Feb. 17, 1953

R. G. PLATA ET AL

2,628,464

APPARATUS FOR WRAPPING ONE LENGTH OF MATERIAL WITH ANOTHER

Filed Dec. 9, 1949

4 Sheets-Sheet 1

Fig. 1.

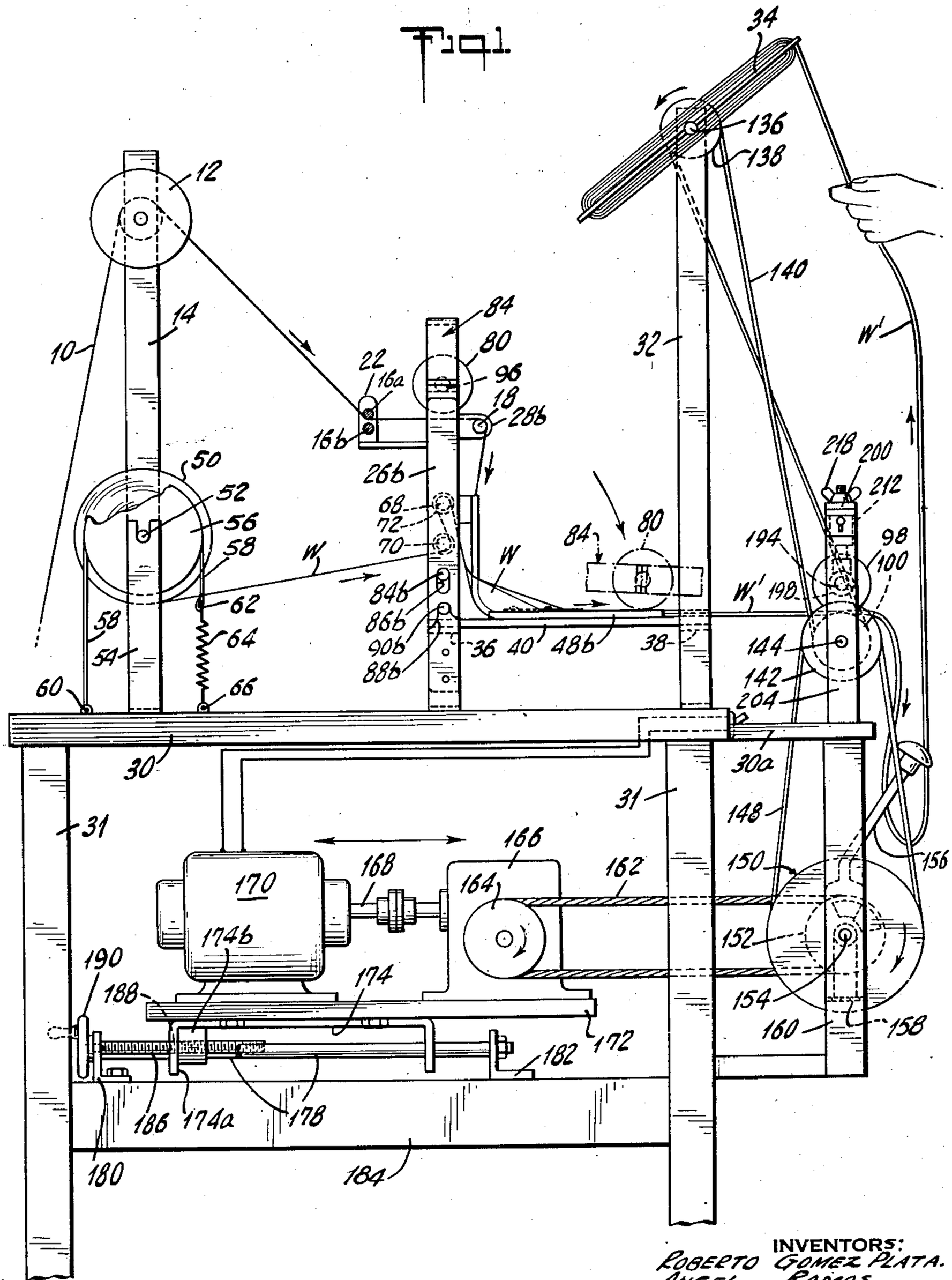

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Fig. 2.

