March 22, 1932. A. E. COLLINS 1,850,706

APPARATUS FOR APPLYING REENFORCING TAPES TO SEAMS

Filed Oct. 23, 1929 4 Sheets-Sheet 1

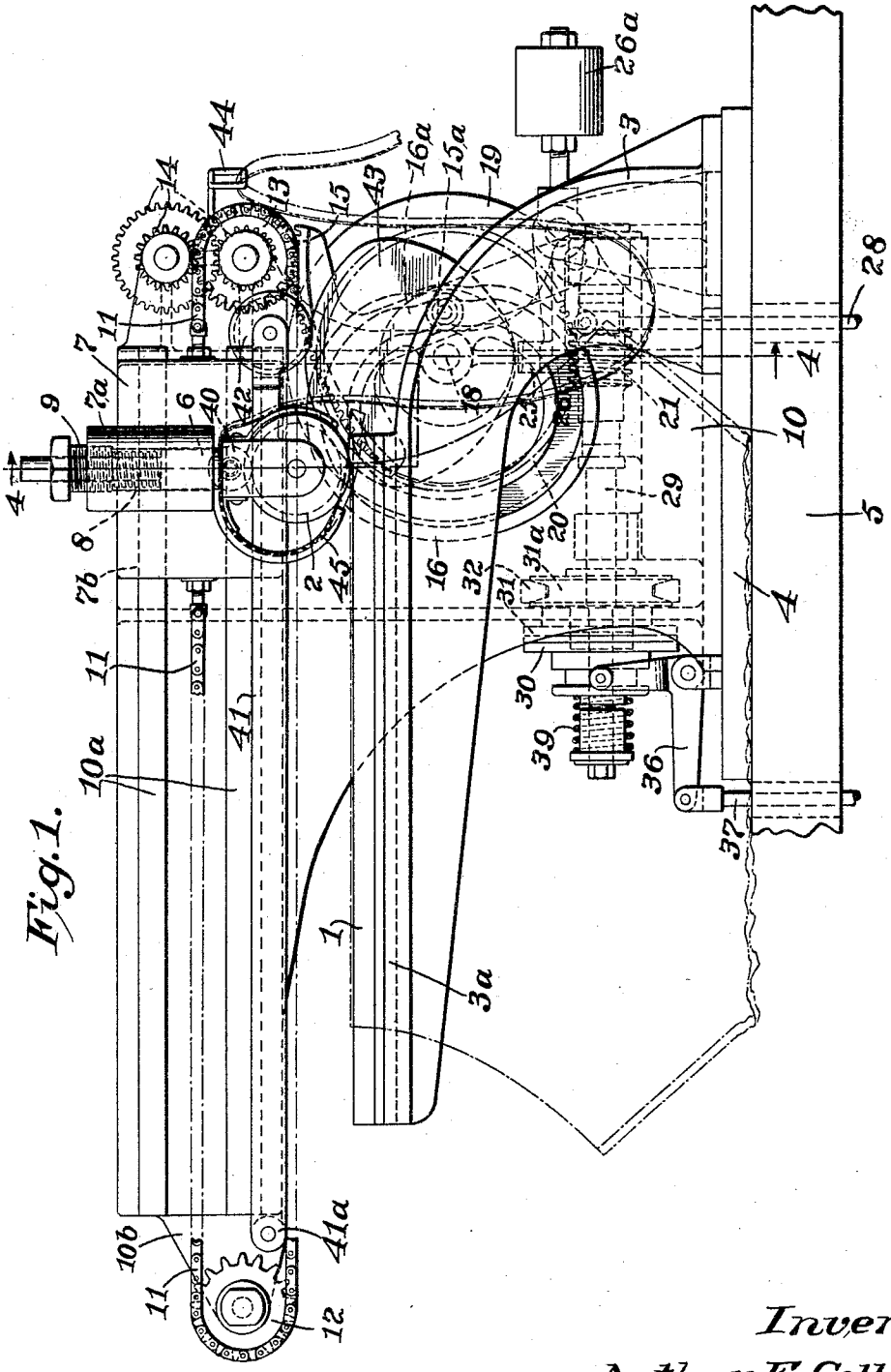


Fig. 1.

