Aug. 20, 1935. C. D. McCARTHY 2,012,014

AUTOMATIC APRON TAPER

Filed July 30, 1932 3 Sheets-Sheet 1

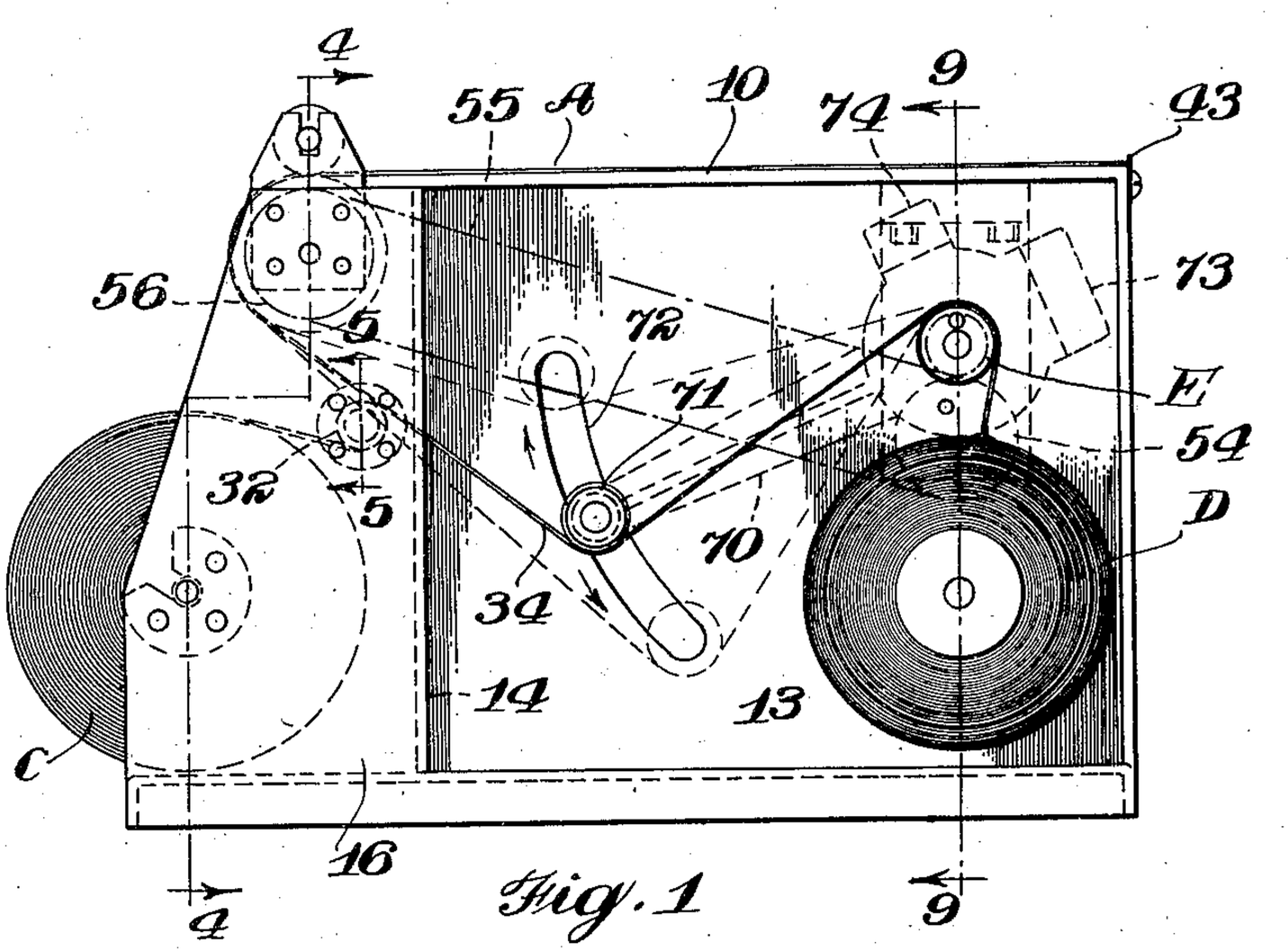

Fig. 1

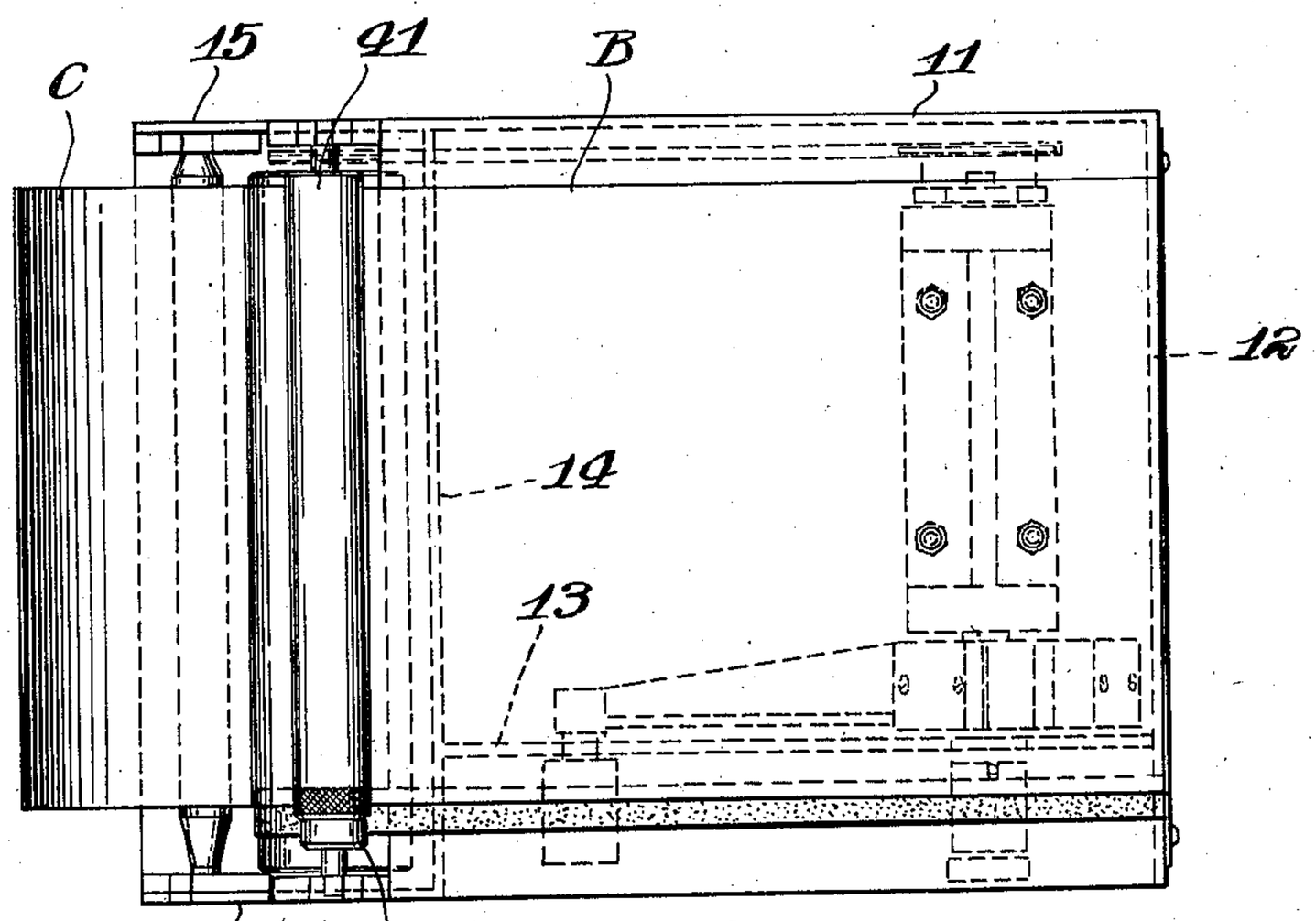