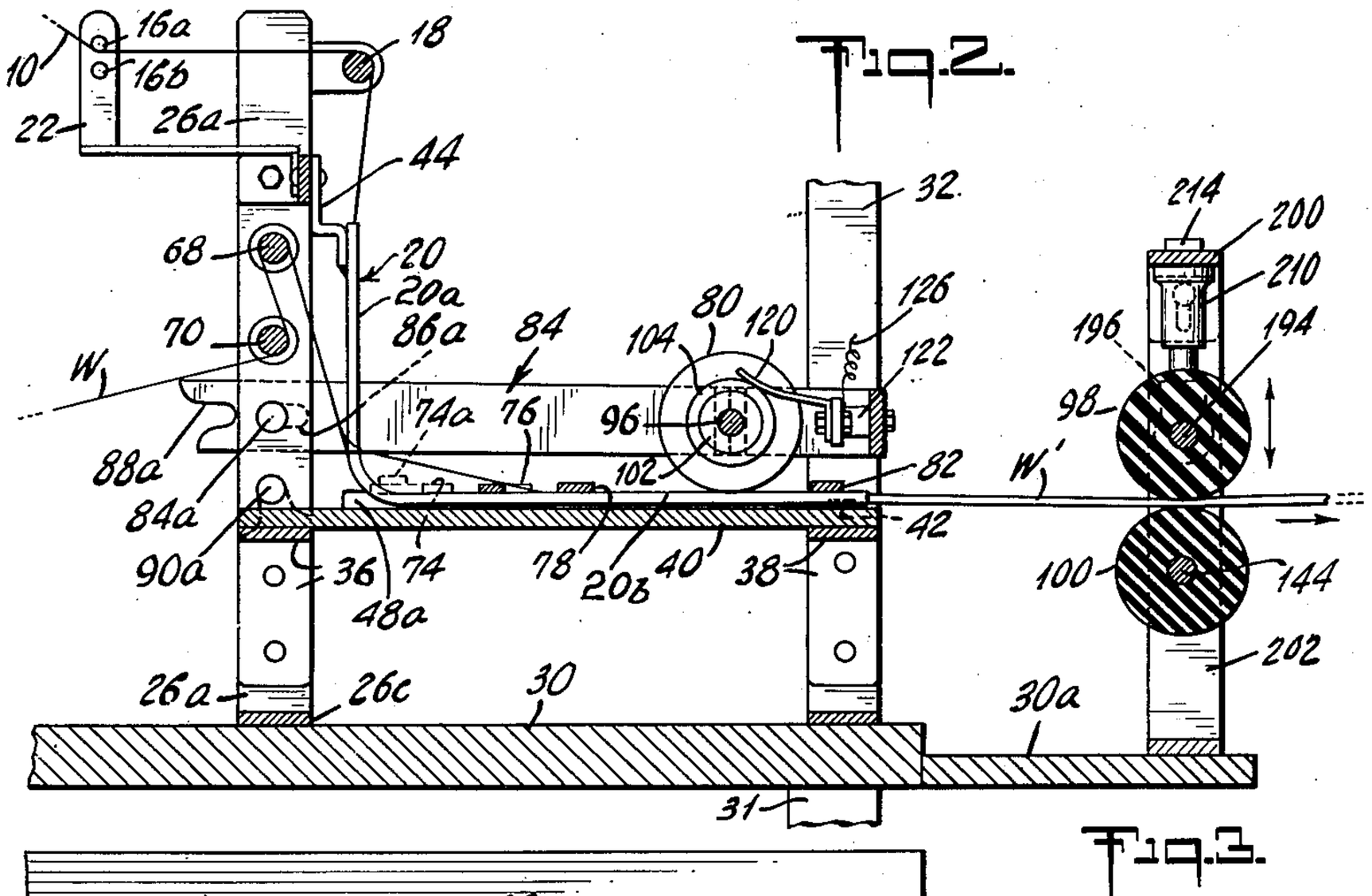

Fig. 3.