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APPARATUS FOR APPLYING REENFORCING TAPES TO SEAMS

Filed Oct. 23, 1929 4 Sheets-Sheet 2

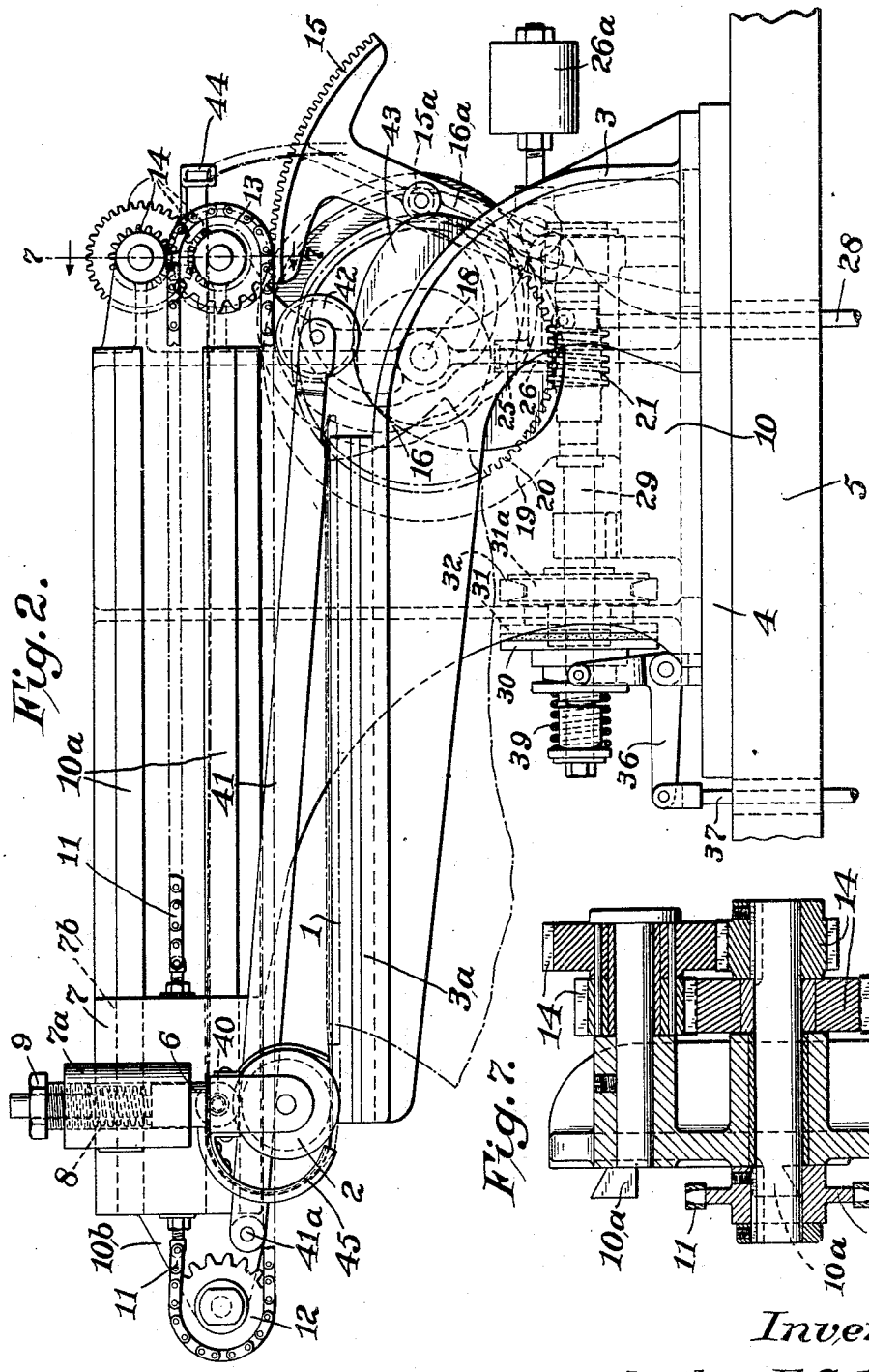


Fig. 2.

