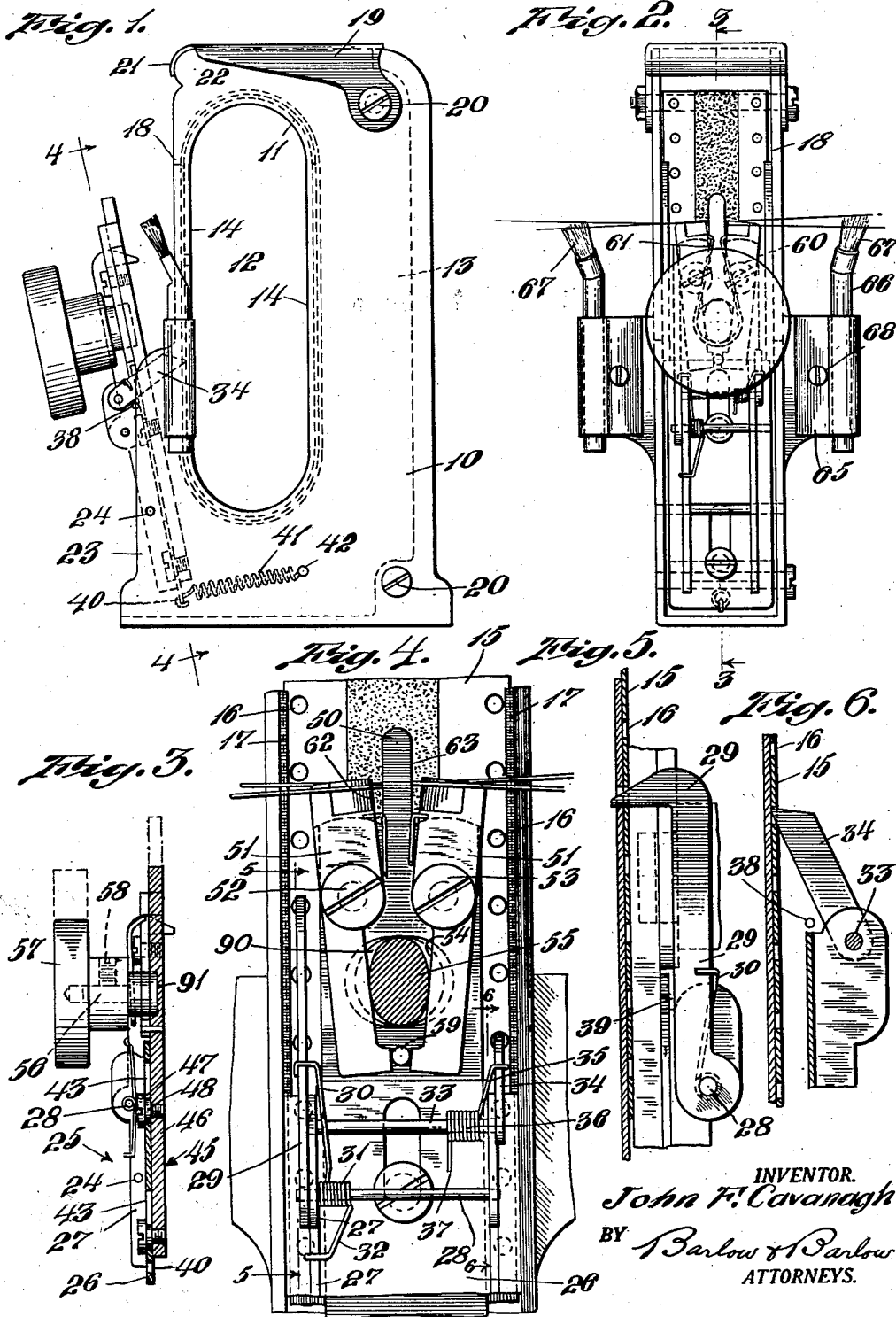
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2,279,299