Fig. 2

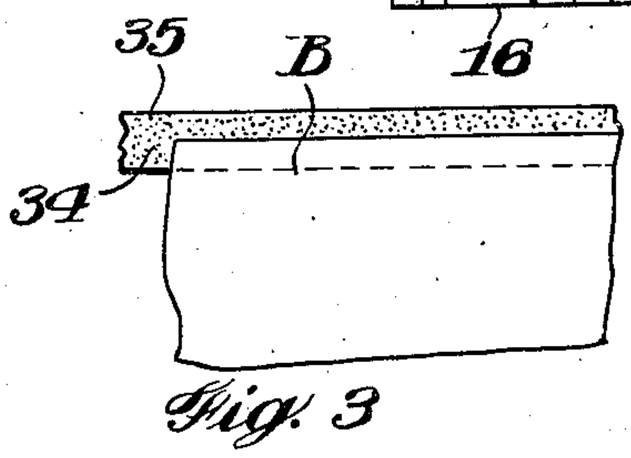

Fig. 3

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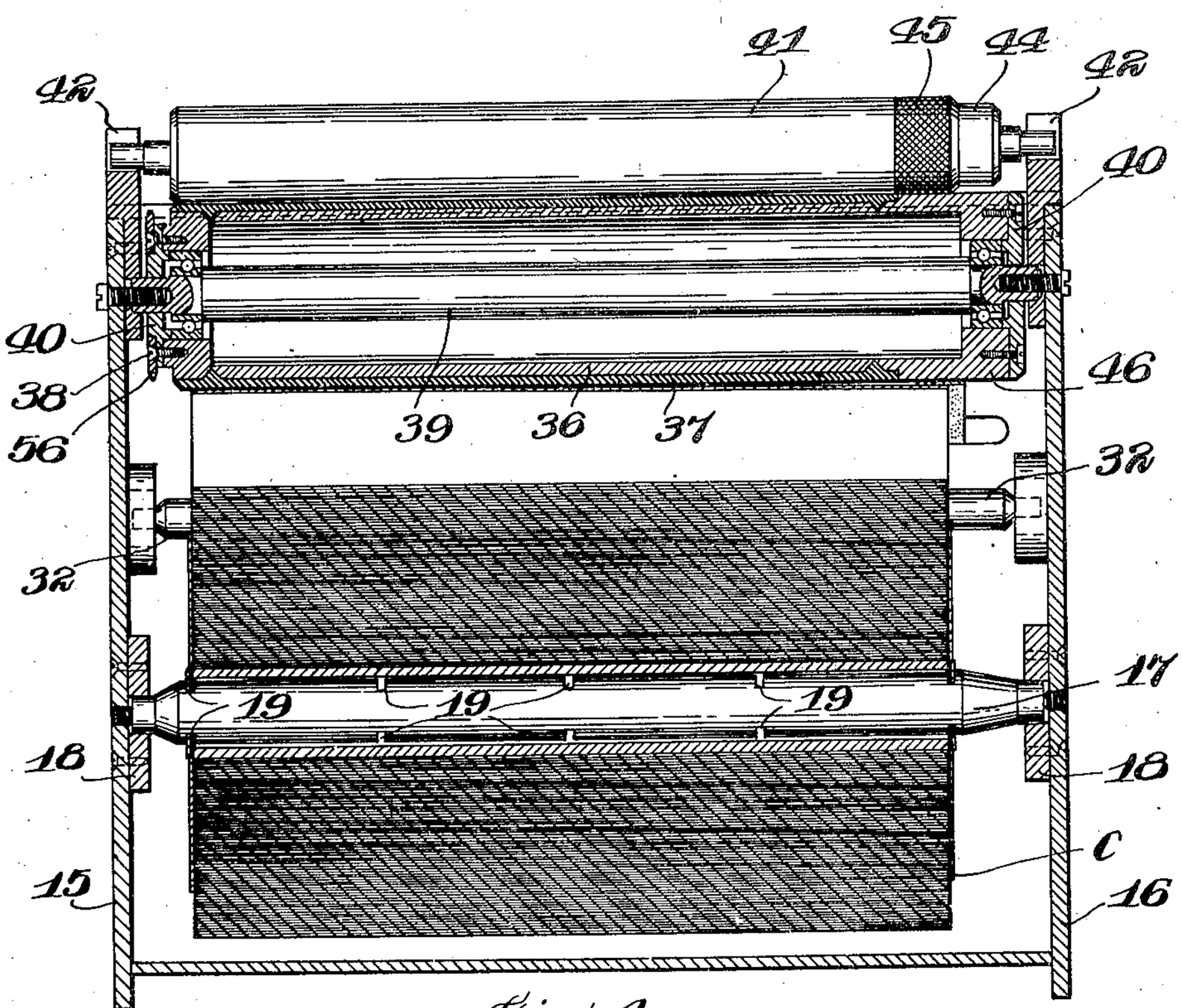