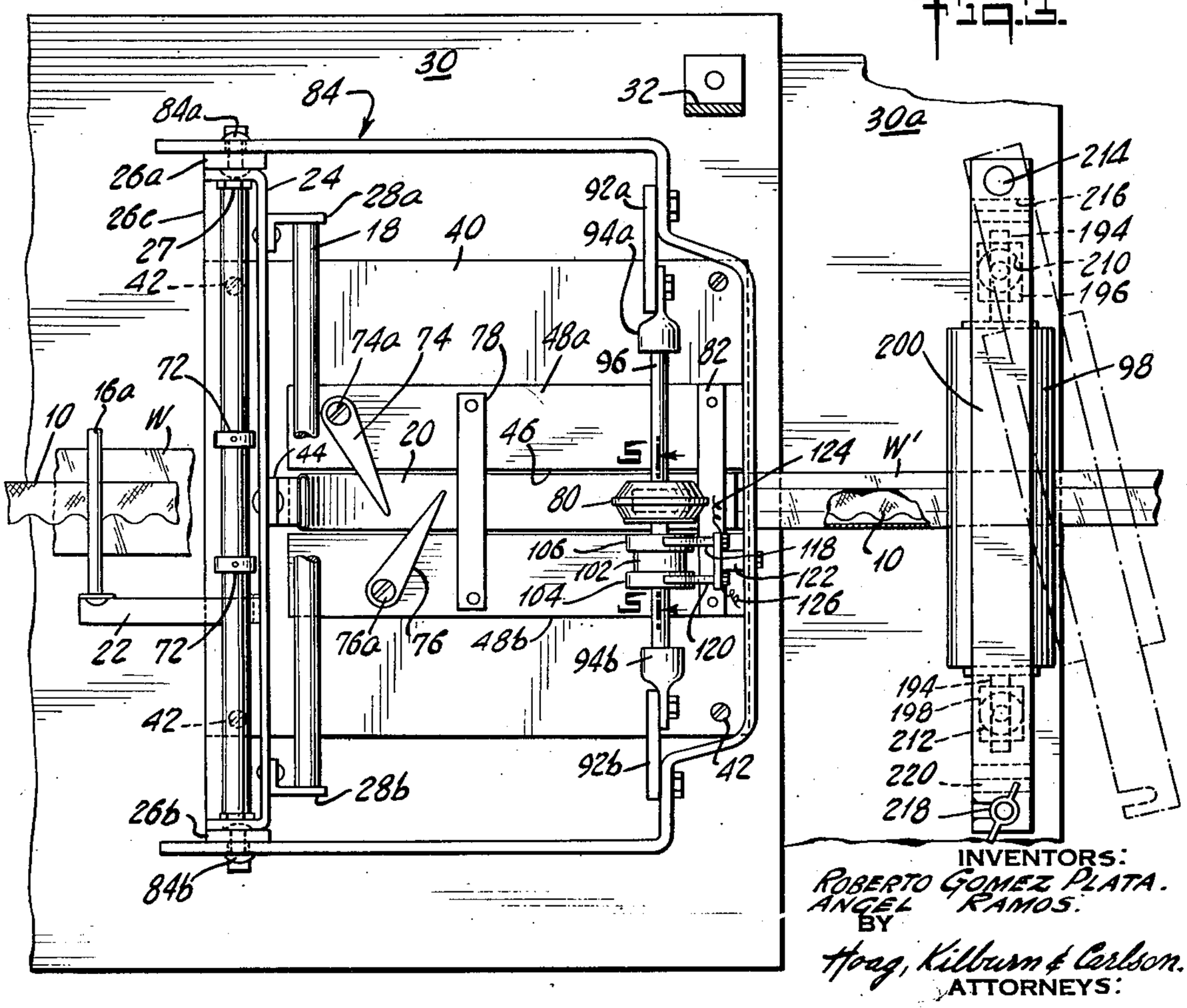

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Fig. 4.