Fig. 7.

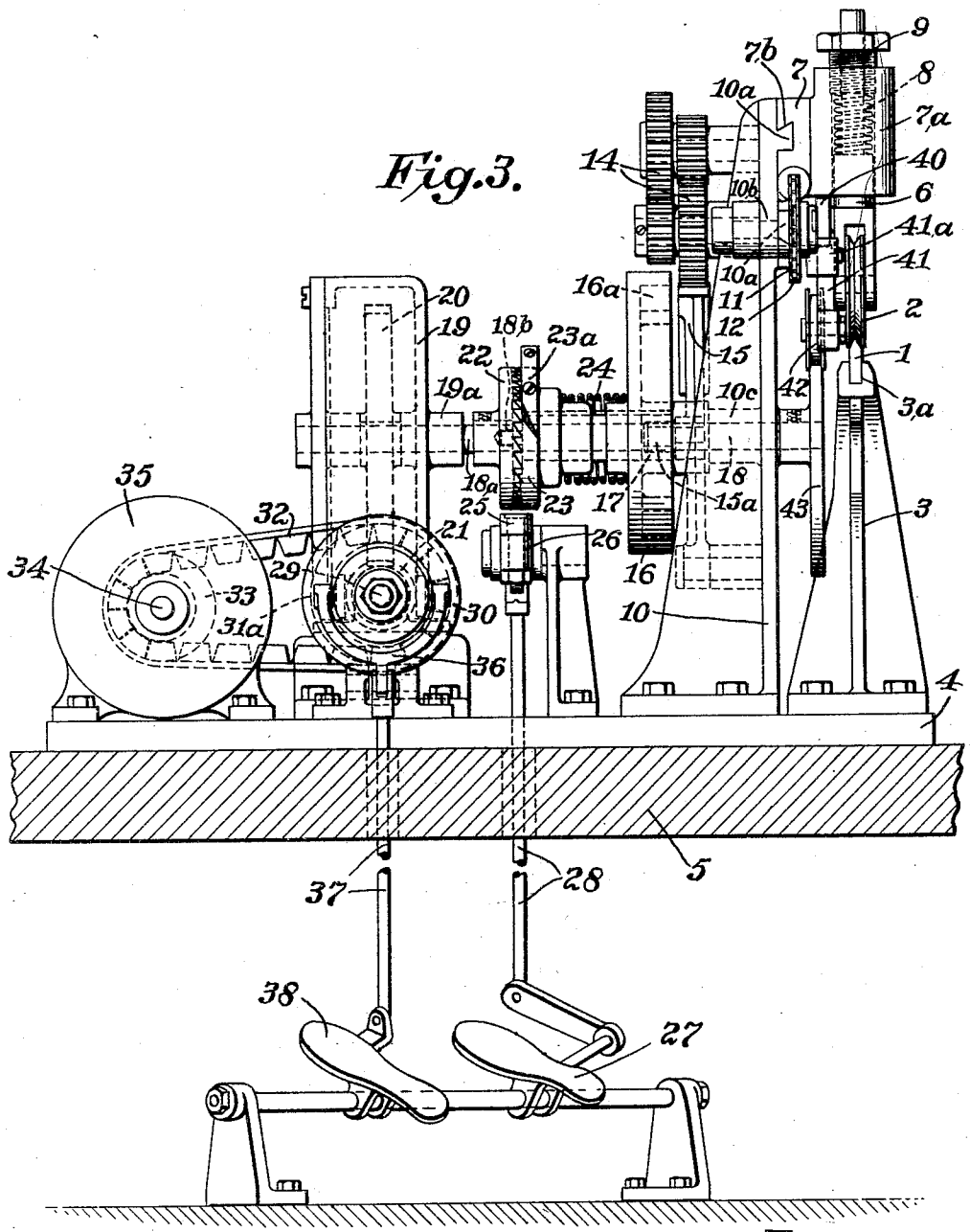
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APPARATUS FOR APPLYING REENFORCING TAPES TO SEAMS

Filed Oct. 23, 1929 4 Sheets-Sheet 3

Fig.3.



