July 17, 1951 B. BOERSMA ET AL 2,560,923

MACHINE FOR MANUFACTURING BINDING TAPES OR TIES

Filed May 2, 1949 4 Sheets-Sheet 1

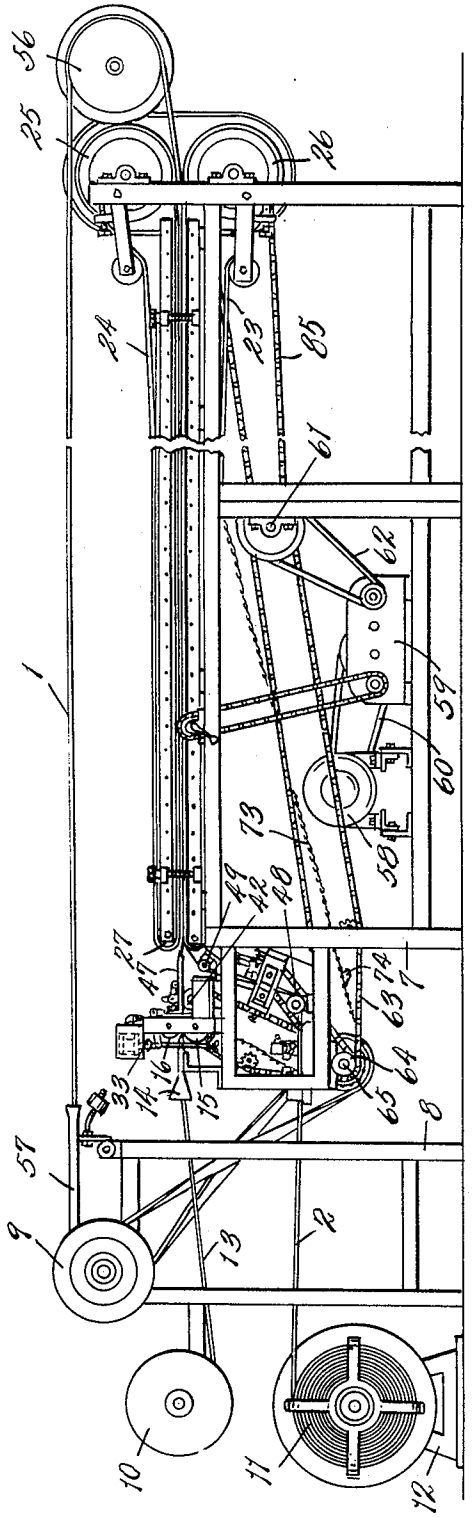


FIG. 1

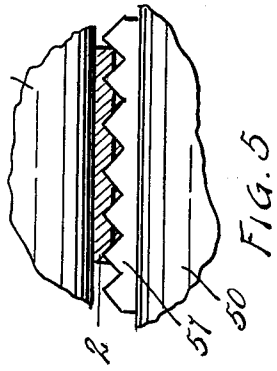


FIG. 5

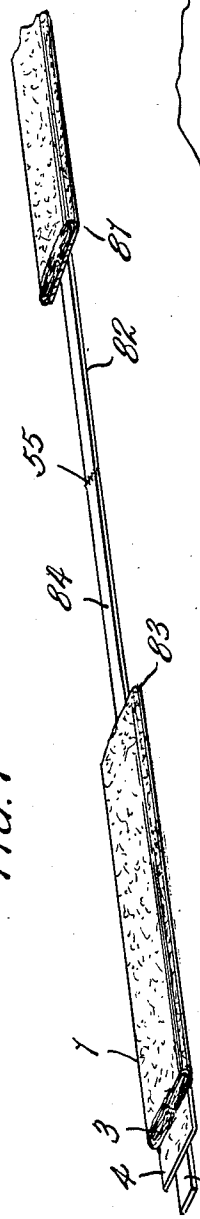