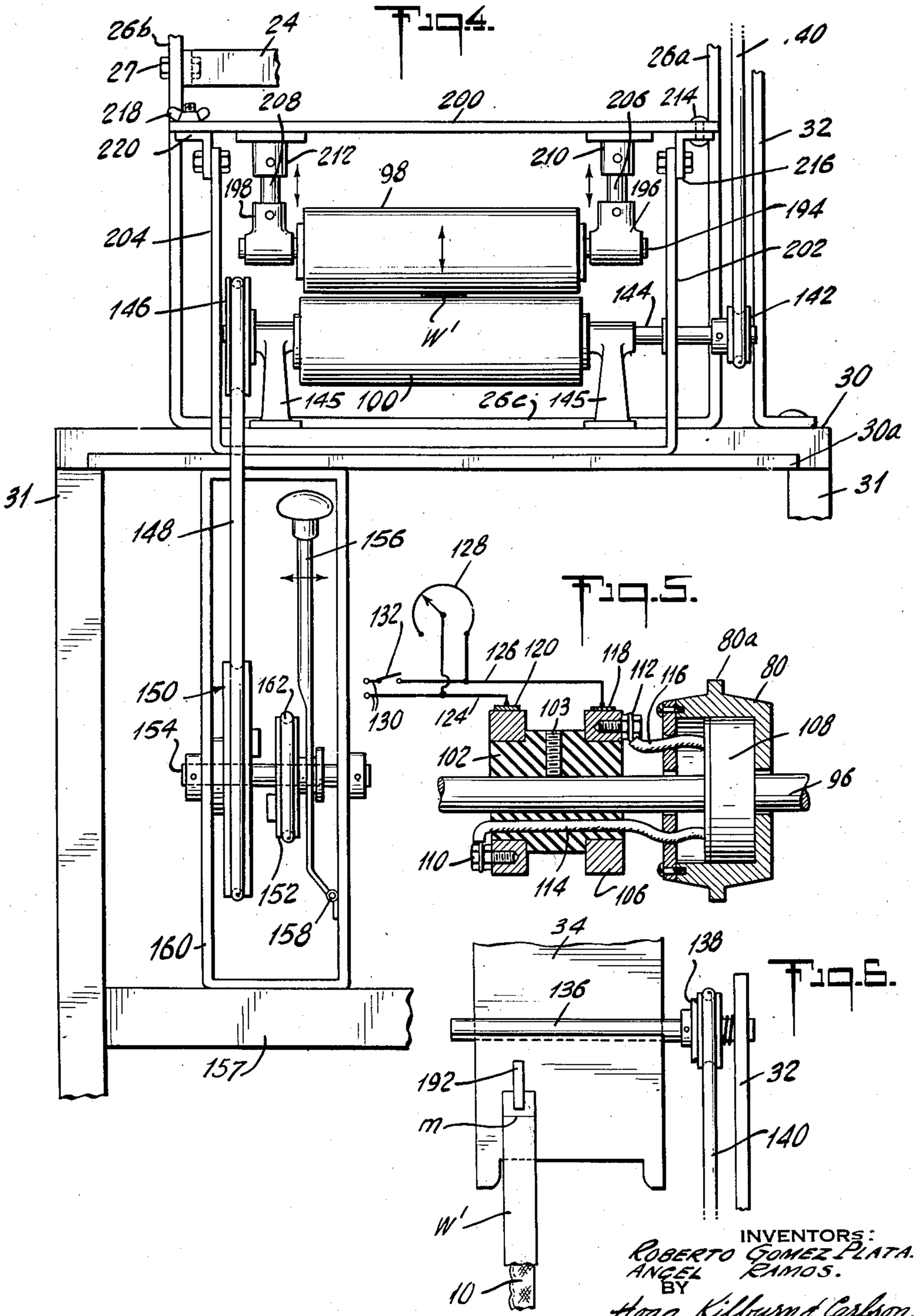

Fig. 5.

Fig. 6.

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Fig. 7.