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APPARATUS FOR APPLYING REENFORCING TAPES TO SEAMS

Filed Oct. 23, 1929 4 Sheets-Sheet 4

Fig. 6.

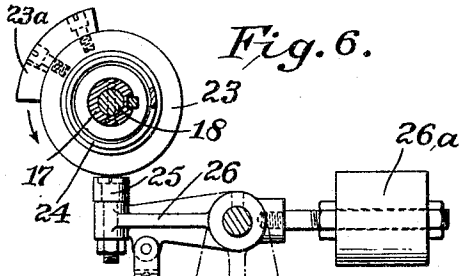


Fig. 4.

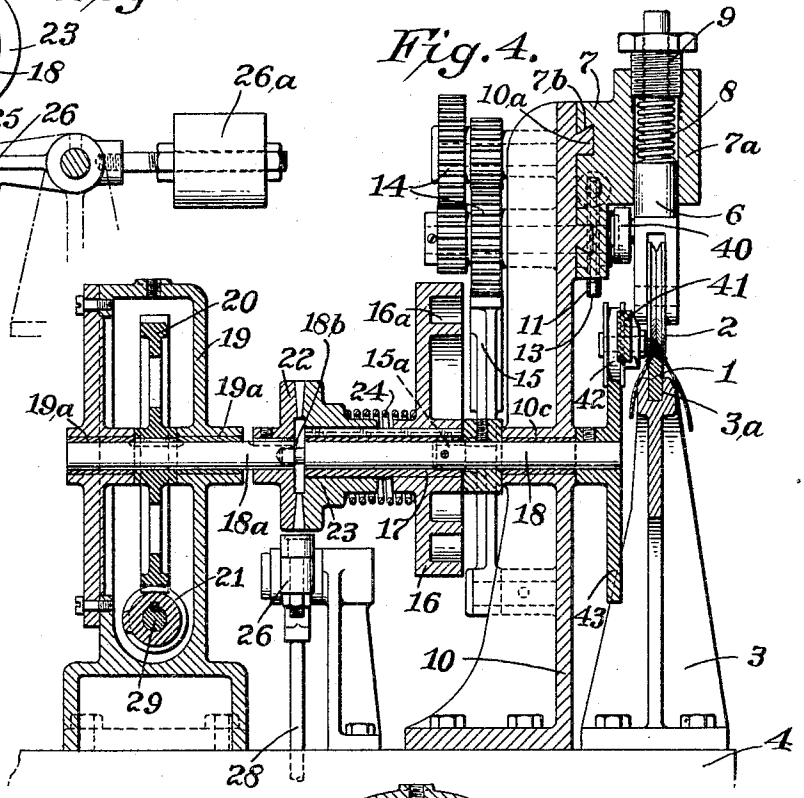
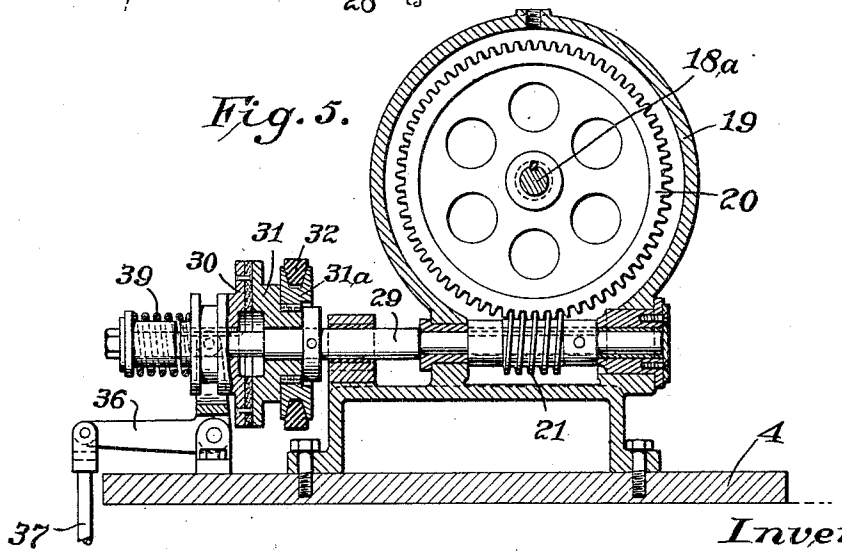