Fig. 4

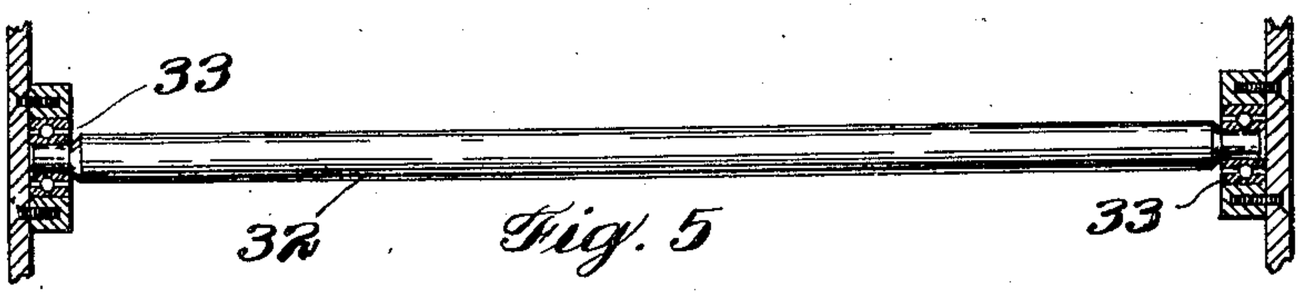

Fig. 5

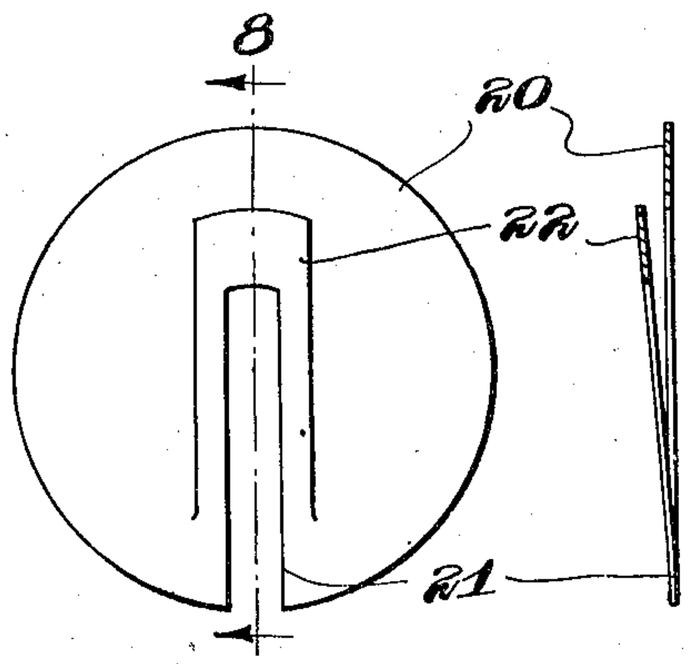

Fig. 7

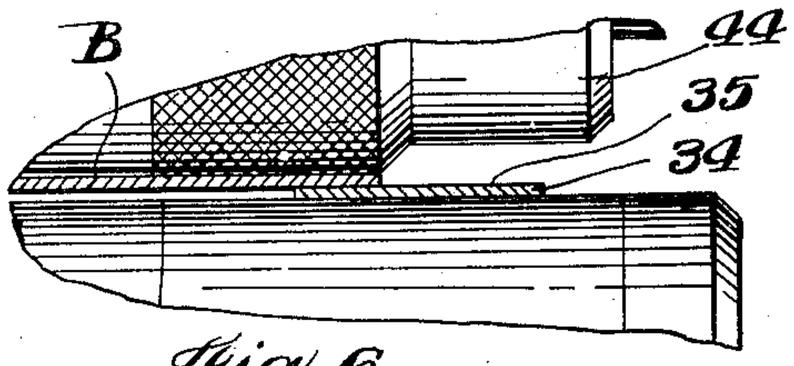

Fig. 6

Fig. 8