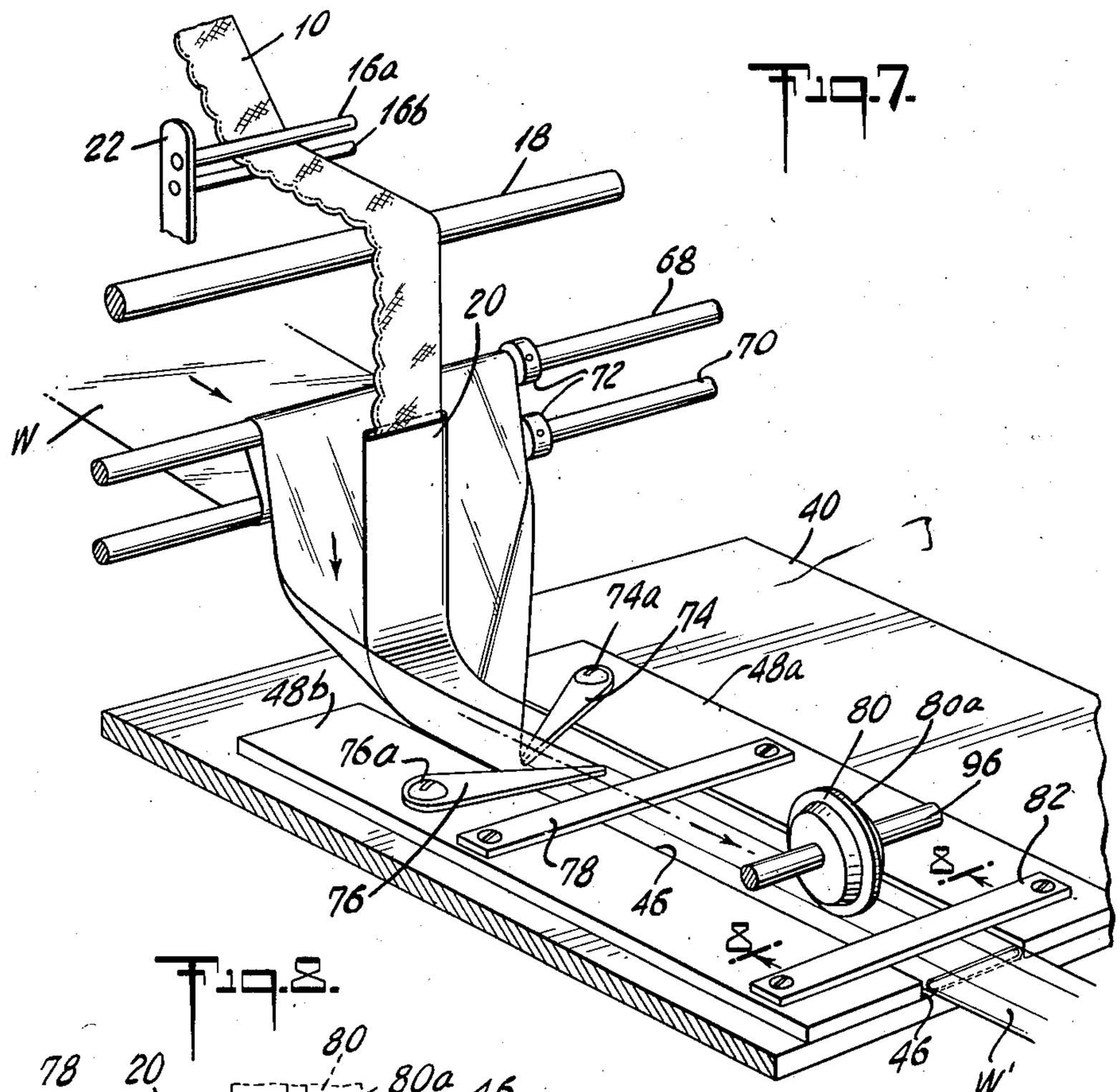


Fig. 8.

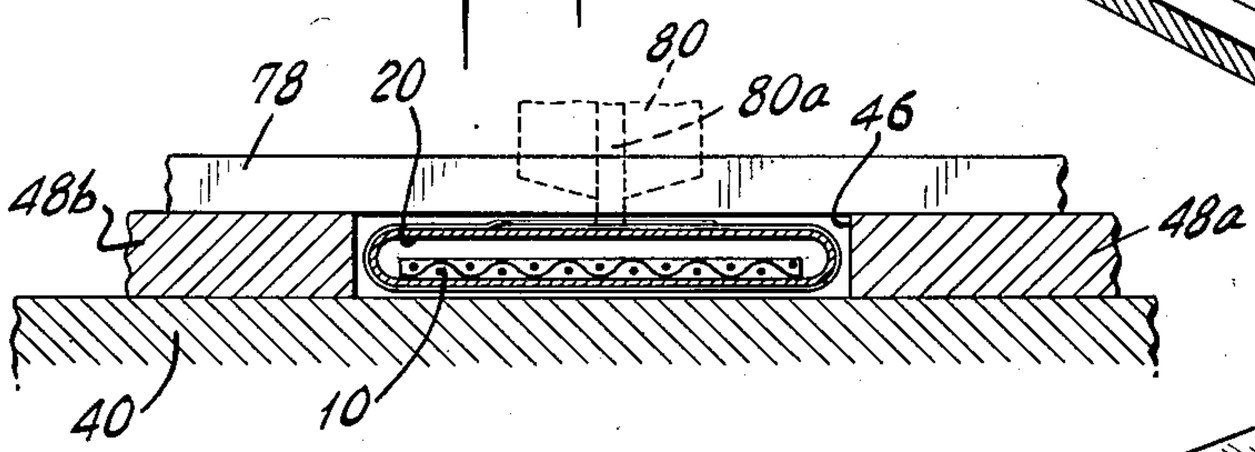
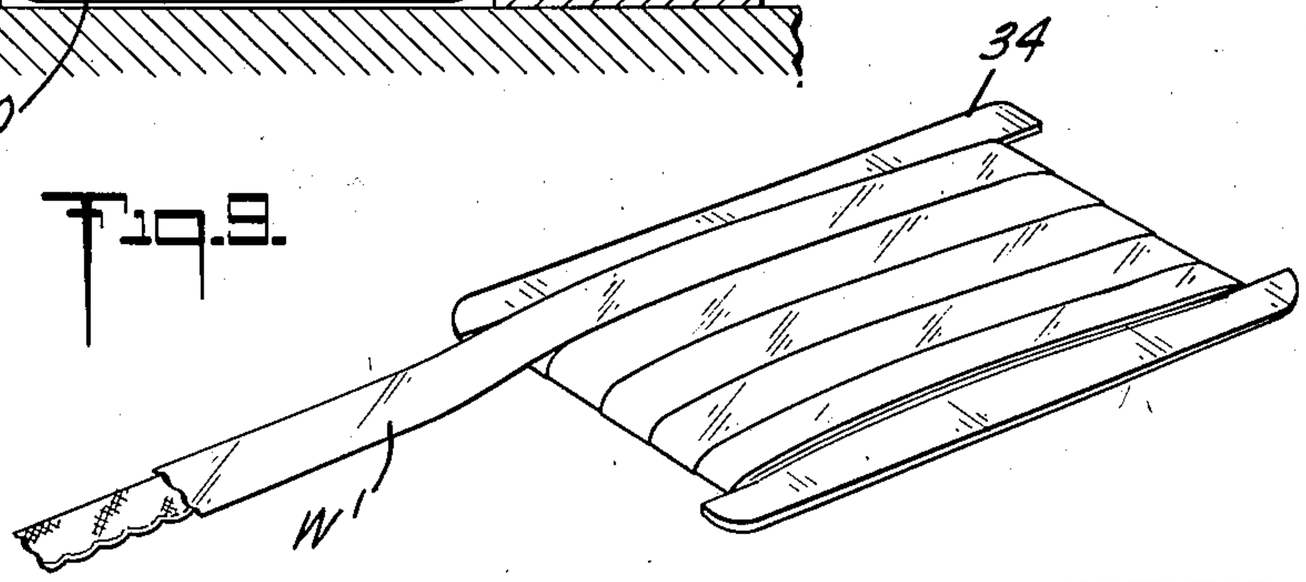


Fig. 9.