SPLICER FOR RUBBER THREAD

Filed Nov. 5, 1940

2 Sheets-Sheet 1



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2 Sheets-Sheet 2

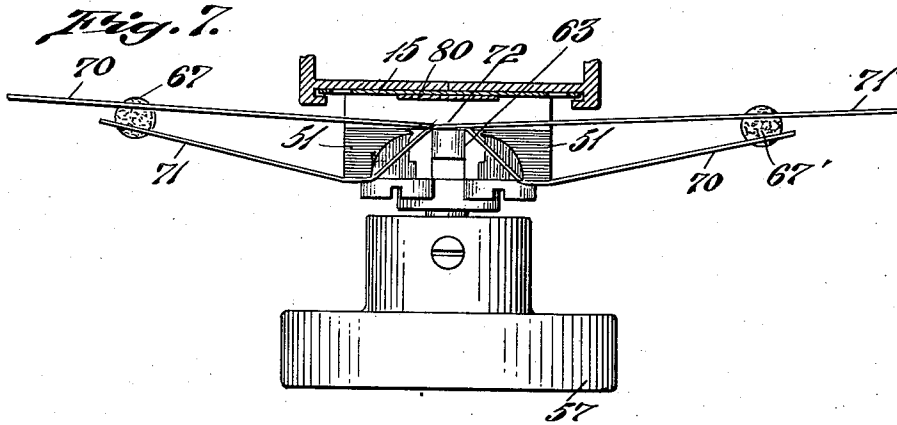


Fig. 9.

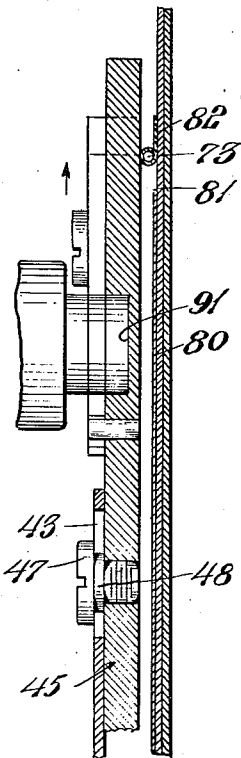


Fig. 8.

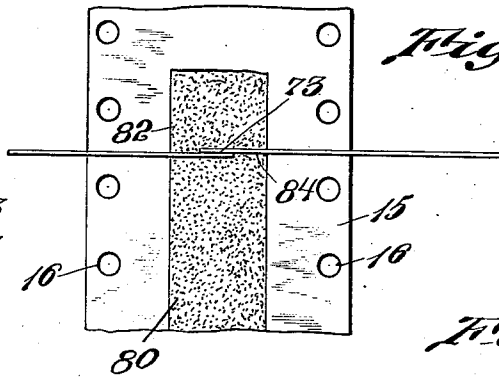


Fig. 10.

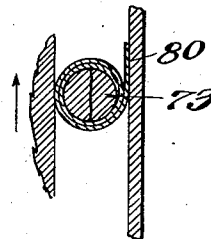


Fig. 11.

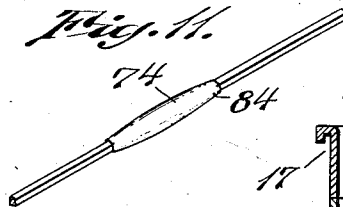
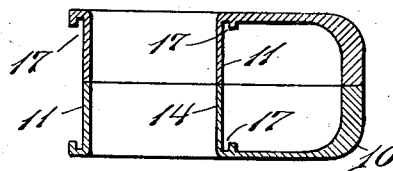


Fig. 12.



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UNITED STATES PATENT OFFICE

2,279,299

SPLICER FOR RUBBER THREAD

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Application November 5, 1940, Serial No. 364,405

11 Claims. (Cl. 28—1)

This invention relates to the splicing, as opposed to knotting, of single strands of rubber known to the trade as rubber thread. The knotting of rubber thread is highly objectionable inasmuch as the knot acts as a snub in passing through guides and needle hooks and furthermore, in most instances, shows up as an imperfection in finished fabrics.