FIG. 6

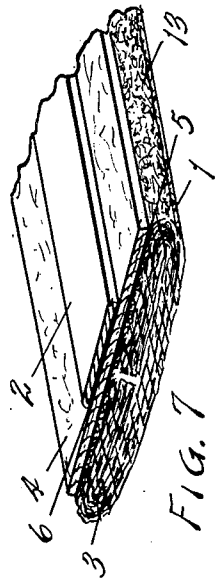


FIG. 7

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MACHINE FOR MANUFACTURING BINDING TAPES OR TIES

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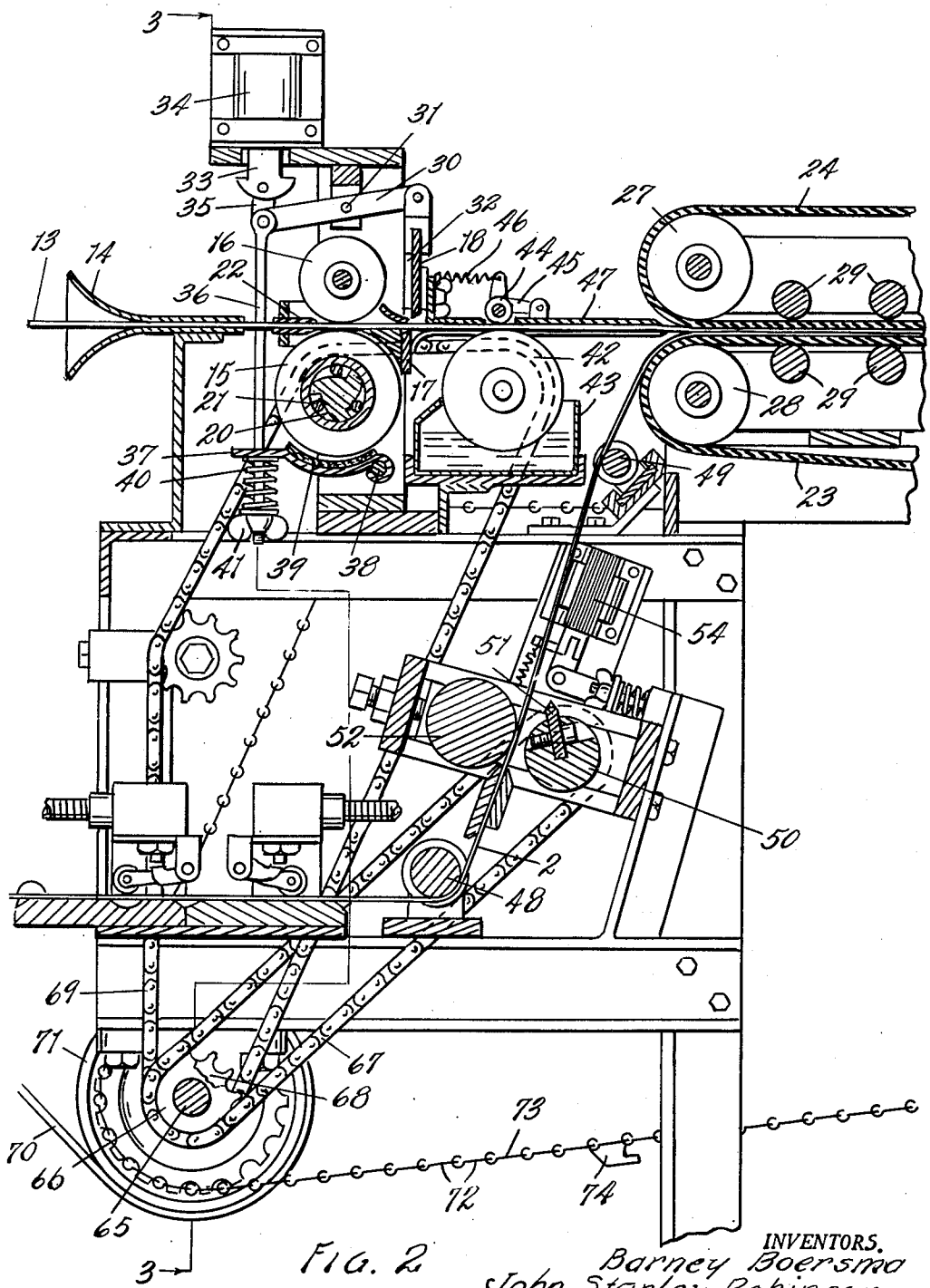