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AUTOMATIC APRON TAPER

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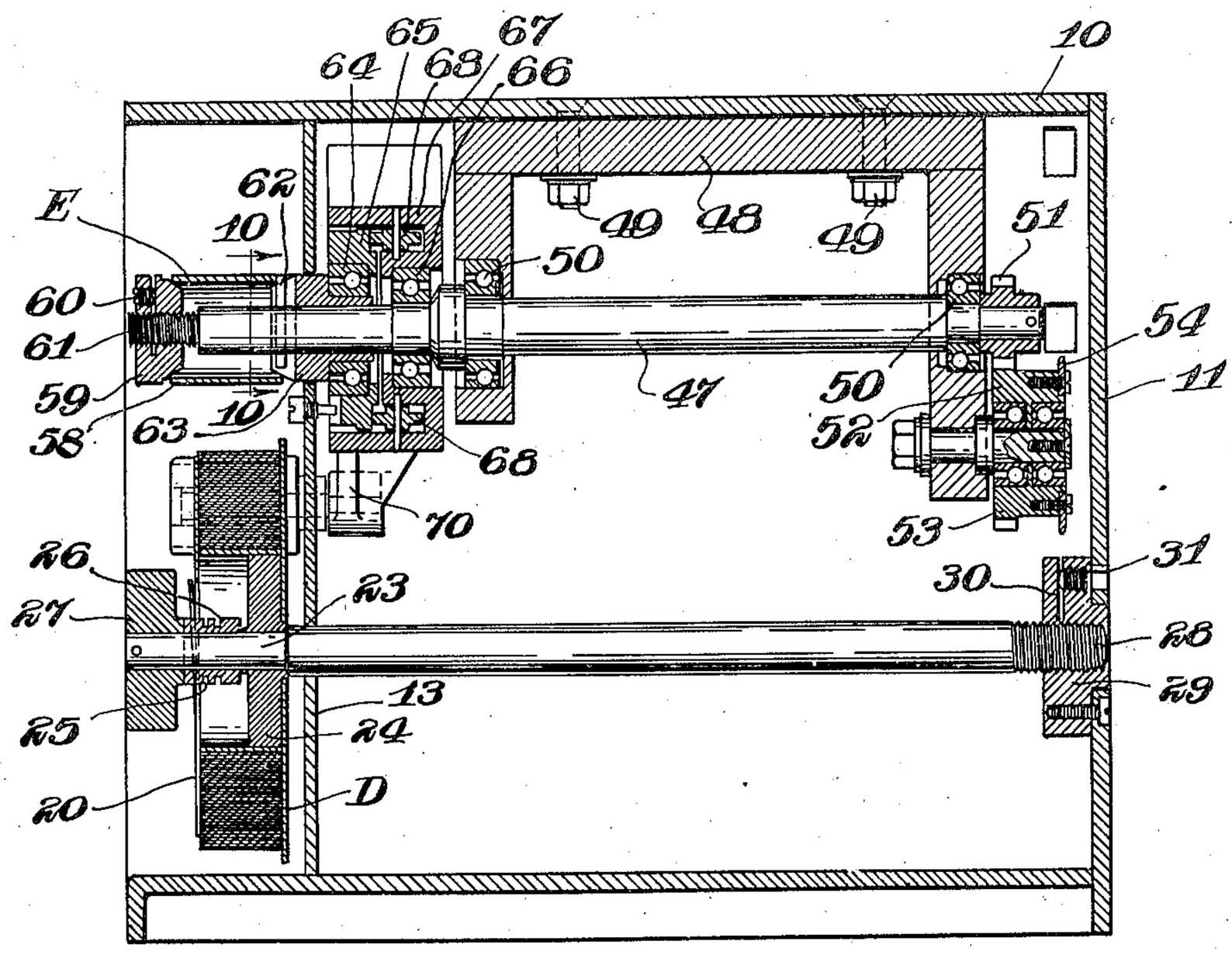