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2,628,464

APPARATUS FOR WRAPPING ONE LENGTH OF MATERIAL WITH ANOTHER

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Application December 9, 1949, Serial No. 132,171

1 Claim. (Cl. 53—83)

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This invention relates to a machine for wrapping or encasing one continuous moving length of material with another. It may be employed in connection with a number of different materials. One contemplated use is its application to wrapping a continuous length of lace, ribbon and the like with a wrapping of cellophane or the like.

An object of the invention is to provide simple and practical apparatus for wrapping one length of material with another.

Another object of the invention is to provide apparatus for encasing one material in another in a continuous operation.

Another object of the invention is to provide apparatus whereby a moving length of material may be continuously encased in another moving length of material.

Another object of the invention is to provide an elongated package comprising a length of material surrounded by a wrapping which in cross section is unitary and endless.

Another object of the invention is to provide apparatus of the above mentioned kind which is flexible to accommodate different thicknesses and widths of material and process them at different speeds suitable to different materials.

Other objects of the invention will be in part obvious or in part pointed out hereinafter.

The invention accordingly consists in the features of construction, combinations of elements, arrangements of parts, and in the several steps and relation and order of each of said steps to one or more of the others thereof, all as will be pointed out in the following description, and the scope of the application of which will be indicated in the folowing claim.

The invention will best be understood if the following description is read in connection with the drawings, in which,

Figure 1 is a side elevation of apparatus embodying the invention;

Figure 2 is a fragmental elevation, partly in cross section, and on an enlarged scale, of part of the device shown in Figure 1;

Figure 3 is a top elevation of the structure shown in Figure 2;

Figure 4 is a fragmental end elevation looking toward the left in Figure 1;

Figure 5 is a detail view taken on the line 5—5 of Figure 3;

Figure 6 is a fragmental view of the winding apparatus shown in the upper right hand of Figure 1;

Figure 7 is a perspective view of a portion of the structure shown in Figure 1;

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Figure 8 is an end view, partly in cross section, taken on the line 8—8 of Figure 7; and

Figure 9 is a perspective view of a length of lace wrapped in cellophane and wound on a support.

In the embodiment of the invention described herein a continuous length 10 of material, such for example as a strip of lace, is led from any source of supply over a guide spool 12 mounted on an upright 14, to and between guide pins 16^a and 16^b and over a guide bar 18 into and through a right angled tube-like shielding or confining member 20, after which it passes, together with its wrapping, between pressure rolls 98 and 100 by which it is advanced, as will be explained. The guide pins 16^a and 16^b project in parallel relation from bracket 22 which extends from the bar 24 the ends of which are bent at right angles and secured by bolts 27 to the upright frame members 26^a and 26^b respectively, which, as shown, are interconnected at the base by the cross member 26^c. Guide rod 18 is supported between the brackets 28^a and 28^b which project from cross bar 24.

The upright 14 is shown projecting upwardly from a table top or support surface 30, which may be elevated by legs 31 and across the upper surface of which the cross member 26^c extends. On the opposite side of the frame 26 from the upright 14 is the upright 32 on which a rewinding spool 34 is rotatably mounted for winding up the wrapped length of material, as will be explained. On the inner side of upright 32 as shown in Figure 2, is a bracket 38 extending up from the table top 30, and removably supported on said bracket and on the cross member 36 extending between the upright frame members 26^a and 26^b, is a platform 40. As shown the platform 40 is secured on said bracket 38 and said cross member 36 as by screws 42, so that one platform may be readily substituted for another having a channel of different width as will be explained.

The vertical portion 20^a of the right angled confining guide member 20 which is preferably closed or substantially closed and shaped to conform to the shape of the material to be wrapped, is supported on bracket 44 projecting from cross bar 24. On platform 40 a channel 46 is provided the width of which will depend upon the width of the material to be wrapped. Channel 46 is defined by two side plates 48^a and 48^b the height of which will also depend upon the particular material to be wrapped and the wrapping employed. The lower, horizontal portion 20^b of the guide and confining member 20 is suspended in said channel parallel with the bottom of the

channel but spaced therefrom sufficiently to permit the wrapping material W to pass freely under the said portion 20b of member 20. As shown herein the wrapping material W, is cellophane or another heat sealable and preferably transparent material and is supplied from the roll 50 mounted on the cross rod 52 which is removably supported between upright 14 and the upright 54 the upper end of which is shown bifurcated to provide for the ready removal of the roll 50 and the substitution of a new roll on rod 52. Also mounted on rod 52 a brake drum 56 may be provided in the form of a pulley fixed to said rod 52 over which, and in frictional contact with which, extends a cord or tape 58 which is secured at one end to table top 30 at 60, and the other end of which is secured at 62 to a tension spring 64 which is fastened to support surface 30 at 66.