FIG. 2

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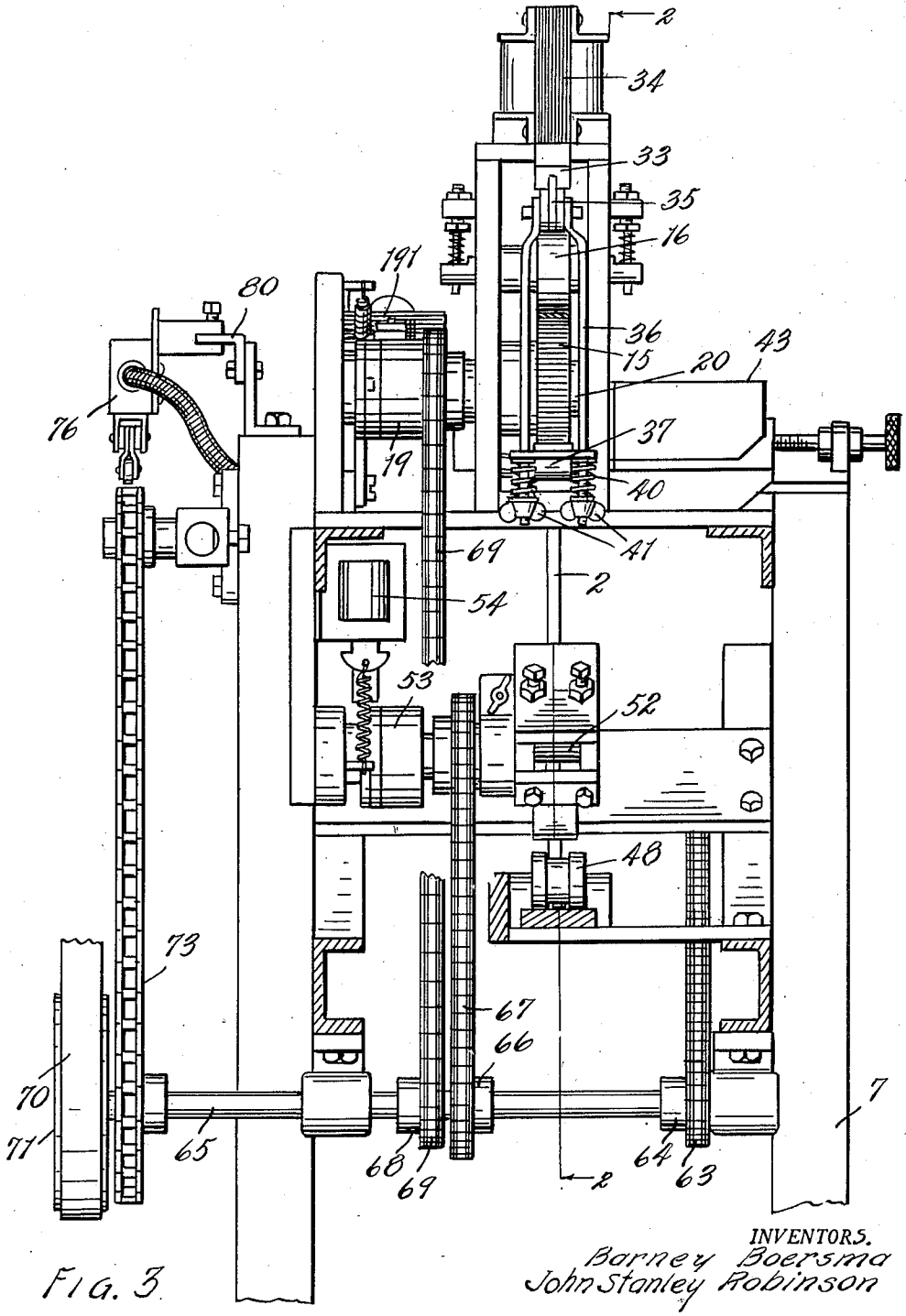


FIG. 3

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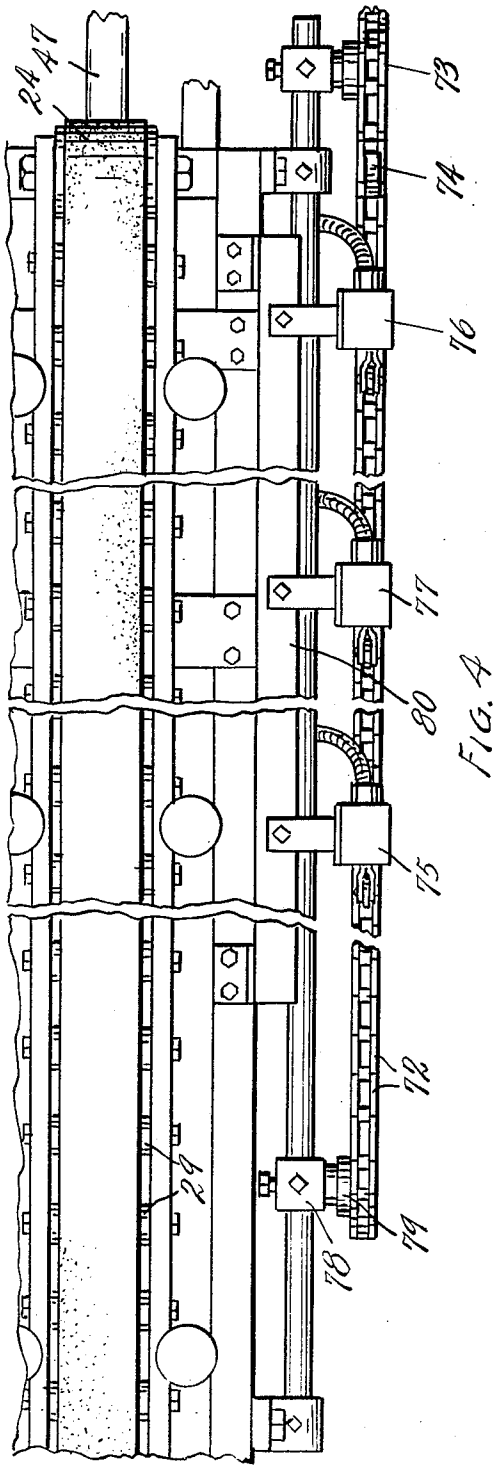


FIG. 4

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UNITED STATES PATENT OFFICE

2,560,923

MACHINE FOR MANUFACTURING BINDING TAPES OR TIES

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Application May 2, 1949, Serial No. 90,792

19 Claims. (Cl. 154—1.6)

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This invention relates to a machine for manufacturing binding tapes or ties comprising metal strands provided with padding.