Fig. 9

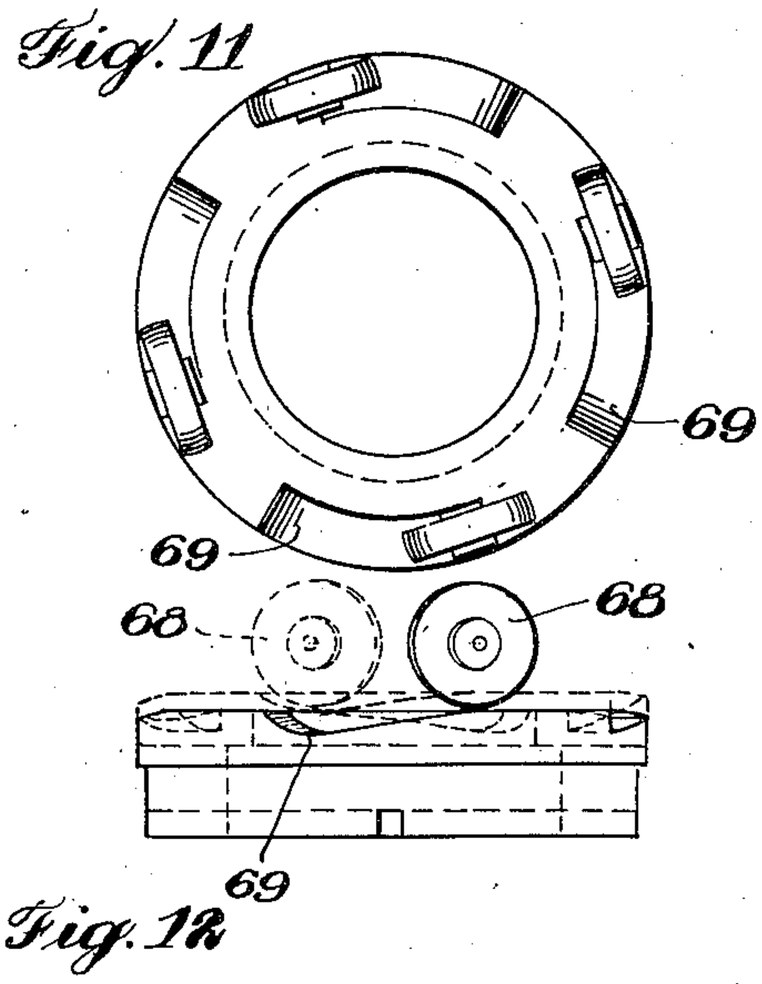

Fig. 11

Fig. 12

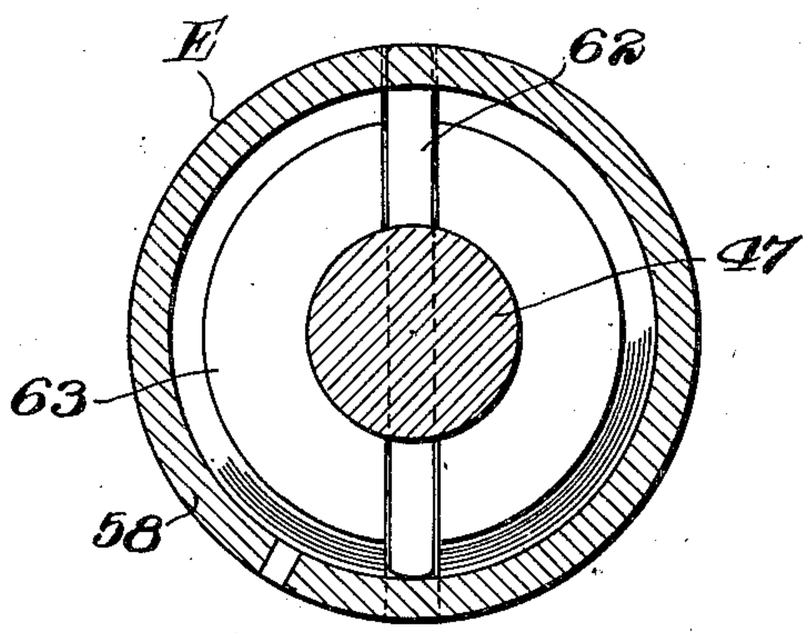

Fig. 10

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Patented Aug. 20, 1935 2,012,014

UNITED STATES PATENT OFFICE

2,012,014

AUTOMATIC APRON TAPER

Charles D. McCarthy, St. Paul, Minn., assignor to Minnesota Mining & Manufacturing Company, St. Paul, Minn., a corporation of Minnesota

Application July 30, 1932, Serial No. 626,841

18 Claims. (Cl. 154—42)

My invention relates to an automatic apron taper wherein means is provided for supporting a supply roll adapted to form the apron supporting means for a tape roll, each supply roll being separately mounted and readily adjustable and removable. The apron roll supporting means is provided with a structure which facilitates the supporting of apron rolls of different widths as well as the tape supporting means. The tape supporting means permits the tape to be adjusted in relation to the marginal edge of the apron sheet so that the apron and the tape may be properly aligned for taping the apron.

A feature resides in providing a counter-balanced take-up means for the slack of the tape between the supply roll and the contacting point with the apron sheet which operates automatically to maintain a uniform tension in the slack portion of the tape as well as automatically maintaining an approximate uniform slack in the tape between the supply roll and the attaching point to the apron and keeping the wrapper of the tape approximately constant around the finishing rollers of the taper. This provides a means of a desirable nature wherein the tape is carried to the apron in proper alignment and is adapted to be attached thereto uniformly without wrinkling to form in a simple manner a taped apron which may be drawn off in the desired length and as needed.

A further means is provided for positively driving the tape feeding pulley which draws the tape from the supply roll, the driving means being operated automatically by the travel of the apron sheet from the supply roll through the tape attaching means and over the table of the apron taper. Thus when the apron sheet is pulled from the supply roll the tape feeding roller or pulley is automatically driven to pull the non-drying adhesive tape from the supply roll, feeding it toward the take-up pulley which is counter-balanced to assist in adjusting the position of the same.

Further, the apron taper is provided with means for automatically changing the diameter of the tape feeding pulley, the position of the take-up pulley automatically regulating the diameter of the tape feeding pulley. The apron taper includes a rubber roller over which the apron passes from the supply roll and a bearing roller of any suitable material which bears down against the apron sheet and keeps it in contact with the rubber roll as the apron sheet passes over the same in the final act of attaching the tape to the apron sheet. Knurling may be provided on the bearing roll at the point of contact of the apron and the tape, attaching the tape to the apron acting to pound the marginal edge of the apron against the adhesive tape, insuring a firm attachment of the apron and the tape.

The invention includes the method of making a taped apron having an adhesive tape projecting from the edge thereof, the tape being of a non-drying nature and requiring no added moisture to attach the same so as to support the apron. The tape forms the supporting means for the apron to hold the apron in place. The method consists in making a masking apron or the like, in attaching the apron sheet and tape by pulling the sheet and the tape adjusted in relation to each other in a manner to cause the tape and the sheet to be attached together with the tape projecting from the edge of the sheet and with a portion of the adhesive surface of the tape exposed and without touching the same.

The various features and details will be more fully hereinafter set forth.

In the drawings forming part of this specification:

Figure 1 is a side elevation of my automatic apron taper.