From drum 50 the wrapping material W is led in open condition around the guide rods 68 and 70 which are supported between the uprights 26a and 26b respectively. Adjustable guide collars 72 are provided on said guide rods, a pair being supplied on each of said rods and spaced apart a distance corresponding to the width of the wrapping material W being employed. From guide rods 68 and 70 the wrapping material is led down behind the vertically extending portion of guide tube 20 and under its horizontally extending portion 20b and its medial longitudinal portion is thus brought into the channel 46 and its lateral margins are turned upwardly by contact with the adjacent edges of the plates 48a and 48b respectively. On said plates and projecting inwardly across the said channel 46 are the folding fingers 74 and 76, finger 74 being mounted on plate 48a by pivot 74a and finger 76 being mounted on plate 48b by pivot 76a. The fingers 74 and 76 extend angularly across said channel 46 and said tube-like member 20b, and the end of said fingers extend beyond the central longitudinal line of channel 46 and serve to turn or fold the margins of the web or wrapping material W into overlapping position on the said member 20b which thus serves as a form around which the material W is shaped to produce a tubular closure. The wrapping material W is supplied in a strip or web having a width relative to the width of the channel 46 to insure that the free margins will overlap when folded over the member 20b.

To prevent the overlapped margins of the wrapping material W from rising up in channel 46, after passing out from under fingers 74 and 76, a cross member 78 may be provided extending across channel 46 secured on top of the plates 48a and 48b in advance of the sealing roll 80. The cross member 82 shown extending over channel 46 beyond the sealing roll is employed primarily merely to join the plates 48a and 48b and keep them in spaced relation.

The sealing roll 80 as shown is a heated sealing roll. It will be understood that any sealing means may be employed suitable to the wrapping material used. Sealing roll 80 is mounted on a U-shaped member 84 the legs of which are pivoted to the uprights 26a and 26b respectively by pivots 84a and 84b, fixed to and projecting from said uprights respectively so that the arm 84 may be swung from operative horizontal position to inoperative vertical position as shown in Figure 1. Said pivots 84a and 84b engage in slots 86a and 86b provided in said U-shaped member 84 adjacent its free ends respectively. The ends of the legs of said U-shaped member 84

are bifurcated at 88a and 88b said bifurcations being adapted to receive and rest on the pins 90a and 90b respectively projecting outwardly from the said vertical uprights 26a and 26b respectively. Member 84 is movable with respect to the uprights 26a and 26b to the extent of the length of the slots 86a and 86b which are sufficiently long to permit the bifurcated lower ends of said U-shaped member 84 to be lifted above and dropped down on the pins 90a and 90b thus locking said member 84 in upright, inoperative position to give free access to the platform 40.

Projecting from opposite legs of the member 84 are brackets 92a and 92b supporting the cup-shaped bearings 94a and 94b respectively between which is rotatably mounted the spindle 96 on which said sealing roll 80 is fixedly mounted. The roll 80 and spindle 96 are rotated by frictional engagement between flange 80a projecting radially from around the periphery of said roll at its median line and the portion of the web of wrapping material W overlying the portion 20b of tube 20, the web being advanced by the action of the pressure rolls 98 and 100 as will be described. Also fixed on spindle 96 by pressure screw 103 is an annular bushing 102 (Figure 5), which may desirably be made of asbestos or the like, on which are supported the metal contact rings 104 and 106 which are connected with a heating unit 108, contained within roll 80, by means of the contact terminals 110 and 112 respectively and the leads 114 and 116 respectively. Resting on contact rings 104 and 106 are the wiping contacts 118 and 120 (Figure 3), which are supported by the insulating bracket 122 supported by said member 84, said wiping contacts being connected respectively to the flexible conductors 126 and 124 which are connected to the opposite sides of a rheostat 128, shown diagrammatically in Figure 5, connected to a source of supply through the leads 130 controlled by the line switch 132.

The heat transmitted from flange 80a of the sealing roll 80 to the overlapped margins of the wrapping material W (see Figure 8), is to cause said overlapped margins to adhere and be sealed together, as is well understood, thus forming an elongated travelling closure or envelope W' surrounding the discharge end of tube 20 and moving away from the tube, so that the strip of material 10 is discharged from the tube into a travelling envelope W' of wrapping material.