The main objects of this invention are:

First, to provide a machine for manufacturing binding tapes or ties comprising a metal ribbon or flat metal strand and a padding adhered thereto, the tape being produced as a continuous strip which may be readily divided into tie sections of predetermined length, portions of the end of the metal strand for each tie section being without padding to facilitate tying.

Second, to provide a machine of the character described for producing binding tape or ties of this character which is largely automatic in its operation, requiring a minimum of manual attention.

Third, to provide a machine having these advantages which is quite economical to produce, is of large capacity and produces a very uniform product.

Objects relating to details and economies of the invention will appear from the description to follow. The invention is defined and pointed out in the claims.

A preferred embodiment of the invention is illustrated in the accompanying drawing, in which:

Fig. 1 is a fragmentary side elevational view of a machine embodying our invention, certain parts being shown conventionally.

Fig. 2 is an enlarged fragmentary longitudinal section on a line corresponding to line 2—2 of Fig. 3.

Fig. 3 is a fragmentary end elevational view, certain parts being omitted to better disclose other parts.

Fig. 4 is a fragmentary plan view.

Fig. 5 is an enlarged fragmentary view showing details of the scoring means for the metal element of the tape.

Fig. 6 is a fragmentary perspective view of the finished tape produced by the machine illustrated.

Fig. 7 is an enlarged fragmentary perspective sectional view thereof.

The machine of our invention is especially designed for making a binding tape, designated generally by the numeral 1, comprising a metal ribbon or strand element 2, a padding element 3, and a backing strip 4 of paper interposed between the metal strand and the padding. The backing strip 4 is adhered to the padding as indicated at 5. The metal element is adhered to the backing as indicated at 6. The padding 3 is desirably formed of multiply tissue folded longitudinally upon itself.

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The binding tapes or ties are well adapted for use in binding or tying objects which have a finished surface which it is desired to protect such, for example, as the doors of refrigerators, the doors and drawers of stoves. The padding and the backing in effect constitute a padding element adhesively secured to the metal strip or ribbon.

In the embodiment of our invention illustrated the frame, designated generally by the numeral 7, is designed to support the various operating parts, a supplemental frame 8 being disposed at the front thereof to support the winding reel 9 for the finished tape and the padding supporting reel or spool 10. The spool or reel 11 for the metal strand element 2 is supported on a separate pedestal 12 in the embodiment illustrated. The details of these frames or supports are not illustrated and will not be described except as to the particular parts which it may be desirable to refer to for convenience in description.

As stated, in the structure illlustrated the padding element, designated generally by the numeral 13, comprises the padding 3 and the backing strip 4 and is fed through the guide 14 by means of the coacting feed rollers 15 and 16 to a cutter comprising the shear bar 17 and the cutter blade 18. The feed roller 15 is a driven roller driven by the one-revolution clutch 19, the details of which are not illlustrated. The driven shaft 20 for the roller 15 is connected to the roller by a one-way or overrunning clutch 21, best shown in Fig. 2, this being of a standard type. The solenoid 191 controls the clutch 19.

A guide 22 is arranged just in front of the bight of the rollers 15 and 16 to effectively support the padding element at that point. This one-way or overrunning drive connection for the roller permits the free revolution of the roller when the one-revolution clutch 19 is disengaged so that the feed and pressure belts 23 and 24 may feed the padding element or draw it through the feed rollers. These feed and pressure belts are supported and driven at their rear ends by opposed rollers 25 and 26, the belts being supported at their front ends by the rollers 27 and 28. These rollers are so arranged that the adjacent reaches of the belts travel rearwardly in parallel relation, the reaches being supported by a series of backing rollers 29. They are driven at the same speed and they serve as driving or feed means as well as pressure means.

The padding element is, as stated, fed by the feed rollers 15 and 16 to the cutter, the blade 18 of which is mounted on the arm 30 pivoted at 31, the blade reciprocating in suitable guides 32. The arm 30 is connected to the armature 33 of

the solenoid 34 by means of the link 35. This link is also connected to the brake rod 36 which passes through the brake shoe 37 pivotally mounted at 38 and having a facing 39 coacting with the driven roller 15. A spring 40 is provided on the brake rod between the brake and the thrust nut 41 so that the brake is yieldingly applied. The purpose of this drive mechanism is to provide an intermittent feed for the padding and to stop the feed while the backing is being severed by the cutter. The padding is divided into sections of tie length. The padding is guided from the cutter to the glue or adhesive roller 42 which dips into a suitable adhesive tank 43.