Fig. 5.



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Patented Mar. 22, 1932 1,850,706

UNITED STATES PATENT OFFICE

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APPARATUS FOR APPLYING REENFORCING TAPES TO SEAMS

Application filed October 23, 1929. Serial No. 401,953.

My present invention relates to an improved means for applying a reenforcing strip, tape, or ribbon to the seams of sheets, and is designed more particularly for applying strips or tapes of unvulcanized rubber or rubberized material to the seams of sheet rubber articles which seams are usually made by the "cut together" method.

The invention aims to provide a machine or apparatus by which such strips may be expeditiously applied and caused to be firmly affixed or "welded" to the seam.

The invention further aims to provide a machine which will be as nearly automatic in its action as is practicable, and one in which the tape or strip will be automatically fed and accurately alined and applied.

The invention further aims to provide a machine which will be automatic in its cycle of operation but may be manually arrested at any point at the will of the operator.

The invention further aims to provide a machine having a work supporting arm positioned for convenient and expeditious placement of the seamed sheet, and one in which presser roll mechanism will apply and roll down the tape or strip, dwell at the end of the rolling down operation to permit the operator to sever the tape, and will return to initial position out of contact with the work and remain at rest to enable the operator to remove the reenforced sheet and replace it with a fresh one.

With these and other objects in view, the invention includes in the novel arrangement and combination of parts as hereinafter described, the invention being defined by the appended claims.

In the drawings wherein similar characters of reference apply to similar parts throughout:

Figure 1 is a front view of the machine with the parts in a normal position of rest, and showing an article to be reenforced in place upon the bar.

Fig. 2 is similar to Fig. 1, but showing the pressure wheel as having made its path of travel to roll down or weld on the ribbon reenforcing strip, and dwelling momentarily at the end of said travel, before returning to normal position.

Fig. 3 is an end elevation of the machine.

Fig. 4 is a vertical sectional view on the line 4—4 of Fig. 1.

Fig. 5 is a vertical sectional view along the line of worm shaft 29.

Fig. 6 is a detail view of the automatic trip mechanism.

Fig. 7 is an enlarged sectional view on line 7—7 of Fig. 2.

In these drawings, the numeral 1 designates a work supporting anvil member or bar, accurately machined and formed preferably with an inverted V-shape ridge on its upper edge, to receive the article to be reenforced, said upper edge cooperating with a traveling pressure wheel 2, which moves in a path across the article, under pressure, to apply and weld the reenforcing strip thereto, and is lifted out of contact upon its return movement.

The bar 1 is fixed in the grooved upper edge 3*a* of a forwardly projecting supporting bracket 3, which is fastened to a base plate 4, and this in turn is fastened to a table or bench 5 which may support a series of such machines.

The pressure wheel 2 is a female V-shape to conform to the male shape of the bar 1 for cooperation therewith, and is journaled in the lower end of spring-pressed roll carrier or stem 6, which is mounted in a suitable boss 7*a* formed on the front of a slide or cross-head 7. Tension of the spring 8 may be varied by the threaded nipple 9 adjustable in the boss 7*a*.

While I have shown and described the pressure wheel and bar as of V-shape, it will be understood that I do not limit myself to this precise shape.

Slide or cross-head 7 is slidably mounted on a large main guide or bracket 10 supported on the base plate 4 and is provided with dove-tailed grooves 7*b* across its back, to engage corresponding ribs 10*a* extending the full length of the bracket 10.