Figure 2 is a plan view of the same.

Figure 3 illustrates a detail of a portion of a taped apron.

Figure 4 is a section on the line 4—4 of Figure 1.

Figure 5 is a section on the line 5—5 of Figure 1.

Figure 6 is a detail of a portion of the apron taper.

Figure 7 illustrates the spring for holding the apron and tape rolls on their support under slight tension.

Figure 8 is a section on the line 8—8 of Figure 7.

Figure 9 is a section on the line 9—9 of Figure 1.

Figure 10 is a section on the line 10—10 of Figure 9.

Figure 11 illustrates a front view of the cam collar for adjusting the tape feeding pulley.

Figure 12 illustrates diagrammatically the cam collar of Figure 11, showing the relative position of the cam wheels which operate the cam collar in a full line position and in a dotted line position.

The apron taper A is automatic in its operation. The taper A is formed with a table portion 10 over which the apron sheet B is drawn from the supply roll C. The table extends across the top of the taper A and the side wall 11 closes one side of the same while the wall 12 closes the front portion.

An inset wall 13 is provided on the side opposite to the wall 11 while an inset back wall 14 is provided so as to form a compartment between the walls 11, 12, 13 and 14, in which some of the operating parts and particularly those which operate as being adjusted to maintain the taper A in proper operating position are inclosed and protected from being tampered with.

Side portions 15 and 16 extend backwardly from the body of the taper A and are adapted to form a supporting means between which the supply roll C for the apron is removably mounted. The roll C is mounted upon the shaft 17 which is held stationary in the supports 18 and the shaft is formed with slots 19 spaced along the shaft so as to provide a means of holding different width rolls such as C. By means of the discs 20 which are formed with a slot 21 adapted to fit in the slots 19 and with a spring arm 22 the roll C is adapted to be supported on the shaft 17 between the tension of the discs 20. This forms a simple means for holding the roll C rotatable upon the shaft 17 and with sufficient friction bearing against the ends of the same to hold it from turning too freely.

The adhesive tape roll D of the taper A may be of the desired width and this tape 34 is formed with an adhesive surface 35 of a non-drying nature and is adjustably supported on one end of the shaft 23. The roll D may be held by one of the spring discs 20, as illustrated in Figure 9, with the core tube of the roll fitting over the core member 24 which is supported on the shaft 23. Suitable slots 25 are formed in a collar 26 carried by the shaft 23 so as to support the spring disc 20 in position to bear with a slight spring tension against the side of the roll D.

The shaft 23 is provided with a knurled knob 27 which is fixed to the end of the shaft 23 adjacent the roll D and the other end of the shaft is threaded at 28 in the fixed bearing 29 which is supported in the side wall 11. The bearing 29 is split at 30 and a set screw 31 spreads the same in relation to the threaded end 28 to lock the threaded end 28 so as to hold the shaft 23 in a transverse adjusted position. When it is desired to adjust the shaft 23 the set screw 31 is released and the shaft 23 turned by engaging tne knob 27 and thus the tape roll D may be adjusted to be set in the desired alignment with the sheet coming from the apron roll.

The sheet B from the roll C is adapted to pass under the idle roller 32 which is supported by the ball bearings 33 between the side walls 15 and 16 and thence around the roll 36 which is formed with a rubber covering 37 and which is mounted on the end ball bearings 38 so that the roll 36 may freely rotate around the central shaft 39. End plates 40 conceal the ball bearings in the roller 36.

Diametrically positioned above the roller 36 I provide a pressure roller 41 which is mounted in the end bearings 42 in a manner to permit the roller 41 to raise and lower and bear with its weight against the sheet B running over the roller 36. Thus the roller 41 tends to hold the sheet B against the rubber surface 37 of the roller 36 while the sheet B is drawn over the table 10 and over the cutting edge 43 which permits the sheet B to be cut off in the lengths desired.

The roll 41 is cut away at 44 to reduce the diameter of the same and it may be knurled at 45 to form a roughened surface thereon. The roller 36 is formed with an end collar 46 of metal or other suitable material having an outer diameter commensurate with the outer diameter of the rubber sheathing 37 and extending beneath the cut away portion 44 and the knurled portion 45 of the roller 41. This collar 46 forms a solid roller bed over which the tape 34 is adapted to run. The cut away portion 44 spaces the surface of the roll 41 away from the adhesive surface 35 of the tape 34, as illustrated in Figure 6, while the tape 34 laps over and engages under the sheet B and is adapted to be secured thereto with pounding or hammer-like action by the knurling 45.

The tape from the roll D is carried up over the automatically expandible and contractible tape feeding pulley E with the adhesive surface 35 of the tape 34 contacting with the surface of the pulley E. The pulley E is mounted upon the shaft 47 which is held by the frame 48 secured to the under surface of the table 10 by the bolts 49. The shaft 47 runs in the ball bearings 50 and is adapted to be rotated by the gear 51 which is driven by the gear 52. The gear 52 is formed on the collar 53 and a sprocket 54 is mounted to this collar and is adapted to be driven by the chain 55 which in turn is driven by the sprocket 56 secured to one end of the roller 36, as illustrated in Figures 1, 4 and 9. Thus when the roller 36 is rotated by the paper sheet B passing over the same, the shaft 47 will be driven through the sprocket 56, the chain 55, the sprocket 54, and through the gears 52 and 51, as illustrated in enlarged section of the pulley E in Figure 10. This pulley is made of a spring sleeve 58 which may expand and contract and which bears on the beveled surface of the nut 59 which is threaded to the end of the shaft and held in set position by the set screw 60 which operates in the same manner as the set screw 31 to fix the nut 59 in adjusted position on the threads 61 of the shaft 47.