The pressure roller 44 is mounted on the pivoted arm 45 yieldingly urged against the work by the spring 46. At the rear of the adhesive applying roller the packing is guided by means of the guide 47 to the feeding and pressure belts. The metal strand element or ribbon 2 is guided by the rollers 48 and 49 to a scoring means comprising the cutter or scoring roller 50 having a serrated scoring blade 51 (see Figs. 2 and 5). The backing or abutment roller 52 is opposed to the scoring roller to support the work while it is acted upon by the blade, as is clearly shown in Figs. 2 and 5. This scoring roller is driven by a one-revolution clutch designated generally by the numeral 53, the clutch being actuated by a solenoid or electrical device designated generally by the numeral 54.

This provides for convenient timing of the scoring roller so that the metal strand is scored at spaced points as indicated at 55, facilitating the breaking of the strand and the severing of the continuous tape into tie lengths or sections. This avoids the use of cutters and also insures that the ties are of the desired length. The metal strand is fed continuously by the feed belts. The packing element is delivered to the belts in sections. The longitudinal spacing of these sections is such that the adjacent ends of the sections are spaced relative to the scores of the metal element as is best shown in Fig. 1.

In the embodiment illustrated the adhesive is applied to the packing element. It might be applied to the metal strand element as the primary object is to provide an adhesive between the meeting faces of the metal strand element and the packing element. The adhesive is applied in such relation to the point of bringing the packing element and the metal strand into contact as to allow the adhesive to become suitably tacky. The length of the pressure and feed reaches of the belts 23 and 24 is such that the metal element and the backing strip become thoroughly bonded together. As they are fed together there is no tendency for the padding strips becoming displaced.

At the rear of the belts the binding tape is passed over a roller 56 and is carried forwardly through the guide 57 to the winding reel or drum 9. In the embodiment illustrated the motor 58 is mounted on the frame 7 below the feed belts and connected to the transmission 59 by the driving belt 60. A jack shaft 61 is driven by the belt 62 from the transmission. This jack shaft has suitable sprocket thereon to drive the chain 63 through the sprocket 64 on the shaft 65, the shaft 65 having a sprocket 66 thereon connected to the scoring roller 50 by the sprocket chain 67. A sprocket 68 is connected to the overrunning clutch and to the glue roll 42 by the drive chain 69. The winding reel 9 is connected by a belt 70 driven by the pulley 71 on the shaft 65.

The length of the binding tape is varied by removing or inserting links 72 in the chain 73 thereby varying the time in which the tappet 74 strikes the switch 75 which operates the solenoid 34 to actuate the cutter blade 18. A switch 76, which is operated by the tappet, controls the solenoid 54 which actuates clutch 53 controlling the scoring roll 50.

A switch 77, which is also controlled by the tappet 74, actuates the feed rolls 15 through the actuation of the solenoid 191. As the links are inserted or removed from the chain 73, we provide an adjustable bracket 78 carrying the sprocket 79 to tighten chain 73. The switches 75, 76, and 77 are mounted on a bracket 80 in spaced relation so that the padding is cut off at 81, the metal strand is scored at 55, and the feed roller 15 driven at the desired time to provide the space 82 between the ends of the padding 81 and 83. This leaves a portion 84 of exposed metal band. The rolls 25 and 26 are driven by the chain 85 driven from suitable sprockets on the shaft 61.

With this arrangement ties varying considerably in length may be produced and the adjustments accomplishing this are quite simple. The tapes are wound upon the spool or drum as continuous tapes but may be separated conveniently without the use of tools. Suitable tools for connecting the exposed ends of the ties are available. Commonly the exposed ends of the metal element are overlapped and their edges crimped for securing them together in the known manner.

The embodiment of our invention illustrated is of large capacity and requires little attention on the part of the operator other than maintaining a supply of material and seeing to it that the machine is properly adjusted to produce the individual ties of the desired length.

We have illustrated and described our invention in a highly practical embodiment thereof. We have not attempted to illustrate or describe other embodiments or adaptations as we believe this disclosure will enable those skilled in the art to embody or adapt our invention as may be desired.

Having thus described our invention, what we claim as new and desire to secure by Letters Patent is:

1. A machine for manufacturing binding tape comprising a metal strand, and a padding adhesively secured to the metal strand comprising a pair of feeding and pressure belts having coacting parallel rearwardly traveling reaches, means for intermittently feeding a padding strip and severing it into sections and delivering the sections in longitudinally spaced relation to the said belts, comprising coacting feed rollers, one of which is driven by a one-revolution driving clutch having a one-way driving connection to the driven roller, a padding cutter disposed at the rear of said feed rollers, a brake for the driven feed roller, means for actuating said cutter during the pause of the driven feed roller, means for applying adhesive to the padding disposed between the cutter and said belts, means for supporting and guiding a metal strand to said belts and into contact with the adhesive bearing side of the padding, a scoring means for said metal strand disposed in advance of said belts and comprising a driven cutter roller and a coacting supporting roller, the cutter roller having a serrated cutter acting to score the strand at spaced points to facilitate fracturing thereof at such points, a one-revolution driving clutch for said cutter roller, and means for actu-

ating said driven feed roller, padding cutter and metal strand scoring roller in timed relation so that the spaced padding sections are delivered to said belts and superimposed upon the metal strand with the adjacent spaced ends of the sections in spaced relation to the scores of the metal strand, said means including a driven chain the length of which may be varied and timing tappets carried thereby and relatively adjustable thereon.