One of the objects of this invention is to effect a union of rubber strand ends which will be sufficiently strong so that these ends will not pull apart as elongation of the yarn occurs.

Another object of the invention is to join the ends without producing an obstruction to the functioning of the rubber yarn in fabrication mechanisms in which the yarn may be used.

A further object of the invention is the provision of a mechanism which will mechanically effect the union of the ends in a rapid and practical manner.

With these and other objects in view, the invention consists of certain novel features of construction, as will be more fully described, and particularly pointed out in the appended claims.

In the accompanying drawings:

Fig. 1 is a side elevation of the device;

Fig. 2 is a front elevation;

Fig. 3 is a section of the slide holder and slide thereon taken substantially on line 3—3 of Fig. 2;

Fig. 4 is an enlarged fragmental sectional view showing the slide carrier and the slide with the operating jaws and the cam for operating the jaws;

Fig. 5 is a fragmental sectional view illustrating the locking pawl in engagement with the film feeder;

Fig. 6 is a fragmental sectional view illustrating the feeding pawl in engagement with the film feeder;

Fig. 7 is a top plan view illustrating the loading of the yarn into the device;

Fig. 8 is an elongated plan view of the relationship of the severed yarn ends in engagement with the film which is to be wrapped about the same just prior to wrapping;

Fig. 9 is a central sectional view illustrating the wrapping of a film about the yarn by rolling the same;

Fig. 10 is a fragmental sectional view illustrating on a larger scale the wrapping of the film about the yarn;

Fig. 11 illustrates the splicing of the yarn ends together;

Fig. 12 is a sectional view through the casing, illustrating the guides for the apron.

I know of no good practical way to join severed rubber thread or strand ends together without knotting them, thus producing by such knotting an enlargement at the point of union which will prevent the thread from passing freely through guides, needle eyes or hooks in which it is used for the formation of fabric. In order that the ends of such rubber or elastic yarn may be joined together, I have provided an arrangement for splicing the ends without knotting and by rolling a thin adhesive film about the ends in such a manner that the ends are reduced and in the finished product no detrimental enlargement of the joined ends occurs, thus permitting the thread to be used in the usual manner for fabrication and providing a junction which is indistinguishable in the finished fabric; and the following is a more detailed description of the present embodiment of this invention, illustrating the preferred means by which these advantageous results may be accomplished:

With reference to the drawings, 10 designates a casing or body portion which is shown of a sufficient size to be convenient to handle and which consists of a shell-like structure formed of some suitable material such as either metal or a plastic. This casing may conveniently be formed in halves, as shown in Fig. 12. The chief function of this body is to provide a convenient support mounting for the yarn holders and for operative parts of the device, also to provide a track 11 for the mounting of the apron which carries the adhesive film. An opening 12 through which the fingers may be passed extends laterally through the body 10 and is closed to the interior 13 of the casing by a wall 14 which extends about the opening 12 and forms a track about which a film feeder 15 of Celluloid is located. The Celluloid film feeder has a highly polished surface with openings 16 spaced along both edges thereof and carries a thin adhesive film 80 such as unvulcanized or only partly vulcanized rubber. This film may be deposited on the Celluloid in a liquid form from which the solvent evaporates. Guides 17 on either side of the track serve to retain the film feeder 15 in snug position against the wall 14 forming the track and also serve to guide the film feeder or apron about the curvature of the track as it moves therealong. These guides are open or stop short as at 18 at the top of the device which enables the film feeder to be removed from and replaced in the device.

Bolts 20 secure the casing halves together. A cover 19 for the casing is hinged on the upper bolt 20 and snaps into engagement with the

curved edge 22 of the casing by reason of a resilient lip 21. The side walls of the casing project forwardly as at 23 and provide a pivotal mounting as by pin 24 for the slide holder designated 25.