A pin 62 keys the sleeve 58 to the shaft 47 so that the sleeve will rotate with the shaft and the key 62 is adapted to fit in a slot formed in the collar 63 which is formed with a beveled surface adapted to extend into the end of the sleeve 58 opposite to the end which is engaged by the nut 59. The collar 63 carries a ball bearing 64 which supports the cam collar 65 and these parts are slidable on the shaft 47 so that the beveled surface of the collar 63 may act to expand or permit the sleeve 58 to contract by its spring tension in accordance with the movement of the collar 63. The shaft 47 supports the ball bearing 66 which in turn supports the sleeve collar 67. A series of anti-friction wheels 68 are mounted in the sleeve collar 67 as illustrated in Figure 9 and are adapted to bear against the cam surfaces 69 which are formed in the cam collar 65. When the collar sleeve 67 is rotated on the bearing 66 irrespective of the rotation of the shaft 47, the wheels 68 will operate against the cam surfaces 69 and tend to move the collar 63 with more or less engagement on the sleeve 58 to expand the same or permit it to be contracted when less engagement takes place. The sleeve collar 67 is formed integral with the operating lever 70 which is positioned adjacent the wall 13 of the apron taper A and which is adapted to support the take-up idle pulley 71. The shaft which supports the pulley 71 from the free end of the lever 70 extends through the slot 72 in the wall 13. This permits the pulley 71 to be positioned outside of the wall 13, as illustrated in Figure. 1. The pulley 71 engages againsts the back or non-adhesive surface of the tape 34 and is adapted to rest against the tape to take up the slack between the pulley E and the roller 36. Counterbalancing weight members 73 and 74 are secured

to the sleeve **67** so that the pulley **71** may be counter-balanced in its various positions in operation against the tape **34**. The tape **34** is adapted to extend up to and around the portion **46** of the roller **36** so that as the sheet B is pulled from the supply roll C the tape **34** will be automatically attached marginally to the sheet B, thus forming an apron for masking and other purposes with the tape **34** attached to the edge thereof and wherein a portion of the adhesive surface **35**, which is of a non-drying nature, may be exposed beyond the sheet B to permit the apron sheet B to be readily attached to any object when it is desired.

The roll D is adjusted on the shaft **23** so that the tape **34** will align properly to the desired overlap with the sheet B. This permits the apron sheet B to be drawn from the apron taper A and to be automatically taped to the uniform overlap and with a smooth attachment of the tape **34** to the same. It should be borne in mind, that the tape **34** must not be attached to the sheet B so as to cause the sheet to wrinkle by reason of the tape being unevenly secured along the edge of the sheet which may be caused by the tape being drawn too tight when attached to the sheet B or too loose. The latter condition would also cause the tape to wrinkle which would be undesirable for a masking sheet.

With my construction of apron taper the feeding of the tape **34** from the roll D is automatically regulated by the adjustable pulley E which is controlled by the slack roller **71** and its supporting arm **70**. When the pulley **71** moves downward in the slot **72** a greater slack is apparent in the tape **34** between the pulley E and the roller **36**, causing the pulley E to automatically contract and feed a less amount of tape to the roll **36**, whereas, when the roller **71** moves upward in the slot **72**, the pulley E automatically expands, feeding a greater amount of tape from the roll D. In this manner my apron taper operates automatically to adjust and regulate the feeding of the tape D to the apron sheet B, causing the tape and sheet to be united uniformly and with a straight attaching edge along the sheet and tape. The main operating parts are inclosed within the casing of the machine and it is only necessary to attach the supply roll C in whatever width is desired on the shaft **17**, as well as the desired width of tape D to the shaft **23**, adjusting the roll D in position so that the desired overlap is obtained between the sheet B and the tape **34** and the machine is ready for operation, so that an apron taper is provided which may be operated by anyone to automatically form the apron as the sheet is drawn from the same. Thus the method of making the apron sheet is simplified and the adhesive tape is attached more uniformly than has been possible heretofore irrespective of the former nature of the tape.

The construction of my apron taper has been set forth in accordance with the patent statutes and the particular detail of the co-operating parts, together with the means of accomplishing the results set forth have been shown, however, it is apparent that the principles of the invention should be considered within the scope of the following claims so that the same may be applied to uses other than those above set forth and carried out by structure within the scope of the claims.

I claim:

1. An automatic apron taper comprising, a frame, a support for a supply roll which is adapted to form the apron, a support for a relatively narrow tape roll offset from said supply roll to overlap therewith, the axes of said rolls extending in parallel relationship, and means for automatically uniting the apron sheet from the supply roll and the tape from the tape roll.

2. An automatic apron taper including, a supporting means for a supply roll of paper or the like, means for supporting a relatively narrow supply roll of tape having a non-drying adhesive surface on one side thereof, and means for automatically uniting the tape and the roll to form a tapered apron, said means including means for automatically feeding the tape to the point of uniting the same in overlapping relationship with the apron sheet with a constant tension to prevent wrinkling of the sheet and the tape.

3. The method of uniting a non-drying adhesive tape and sheet to form a taped apron consisting in attaching a portion of the adhesive surface of the tape to the sheet as the sheet is pulled from a supply roll, and feeding the tape with constant tension to the sheet in proportion to the movement of the sheet to form a non-wrinkled attaching edge to the apron.

4. An apron taper including, a frame, an adjustable support for holding rolls of paper adapted to form the apron sheet, means for adjustably holding a non-drying adhesive supply roll of tape, means for adjusting the tape roll in relation to and driven by the edge of the sheet roll, and means for feeding the tape in proportion to the travel of the sheet from the supply roll to unite the sheet and tape uniformly.