2. A machine for manufacturing binding tape comprising a metal strand, and a padding adhesively secured to the metal strand comprising a pair of feeding and pressure belts having coacting parallel rearwardly traveling reaches, means for intermittently feeding a padding strip and severing it into sections and delivering the sections in longitudinally spaced relation to the said belts, comprising coacting feed rollers, a padding cutter disposed at the rear of said feed rollers, means for actuating said cutter during the pause in the padding feed, means for applying adhesive to the padding disposed between the cutter and said belts, means for supporting and guiding a metal strand to said belts and into contact with the adhesive bearing side of the padding, a scoring means for said metal strand disposed in advance of said belts and comprising a driven cutter roller and a coacting supporting roller, the cutter roller having a cutter acting to score the strand at spaced points to facilitate fracturing thereof at such points, and means for actuating said driven feed roller, padding cutter and metal strand scoring roller in timed relation so that the spaced padding sections are delivered to said belts and superimposed upon the metal strand with the adjacent spaced ends of the sections in spaced relation to the scores of the metal strand.

3. A machine for manufacturing binding tape comprising a metal strand element, and a padding element adhesively secured to the metal strand element comprising a pair of feeding and pressure belts having coacting parallel rearwardly traveling reaches, means for intermittently feeding a padding strip and severing it into sections and delivering the sections in longitudinally spaced relation to the said belts, comprising coacting feed rollers, one of which is intermittently driven, a padding cutter disposed at the rear of said feed rollers, means for actuating said cutter during a pause of the driven feed roller, means for supporting and guiding a metal strand to said belts and into contact with the padding, means for applying adhesive to a surface of one of said elements prior to its being brought into contact with the other element, a scoring means for said metal strand disposed in advance of said belts and comprising an intermittently driven cutter roller and a coacting supporting roller, the cutter roller having a serrated cutter acting to score the strand at spaced points to facilitate fracturing thereof at such points, and means for actuating said driven feed roller, padding cutter and metal strand scoring roller in timed relation so that the spaced padding sections are delivered to said belts into superimposed relation to the metal strand with adjacent ends of the sections in spaced relation to the scores of the metal strand.

4. A machine for manufacturing binding tape comprising a metal strand element, and a padding element adhesively secured to the metal strand element comprising a pair of feeding and pressure belts having coacting parallel rearwardly traveling reaches, means for intermittently feeding a padding strip and severing it into sections and delivering the sections in longitudinally spaced relation to the said belts, a padding cutter disposed at the rear of said feed means, means for actuating said cutter during a pause of the feed means, means for supporting and guiding a metal strand to said belts and into contact with the padding, means for applying adhesive to a surface of one of said elements prior to its being brought into contact with the other element, a scoring means for said metal strand disposed in advance of said belts and acting to score the strand at spaced points to facilitate fracturing thereof at such points, and means for actuating said padding strip feed means, padding cutter and metal strand scoring means in timed relation so that the spaced padding sections are delivered to said belts into superimposed relation to the metal strand with adjacent ends of the sections in spaced relation to the scores of the metal strand.

5. A machine for manufacturing binding tape comprising a metal strand element, and a padding element adhesively secured to the metal strand element comprising a pair of feeding and pressure belts having coacting parallel rearwardly traveling reaches, means for intermittently feeding a padding strip and severing it into sections and delivering the sections in longitudinally spaced relation to the said belts comprising coacting feed rollers, one of which is intermittently driven, a padding cutter disposed at the rear of said feed rollers, means for actuating said cutter during a pause of the driven feed roller, means for supporting and guiding a metal strand to said belts and into contact with the padding, means for applying adhesive to a surface of one of said elements prior to its being brought into contact with the other element, and means for actuating said driven feed roller and padding cutter in timed relation so that the spaced padding sections are delivered to said belts and adhered to the metal strand with their ends in longitudinally spaced relation.

6. A machine for manufacturing binding tape comprising a metal strand element, and a padding element adhesively secured to the metal strand element comprising a pair of feeding and pressure belts having coacting parallel rearwardlly traveling reaches, means for intermittently feeding a padding strip and severing it into sections and delivering the sections in longitudinally spaced relation to the said belts, said means including feed rollers and a padding cutter disposed at the rear of said feed rollers, means for actuating said cutter during a pause of the feed means, means for supporting and guiding a metal strand to said belts and into contact with the padding, means for applying adhesive to a surface of one of said elements prior to its being brought into contact with the other element, and means for actuating said feed means and padding cutter in timed relation so that the spaced padding sections are delivered to said belts and adhered to the metal strand with their ends in longitudinally spaced relation.