Movement to the slide or cross-head, carrying the pressure wheel 2, is imparted by means of a chain 11 attached to the forward

edge of the cross-head and extending over a sprocket 12 mounted on an extension 10*b* of the main bracket 10, and thence in a horizontal stretch to the opposite side of the bracket where it passes around a sprocket 13 suitably mounted, and back to the rear edge of the cross-head 7. This in turn is driven, first in one direction, and then in the other, by a train of spur gears 14, utilized to increase the movement of drive, from a gear sector 15, pivotally mounted on the main bracket 10. This gear-sector, in turn, is moved forward and back by a face cam 16 provided with a properly shaped groove 16*a* to impart the necessary motion to the roller 15*a* mounted on the sector.

The cam 16 is keyed to a sleeve 17 which is pinned to a shaft 18 suitably mounted in an elongated bearing 10*c* of bracket 10, and having its other end reduced to enter a bearing 18*b* formed in the end of aligned shaft 18*a* journaled in bearings 19*a* of the housing 19 for the worm drive gearing 20—21.

An automatic clutch mechanism is provided between the worm drive 20—21 and the cam 16 which regulates the cycle of operations, and this consists of the clutch member 22 fixed to the shaft 18*a*, and the movable clutch member 23 splined on the sleeve 17, which is normally pressed into engagement with its companion by the spring 24 to be rotated thereby. On the periphery of the clutch member 23 is positioned the cam-tooth 23*a*, which in the rotation of the member 23 will come around into the plane of a roller 25 mounted on a pivoted arm 26, to be retracted thereby, and effect disengagement of the clutch, to stop the cycle of operations.

The roller 25 may be pulled down from engagement with the cam-tooth 23*a* at the will of the operator, by movement of a foot pedal 27 connected to the arm 26 by rod 28, to repeat the cycle of operation, but is held up to its work by counterweight 26*a*.

Worm 21 is carried on a shaft 29 with bearings in the gear-housing 19 and this shaft is extended from one side of the housing, and has splined thereon the slidable member 30 of a friction clutch, the other member 31 of which is loosely mounted on said shaft, and has formed therewith a pulley 31*a* driven by a V-belt 32 from a pulley 33 fixed to the shaft 34 of the motor 35, mounted on the base plate 4.

This clutch 30—31 may be disengaged as required by the operator, through bell-crank 36 and rod connection 37 to a separate foot pedal 38, it being understood from the drawings that the sliding member 30 of the clutch is normally pressed into working engagement with its companion by the spring 39.

Referring to the pressure wheel 2, it will be understood that this wheel must exert proper pressure on the article being reenforced to effectually weld the ribbon reenforcing strip thereto, but on its return idle movement, it is desirable to raise said pressure wheel clear of the work. My preferred means of accomplishing this is to provide a roller 40 mounted on one side of the stem 6 carrying the pressure wheel 2 which roller is positioned to ride along the upper edge of a rail or bar 41 pivoted at one end 41*a* and having mounted thereon, at its other end, a roller 42 to be raised and lowered by a cooperating cam 43, fixed on the front end of the shaft 18, and of such shape as to effect the lowering of the bar 41 on the working travel of the pressure wheel 2 across the work piece, and a raising thereof on the return or idle travel of said wheel 2.

Associated with the presser roll is a strip or ribbon guide 45 of approximately semi-circular shape having its upper end located above the roll and its lower end terminating in proximity to the point of contact of the roll and work supporting bar, this guide being affixed to the roll carrier. A strip or ribbon guide or eye 44 is placed at the rear end of the machine to one side of a vertical plane passing through the bar 1.

Suitable guards may be placed about the pressure wheel and gearing to protect the operator.

The ribbon may be fed into the machine by special ribbon feed mechanism if desired, or from loosely piled supply trays, not shown.

As shown in Fig. 1, the parts are in normal position of rest, and the article to be reenforced (such as "teddy pants"), is placed upon the bar 1 with the seam lined up on the edge of the bar. The reenforcing ribbon has been threaded through the eyelet 44 and around guide 45 to bring its end into proper position for application to the seam.