5. The method of making a taped masking apron consisting in uniting a sheet of paper or similar material with the surface of a non-drying adhesive tape with a portion of the adhesive surface of the tape projecting beyond the edge of the sheet to which it is attached, and feeding the tape with a constant tension to attach the same to the sheet in a manner to prevent wrinkling of the tape and the sheet.

6. A device for taping a sheet pulled from a supply roll comprising, roller means through which the sheet is adapted to be pulled, said roller means including a bearing roll, and a driving roller having a clinging surface formed on a portion thereof, a smooth metal surface formed on another portion of said last roll, a reduced diameter portion formed on said bearing roll adjacent said metal portion on said driving roll, and means for feeding a tape having a non-drying adhesive surface over said smooth portion on said driving roll with the adhesive surface outwardly disposed to engage with the sheet pulled through said roller means, said reduced diameter on said bearing roll providing a space between said rolls for the portion of the adhesive surface of said tape which is not adhered to the sheet pulled through said roller means.

7. A device for taping a sheet and the like with a tape having a non-drying adhesive surface, roller means through which the sheet is pulled, means for feeding the tape automatically to the sheet and through the roller means with a portion thereof attached to the sheet and a portion projecting from the sheet in proportion to the rate of travel of the sheet through said roller means.

8. An automatic apron taper including, means for supporting a supply roll of paper which is adapted to form the apron sheet, means for supporting an adhesive tape having a non-drying adhesive surface, and means for feeding the tape

from the supply roll in proportion to the rate of travel of the sheet from the supply roll, to automatically unite the tape and sheet together to form a taped apron with a smooth attaching edge.

9. An automatic apron taper comprising, means for supporting a supply roll of paper or the like adapted to form the apron sheet, means for supporting a supply roll of adhesive tape, roller means through which the apron sheet and the tape are adapted to pass to tape the sheet automatically, a feeding pulley for pulling the tape from the supply roll, and means regulated by the slack in the tape between the feeding pulley and the point of attachment with the sheet to increase and decrease the diameter of said feeding pulley to automatically regulate the feeding of the tape to the sheet to form a uniformly taped apron.

10. An apron taper including, means for attaching an adhesive tape to the apron sheet automatically, means for supporting the sheet and the tape to bring the same into adjusted alignment and in overlapping relation with each other to attach a portion of the adhesive surface of the tape marginally to the sheet to form a taped apron, and means for automatically varying the proportion of the feeding of the tape to the sheet to the movement of the sheet in taping the same to uniformly attach the tape and sheet together.

11. A tape feeding device for apron tapers including, a support for a roll of adhesive tape, a feeding pulley for pulling the adhesive tape from the supply roll and feeding it to the apron taper, a tape slack idle roller, and means operable by the movement of said idle roller in positions of more or less slack of the tape to increase and decrease the size of said feeding pulley to feed more or less tape from the supply roll.

12. A tape feeder in combination with a support for a supply roll of adhesive tape, means for pulling the adhesive tape by contacting the adhesive surface thereof from the supply roll held by said support, said means including an expandible and contractible sleeve automatically operated in accordance with the slack of the adhesive tape extending from said feeding means to the point of attachment of the tape, whereby when the slack becomes too great, said feeding means will feed less tape and when the slack shortens, said feeding means will automatically feed more tape.

13. A tape feeder for apron tapers and the like including, an automatically expandible and contractible tape feeding pulley adapted to engage the adhesive surface of the tape and pull the same from a source of supply, means for automatically operating said feeding pulley to expand and contract the same in proportion to the degree of slack in the tape extending from said feeding pulley to uniformly feed the tape to the apron taper.

14. The combination, an apron taper having means for taping a sheet with an adhesive tape, a sheet feeding means, a tape feeding means adapted to pull the adhesive tape from a source of supply, and means for automatically regulating said tape feeding means in proportion to the sheet feeding means and to the degree of slack in the tape from said feeding means to the apron taping means.

15. The combination, an apron taper having means for uniting an adhesive tape to the edge of an apron sheet as the sheet is pulled from a source of supply and the tape is fed from a source of supply, a tape feeding pulley, and means for expanding and contracting said tape feeding pulley in proportion to the slack in the tape from said feeding means to said taper, whereby the slack in said tape is maintained uniform by increasing and decreasing the size of said feeding pulley to supply the tape to said apron taper under a uniform tension.

16. The combination, an apron taper having means for attaching a sheet and adhesive tape together, and means for feeding the adhesive tape to said apron taper under a uniform tension from a source of supply and at approximately the same feeding rate.

17. The combination, means for supporting a supply of sheet material which is adapted to form an apron sheet, means for automatically attaching an adhesive tape to the sheet to form a taped apron, means for supporting a supply of adhesive tape, means for pulling and feeding the adhesive tape from the source of supply thereof, means for driving said feeding means for the tape by said means for attaching the sheet and tape together to feed the tape in unison with the operation of the attaching of the tape and sheet, and means for automatically regulating the slack between the source of supply of the tape and the attachment of the same to the sheet by controlling said tape feeding means.

18. The combination, an apron taper having means for attaching the apron and the tape as the same is pulled from the taper, means driven by said apron taping means to feed the tape from the tape feeding means in proportion to the operation of said taper, and means governed by the slack in the tape between the source of supply of the tape and said taping means to regulate the tape feeder, whereby the tape is uniformly fed to said taper and maintained at a uniform tension in the slack thereof to regulate the attaching of the tape to the sheet to form a smooth taped apron sheet.

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