7. A machine for manufacturing tape comprising a metal strand element, and a padding element adhesively secured to the metal strand element comprising a pair of feeding and pressure belts having coacting parallel rearwardly traveling reaches, means for intermittently feeding a padding strip and severing it into sections and delivering the sections in longitudinally spaced relation to said belts, said feeding and severing means including feed means and a padding cutter disposed at the rear of said feed means, means

for actuating said cutter during a pause in the padding feed, means for supporting and guiding a metal strand to said belts and into contact with the adhesive bearing side of the padding, means for scoring said metal strand at spaced points to facilitate fracturing thereof at such points disposed in advance of said belts, means for applying adhesive to one of the elements, and means for actuating said padding feed means, padding cutter and metal strand scoring means in timed relation so that the spaced padding sections are delivered to said belts into superimposed relation to the metal strand with adjacent ends of the sections in spaced relation to the scores of the metal strand.

8. A machine for manufacturing binding tape comprising a metal strand element, and a padding element adhesively secured to the metal strand element, comprising driving means, a pair of feeding and pressure belts having coacting parallel rearwardly traveling reaches, means for intermittently feeding a padding strip and severing it into sections and delivering the sections in longitudinally spaced relation to the said belts, said feeding and severing means including feed means and a padding cutter disposed at the rear of said feed means, means for actuating said cutter during a pause in the feeding operation of said feeding means on said padding strip, means for supporting and guiding a metal strand to said belts and into contact with one of the sides of the padding, and means for applying adhesive to one of the elements, said belts, feed means and cutter being cooperatively connected to said driving means.

9. A machine for manufacturing binding tape comprising a metal strand, and a padding adhesively secured to the metal strand comprising a pair of feeding and pressure belts having coacting parallel rearwardly traveling reaches, means for intermittently feeding a padding strip and severing it into sections and delivering the sections in longitudinally spaced relation to the said belts, said feeding and severing means including feed means and a padding cutter disposed at the rear of said feed means, means for actuating said cutter during the pause in the padding feed, means for applying adhesive to one side of the padding disposed between the cutter and said belts, means for supporting and guiding a metal strand to said belts and into contact with the adhesive bearing side of the padding, means for scoring said metal strand at spaced points to facilitate fracturing thereof at such points disposed in advance of said belts, and means for actuating said padding feed means, padding cutter and metal strand scoring means in timed relation so that the spaced padding sections are delivered to said belts into superimposed relation to the metal strand with adjacent spaced ends of the sections in spaced relation to the scores of the metal strand.

10. A machine for manufacturing binding tape comprising a metal strand, and a padding adhesively secured to the metal strand comprising driving means, a pair of feeding and pressure belts having coacting parallel rearwardly traveling reaches, means for intermittently feeding a padding strip and severing it into sections and delivering the sections in longitudinally spaced relation to the said belts, said feeding and severing means including feed means and a padding cutter disposed at the rear of said feed means, means for actuating said cutter during the pause in the padding feed, means for applying adhesive to one side of the padding disposed between the cutter and said belts, means for supporting and guiding a metal strand to said belts and into contact with the adhesive bearing side of the padding, said belts, feed means and cutter being operatively connected to said driving means.

11. In a machine for manufacturing binding tape comprising a metal strand element, and a padding strip element adhered thereto, the combination of driving means, feeding and pressure belts having coacting parallel rearwardly traveling reaches, means for intermittently feeding a padding strip element, means for severing the padding strip element into sections and delivering the sections to the belts, means for guiding a metal strand to the belts and into contact with the adhesive bearing sides of the padding sections, means for scoring the metal strand at longitudinally spaced points prior to the delivery thereof to said belts, means for applying adhesive to one of the elements, the feed means for the padding sections being timed relative to the travel of the belts and of the metal strand so that the padding sections are positioned with their adjacent ends in spaced relation to the fracturing points of the metal strand, said belts, feed means, severing means, and scoring means being operatively connected to said driving means.

12. In a machine for manufacturing binding tape comprising a metal strand element, and a padding strip element adhered thereto, the combination of driving means, feeding and pressure belts having coacting parallel rearwardly traveling reaches, means for intermittently feeding a padding strip element, means for severing the padding strip element into sections and delivering the sections to the belts, means for guiding a metal strand to the belts and into contact with the adhesive bearing sides of the padding sections, means for applying adhesive to one of the elements, the feed means for the padding sections being timed relative to the travel of the belts so that the padding sections are positioned with their adjacent ends in spaced relation, said belts, feed means and severing means being operatively connected to said driving means.