Now upon release of the clutch 23 by the operator, the pressure wheel 2 will perform a complete cycle of operation, first, traveling under pressure, across the work piece and applying and rolling down the strip or tape; second, dwelling momentarily at the end of this travel, to permit the operator to sever the tape manually (Fig. 2), and third, returning to normal position of rest, but with released pressure, due to the elevated position of the bar 41 controlled by cam 43.

During the forward movement, the slack of the tape is drawn around guide 45 by which it is directed to proper position on the seam and a like additional amount is drawn through guide 44. On the return movement, this additional portion of tape between guides 44 and 45 drops down in the shape of a slack loop to one side of bar 1 by reason of the laterally displaced position of the eye 44 and on the next forward movement this slack portion is drawn around the guide 45 by reason of the application of the tape to the seam and so on until the tape is exhausted or the operator ceases operations.

During the dwell in the traveling movement of the roll 2 the latter is raised from contact with the reenforced seam and it is during this period that the severing takes place, the operator drawing the article forward on support 2 to produce a slight slack in the tape and snipping the tape at the end of the seam with a pair of shears.

After the roll has returned to initial position and a fresh article placed on bar 2 the operator presses the end of the tape, which has been carried back by the guide, down onto the edge of bar 2 adjacent the rear end of the seam, whereupon the above described tape applying operation is repeated.

Having thus described my invention, what I claim is:

1. Apparatus for applying an adhesive surface strip to a seamed sheet comprising a fixed substantially horizontal supporting bar, a guide adjacent the same, a slide member carried by said guide, a roller supported by said slide member, said roller having a grooved periphery, and said bar a coacting edge of corresponding male formation, means for reciprocating said slide, and means for holding said roller elevated during movement in one direction and depressed into contact with the work on the bar on movement in the other direction.

2. Apparatus for applying an adhesive surface strip to a seamed sheet comprising a fixed substantially horizontal supporting bar, a guide adjacent the same, a slide carried by said guide, a vertically movable roll carrier supported by said slide, spring means tending to depress said roll carrier, a roll carried by said roll carrier having a grooved periphery, said supporting bar having its upper edge of male formation to substantially correspond to the groove in the roll, means for reciprocating said slide member, and means for holding said roll carrier elevated against the action of the spring during its movement in one direction.

3. Apparatus for applying an adhesive surface strip to a seamed sheet comprising a fixed substantially horizontal supporting bar, a guide adjacent the same, a slide carried by said guide, a vertically movable roll carrier supported by said slide, spring means tending to depress said roll carrier, a roll carried by said roll carrier having a grooved periphery, said supporting bar having its upper edge of male formation to substantially correspond to the groove in the roll, means for reciprocating said slide member, and means for holding said roll carrier elevated against the action of the spring during its movement in one direction comprising abutment means on the roll carrier, a rail underlying said abutment means, and means for raising and lowering said rail in synchronism with the reciprocation of the slide.

4. Apparatus for applying an adhesive surface strip to a seamed sheet comprising a fixed substantially horizontal supporting bar, a guide adjacent the same, a slide carried by said guide, a vertically movable roll carrier supported by said slide, spring means tending to depress said roll carrier, a roll carried by said roll carrier having a grooved periphery, said supporting bar having its upper edge of male formation to substantially correspond to the groove in the roll, means for reciprocating said slide member, and means for holding said roll carrier elevated against the action of the spring during its movement in one direction comprising abutment means on said roll carrier, a rail articulated at one end to a fixed pivot and underlying said abutment means, and means for raising and lowering the opposite end of said rail in synchronism with the movement of the slide.

5. Apparatus for applying an adhesive surface strip to a seamed sheet comprising a substantially horizontal supporting bar and a coacting presser roll, said roll having a channeled periphery and said bar a supporting edge of corresponding male formation, means for causing said roll to move along said bar in one direction in contact with the work supported on the bar, means for causing the roll to move in the opposite direction out of contact with said work, and a strip guide encircling the forward side of said roller, and movable in unison therewith.