This slide holder consists of a plate 26 having flanges 27 through which the pivot pin 24 extends and also provides in an enlarged portion thereof a mounting for the pin 28 upon which the locking pawl 29, to enter an opening 16, is pivotally mounted and swung in one direction by arm 30 of the spring 31; while the other arm 32 of the spring engages the flange 27. The pawl 29 is limited in its forward movement by engagement with the slide holder plate which extends beneath it as shown at 39 in Fig. 5. The flange also supports the pin 33 which pivotally mounts the feed pawl 34 to enter an opening 16 on the other margin of the film feeder which has one arm 35 of the spring 36 forcing that pawl about its pivotal mounting; while the other arm 37 of the spring engages the slide holder. A stop pin 38 limits the forward movement of the pawl 34. An eye 40 serves as connection for spring 41 which is anchored as at 42 in the casing to swing the slide holder about its pivot 24 to the position shown in Fig. 1. The slide holder also has in it slots 43.

The slide is designated generally 45 and consists of a plate 46 which has shouldered bolts 47 fastened into the plate with portions 48 slidable in and guided by the slots 43 and headed to extend over the slide holder so as to form an effective guide for vertical movement of the plate with reference to the slide holder. This plate is cut away at its upper end to provide an anvil 50 protruding beyond the remaining portion of the plate, while upon the plate there are a pair of jaws 51 pivotally mounted as at 52 by means of screws headed as at 53 with the jaws being cut away as at 54 to receive between them the cam 55 of a stub shaft 56 formed between shoulder 90 which receives the jaws. The shaft is received in a recess 91 in the plate and the shaft handle 57 is secured by means of set screw 58. A stop pin 59 is located between the jaws below the cam so as to limit the opening movement of the jaws. The jaws are swung to open position by a bow spring 60 which extends about the cam and shaft with its ends 61 engaging the upper portions of the jaws below cutting edges 62 which are provided to engage the opposite sides 63 of the anvil 50 to move the jaws against the anvil and sever the yarn which may be positioned between the anvil and the jaws.

On either side of the casing, supports 65 are provided in which there are mounted yarn holders 66 consisting of bristles 67 extending upwardly therefrom which serve to effectively frictionally retain the rubber yarn in the operation of the device. These yarn holders may be adjusted as to position by screws 68 serving to clampingly engage the portion 66 and also to provide for an adjustment of the height of the bristles 67.

In operation the device is grasped with the back of the casing against the palm of the hand and the tips of the fingers within the hole 12. Assuming that I wish to splice two end portions 70, 71 of rubber yarn, I will place the end portion 70 through bristles 67, thence along the face 72 of the anvil between side 63 of the anvil and the cutting jaw 51 and thence through the other bristle or yarn holder as at 67'; while the other end portion 71, to the right of Fig. 7, will be

placed through bristles 67', thence across the face of the anvil 72 between the opposite side of the anvil and the opposite cutter 51 and then through the bristles 67 of the other yarn holder. The bristles provide the proper degree of tension in the yarn which may be under some little elongation. The yarn is now loaded into the device for operation thereof. The handle 57 is grasped in the other hand, and turned enough to bind but not sever the yarn, and the slide holder swung to move the yarn across the face of the anvil into engagement with the film 80 on the film feeder, and, as this motion occurs, the handle 57 will be rotated to cause the cam 55 to move the jaws or nippers to cut the yarn between the cutting edges of the nippers and the anvil. Also, as this motion of the slide holder takes place, pawl 34 will engage an opening 16 and move the film upward. Thus, when the face of the anvil engages the film 80, there will remain on the face of the anvil only portions of the yarn overlapping each other the width of the anvil. Also, when this engagement occurs, pawl 29 enters the hole 16 on the other margin of the film feeder and locks it against further movement. Then, by lifting the handle and moving the slide upwardly, the overlapping portions of the yarn at 73 will cause the film to break as at 81, and will roll that portion of the film 82 about the overlapped portions of the yarn and about either side thereof as at 84 (see Fig. 9) so as to provide a spliced joint, while the overlapped portions are in compressed relationship. The upward movement will be sufficient to wrap this film one or two revolutions about the overlapped portion 73 and then by reciprocating slide downwardly and upwardly one or two times a very firm union occurs and a splice results such as designated as at 74, as shown in Fig. 11.