13. In a machine for manufacturing binding tape comprising a metal strand element, and a padding strip element adhered thereto, the combination of driving means, feeding belts having coacting parallel rearwardly traveling reaches, means for delivering padding sections to said belts with their ends in longitudinally spaced relation, means for guiding a metal strand having longitudinally spaced fracturing points to said belts, means for applying adhesive to one of the elements, and means for timing the delivery of the padding sections relative to the fracturing points of the metal strand so that the padding sections are positioned relative to the metal strand with their ends in spaced relation to the fracturing points thereof, the belts acting to feed the metal strand and sections at uniform speed and apply pressure thereto, said belts and padding delivery means being operatively connected to said driving means.

14. In a machine for manufacturing binding tape comprising a metal strand element, and a padding strip element adhered thereto, the combination of driving means, feeding belts having coacting parallel rearwardly traveling reaches, means for delivering padding sections to said belts with their ends in longitudinally spaced relation, means for guiding a metal strand to said

belts, means for applying adhesive to one of the elements, and means for timing the delivery of the padding sections so that the padding sections are positioned with their ends in spaced relation, the belts acting to feed the metal strand and sections at uniform speed and apply pressure thereto, said belts and padding delivering means being operatively connected to said driving means.

15. In a machine for manufacturing binding tape comprising a metal strand element, and a padding strip element, the elements being adhesively connected, the combination of driving means, feeding and pressure belts having coacting parallel rearwardly traveling reaches, means for intermittently feeding the padding strip element, means for severing the padding strip into sections and delivering the sections to the belts in longitudinally spaced relation, means for guiding a metal strand to the belts, means for scoring the metal strand at longitudinally spaced points prior to the delivery thereof to said belts, the feed means for the padding sections being timed relative to the travel of the belts and of the metal strand so that the padding sections are positioned with their adjacent ends in spaced relation to the fracturing points of the metal strand, and means for applying adhesive to one of the elements prior to their being brought into contact and subjected to the pressure of said better, said belts, feed means, severing means and scoring means being operatively connected to said driving means.

16. In a machine for manufacturing binding tape comprising a metal strand element, and a padding strip element, the elements being adhesively connected, the combination of driving means, feeding and pressure belts having coacting parallel rearwardly traveling reaches, means for intermittently feeding the padding strip element, means for severing the padding strip into sections and delivering the sections to the belts in longitudinally spaced relation, means for guiding a metal strand to the belts, the feed means for the padding sections being timed relative to the travel of the belts and of the metal strand so that the padding sections are positioned with their adjacent ends in spaced relation, and means for applying adhesive to one of the elements prior to their being brought into contact and subjected to the pressure of said belts, said belts, feed means and severing means being operatively connected to said driving means.

17. In a machine for manufacturing binding tape comprising a metal strand element, and a padding strip element, the elements being adhesively connected, the combination of driving means, feeding and pressure means, means for intermittently feeding the padding strip element, means for severing the padding strip into sections and delivering the sections to the feeding and pressure means in longitudinally spaced relation, means for guiding a metal strand to the feeding and pressure means, means for scoring the metal strand at longitudinally spaced points prior to the delivery thereof to said feeding and pressure means, the feed means for the padding sections being timed relative to the feeding and pressure means and of the metal strand so that the padding sections are positioned with their adjacent ends in spaced relation to the fracturing points of the metal strand, and means for applying adhesive to one of the elements prior to their being brought into contact and subjected to the pressure of said feeding and pressure means, said feeding and pressure means, intermittent feed means, severing means and scoring means being operatively connected to said driving means.

18. In a machine for manufacturing binding tape comprising a metal strand element, and a padding strip element, the elements being adhesively connected, the combination of driving means, feeding and pressure means, means for intermittently feeding the padding strip element, means for severing the padding strip into sections and delivering the sections to the feeding and pressure means in longitudinally spaced relation, means for guiding a metal strand to the feeding and pressure means, the feed means for the padding sections being timed relative to the feeding and pressure means and of the metal strand so that the padding sections are positioned with their adjacent ends in spaced relation, and means for applying adhesive to one of the elements prior to their being brought into contact and subjected to the pressure of said feeding and pressure means, said feeding and pressure means, intermittent feed means and severing means being operatively connected to said driving means.

19. In a machine for manufacturing binding tape comprising a metal strand element and a padding strip element adhered thereto from a continuous strip of padding material and a continuous strip of metal, the combination of driving means, coacting feeding and pressure members, variably timed means for severing a padding strip into sections and delivering the sections to said members in longitudinally spaced relation, means for guiding a metal strand to said members and into contacting relation to said padding sections, means for applying adhesive to one of said elements in advance of their point of contact, and variably timed means for scoring the metal strand element at spaced points to facilitate fracturing thereof at such points, the timed means for delivering of the padding sections being synchronized with the timed scoring means so that the padding sections are positioned with their ends in spaced relation to the fracturing point of the metal strand element, said coacting pressure and feed members, severing and delivering means, and scoring means being operatively connected to said driving means.

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