6. Apparatus for applying an adhesive surface strip to a seamed sheet comprising a fixed substantially horizontal supporting bar, a guide adjacent and parallel to said bar, a slide carried by said guide, a roll carrier supported by said slide, spring means tending to depress said roll carrier, a roll carried by said carrier coacting with said supporting bar, a rail having one end articulated to said slide at the front end, an abutment on the roll carrier overlying said rail, sprockets journaled at opposite ends of said roll carrier, a chain passing around said sprockets and connected to said slide, means for causing said chain to travel alternately in opposite directions to impart reciprocating movement to the slide, and means for raising and lowering the free end of said rail.

7. Apparatus for applying an adhesive surface strip to a seamed sheet comprising a fixed substantially horizontal supporting bar, a guide adjacent and parallel to said bar, a slide carried by said guide, a roll carrier supported by said slide, spring means tending to depress said roll carrier, a roll carried by said carrier coacting with said supporting bar, an arc shaped strip guide partially encircling said roll and having a terminal end adjacent the point of contact of the roll with the work supporting bar, a rail having one end articulated to said slide at the front end, an abutment on the roll carrier overlying said rail, sprockets journaled at opposite ends

of said roll carrier, a chain passing around said sprockets and connected to said slide, means for causing said chain to travel alternately in opposite directions to impart reciprocating movement to the slide, and means for raising and lowering the free end of said rail.

8. Apparatus for applying an adhesive surface strip to a seamed sheet comprising a fixed substantially horizontal supporting bar, a guide adjacent and parallel to said bar, a slide carried by said guide, a roll carrier supported by said slide, spring means tending to depress said roll carrier, a roll carried by said carrier coacting with said supporting bar, a rail having one end articulated to said slide at the front end, an abutment on the roll carrier overlying said rail, sprockets journaled at opposite ends of said roll carrier, a chain passing around said sprockets and connected to said slide, a gear connected with one of said sprockets, an oscillating gear segment engaging said gear, cam means for oscillating said gear segment, and cam means for raising and lowering the free end of said rail.

9. Apparatus for applying an adhesive strip to a seamed sheet comprising a forwardly projecting sheet supporting bar, a presser roller arranged to travel lengthwise of the bar above the same, means for causing said roll to travel forward in contact with the work on the bar and backward out of contact therewith, an arc-shaped strip guide in advance of said roller and movable therewith, and a strip guide adjacent the rear end of said arm.

10. Apparatus for applying an adhesive strip to a seamed sheet comprising a forwardly projecting sheet supporting bar, a presser roller arranged to travel lengthwise of the bar above the same, means for causing said roll to travel forward in contact with the work on the bar and backward out of contact therewith, an arc-shaped strip guide in advance of said roller and movable therewith, and a strip guide adjacent the rear end of said arm, and arranged at one side of a vertical plane passing through said arm.

11. Apparatus for applying a reenforcing strip to a seamed rubber article, said apparatus comprising a stationary ridged anvil member adapted to align and support the article along the seam thereon, a complimentary strip-applying roller adapted for progressive cooperation therewith, and means for propelling said roller along said anvil.

12. Apparatus for applying a reenforcing strip to a seamed rubber article, said apparatus comprising a stationary ridged anvil member adapted to align and support the article along the seam thereof, a complementary strip-applying roller adapted for progressive cooperation therewith, means for propelling said roller along said anvil in engagement with the article, and means for automatically returning said roller out of engagement with the article.

13. Apparatus as defined by claim 12 including means for determinately arresting movement of the roller between its forward and return movements.

14. Apparatus for applying a reenforcing strip to a seam of a tubular rubber article, said apparatus comprising an open-ended stationary frame member, a ridged anvil member supported thereby and adapted to extend within the article to support the same, a complementary strip-applying roller adapted for progressive cooperation therewith, and means for propelling said roller along said anvil.

In testimony whereof, I affix my signature.

ARTHUR E. COLLINS.