The length of movement of slide 45 is such that the distance the pair of threads roll along film feeder 15 is greater than the distance said film feeder moves in the feeding operation. This insures the complete utilization of the amount of rubber film supplied to the threads in such film-feeding operation.

I claim:

1. In a splicer, a carrier for a thin film of material, a film carried thereby, mechanical means for holding a pair of thread end portions in predetermined overlapped relation and moving the same into engagement with said film, said means being mounted for sliding movement to wrap the film about the end portions when moved into engagement therewith.

2. In a splicer, a carrier for a thin film of material, a film carried thereby, means for holding the thread and severing the same to provide portions in overlapping relation, said means being mounted for movement to roll the film about the overlapped ends of thread.

3. In a splicer, retaining means for the end portions of thread in proximity to each other, means for severing the thread end portions while retaining some portions in overlapping relation, a carrier for a thin film of material, a film carried thereby, and means for moving said overlapped end portions of the thread into contact with said film and rolling the end portions to wrap the film about said overlapped end portions.

4. In a splicer, a carrier for a thin film of material, a film carried thereby, a rockably-mounted slide holder to swing toward and from said film, a slide in said holder to move generally

lengthwise of said film, means on said slide for receiving and severing the thread end portions to provide the portions in predetermined overlapping relation, said threads being movable into contact with said film by swinging the holder, and then by moving the slide, roll the film about the overlapped ends.

5. In a splicer, friction means for retaining the end portions of thread in proximity to each other, means for severing the end portions while retaining some portions in overlapping relation, a carrier for a thin film of material, a film carried thereby, and means for moving said overlapped end portions of the thread into contact with said film and rolling the end portions to wrap the film about said overlapped end portions.

6. In a splicer, bristles for retaining the end portions of thread in proximity to each other, means for severing the end portions while retaining some portions in overlapping relation, a carrier for a thin film of material, a film carried thereby, and means for moving said overlapped end portions of the thread into contact with said film and rolling the end portion to wrap the film about said overlapped end portions.

7. In a splicer, a body, a carrier apron provided with a film of adhesive material, a pair of friction-gripping thread retainers, one on either side of said body and apron, a rockably-mounted slide holder to swing toward and from said apron, a pawl carried by said holder to engage and feed said apron upon reciprocation of the holder toward and from the apron, a slide in said holder provided with an anvil, a pair of jaws mounted on said slide, and when open receptive to thread end portions extending in opposite directions across the front of the anvil and between the anvil and the jaws, a cam to move the jaws to sever the threads between the anvil and jaws to leave the portion of the threads across the front of the anvil in overlapped relation, said portions

being movable into engagement with the film and by movement of the slide to roll the the thread and cause the film to wrap about the thread ends.

8. In a device for splicing rubber threads, a movable adhesive carrier, means for holding in overlapped relation and under predetermined tension a pair of rubber threads, said means being adapted to carry said overlapped threads into contact with said adhesive carrier for the purpose of applying adhesive to said overlapped threads and means to feed said adhesive carrier a predetermined distance between adhesive applications.

9. In a device of the character described, means for holding a pair of overlapped thread ends, an adhesive carrier in the form of a flexible strip having a width greater than the length of the overlap of said threads, means for bringing said thread holding means into engagement with said carrier for the purpose of applying adhesive to said overlap and means for moving said adhesive carrier a predetermined distance between each adhesive applying operation.

10. In a device of the character described, an adhesive carrier consisting of a strip of flat flexible material, means for feeding said adhesive carrier in step-by-step movement at predetermined intervals, and means to move overlapped thread end portions into engagement with the adhesive carrier.

11. In a device of the character described, means for applying a film of adhesive to a pair of overlapped thread ends, said means consisting of a flexible tape-like member adapted to carry coagulated film on its surface and to be moved in linear direction through predetermined spacings at predetermined intervals, and means to move overlapped thread end portions into engagement with the adhesive carrier.

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