The elongated package thus formed comprising material 10 encased in its envelope of wrapping material W' passes between pressure rolls 98 and 100 which are preferably rubber covered and are adjustably mounted as will be described, for movement to regulate the pressure exerted on the material 10 and its wrapping. The pressure rolls engage and continuously draw the lengths of materials 10 and W from their sources through the wrapping step and deliver them as a wrapped package comprising in cross section a thin member wrapped in an endless flattened ring. After passing between rolls 98 and 100 the elongated package is preferably cut into desired lengths, each of which may be wound on a support 134, which, for light materials, may be a sheet of cardboard. Projecting from the top of upright 32 is a split spindle 136 between the spring-like ends of which the support 34 may be inserted and held while the spindle is rotated, as for example by means of the friction clutch 138 mounted on said spindle 136 and driven by a belt 140 from a pulley 142 mounted on shaft 144 rotatably supported in

bearings 145 supported on table top extension 30a. On shaft 144 are also mounted pressure roll 100, and pulley 146 which is driven through belt 148 from a pulley comprising a fixed clutch member 150 adapted to be engaged by a slideable clutch member 152. Since the particular clutch means shown is well known and constitutes no part of this invention it will not be described in detail but the said clutch members are shown mounted on a shaft 154 extending between the sides of an enclosure 160 supported under the table top extension 30a on frame member 157. Clutch member 152 is slideable on shaft 154 by the operation of the control handle 156 the lower end of which is shown hingedly connected at 158 on the inside of said clutch enclosure 160. Clutch pulley 152 is rotatably as well as slideably mounted on shaft 154 and is driven by an extensible belt 162 from the drive pulley 164 of speed regulator 166 which in turn is driven by shaft 168 from motor 170. Speed regulator 166 and motor 170 are shown mounted on platform 172 which is supported on inverted channel member 174 which in turn is mounted for movement in a horizontal plane on guide rods 178 which are supported by the brackets 180 and 182 which rest on the frame cross support means 184 extending between said table legs 31. Extending through bracket 180 and rotatably supported thereby is an externally threaded adjustment screw 186 which extends through the bent down end 174a of the inverted channel member 174 and engages the internally threaded bore 188 extending through said end 174a and its inwardly projecting boss 174b. At its outer end screw 186 has the hand wheel 190 by which the screw may be rotated to move platform 174 toward or away from the pulley 152 thereby shortening or lengthening belt 162 and thereby raising or lowering the belt in the grooves of pulleys 164 and 152 respectively and correspondingly increasing or decreasing the speed of rotation of the belt in a well known manner thereby controlling the speed of rotation of pressure roll 100 which in turn controls the speed of rotation of roll 98 through frictional contact. It will be understood that regulation of the rate of rotation of the pressure rolls 98 and 100 will result in a synchronous change in the speed of travel of material 10 and its wrapping W and in the speed of rotation of spindle 136 and the winder and support 34 mounted thereon.

After leaving the pressure rolls 98 and 100 the leading end of the package comprising the length of material 10 and the wrapper envelope W' is secured in any desired way, as for example by a piece of adhesive tape 192, see Figure 6, to the said support 34 which is mounted on spindle 136 and revolved therewith until a winding of predetermined length is obtained. In order to facilitate obtaining wound packages of uniform length the material 10 or the wrapping W may be initially marked at desired intervals. If cellophane or a similar transparent material is used for the wrapping marks made on material 10 will be visible through the wrapping as indicated at *m* in Figure 6. If the cutting operation is performed by hand the operator may sever each length after the greater part of the length has been wound upon a support 34. He then immediately attaches the leading end of the unsevered package to another support 134 and substitutes the latter on spindle 136 for the support on which the preceding and now severed length is wound.

As stated above pressure roll 100 is mounted on shaft 144 rotatably supported in bearings 145 supported on table top extension 30a. Roll 98 is adjustably mounted for movement toward or away from roll 100 in a vertical plane being mounted on shaft 194 suspended from bearings 196 and 198 supported from cross frame member 200 which in turn is supported on the upright frame members 202 and 204. The bearings 196 and 198 are fixed to the lower ends of rods 206 and 208 respectively the upper ends of which are threadedly engaged in the cup-shaped bearings 210 and 212 which are fixed to and project from the under surface of said cross member 200. Member 200 is pivotally mounted by a vertical pivot 214 on the bracket 216 secured to the upright support member 202 and may be moved in a horizontal plane to give access to the roll 100. The opposite end of said support member 200 is provided with a thumb screw 218 adapted to engage with a bracket 220 mounted on the upright support member 204 for securing the cross support member 200 in position with roll 98 in operative relation to roll 100.

While member 20 has for convenience been referred to herein as a tube-like member or tube it will be understood that it does not have to be endless in cross section or unitary, its function being to provide a shield or form around which the length W may be wrapped to form a wrapper endless in cross section and tubular, encasing the length of material 10.

The method disclosed herein may be performed by various structures as well as manually. It has the advantage of flexibility in being applicable to a wide variety of materials, and to lengths differing widely in size and shape.

It will thus be seen that there has been provided by this invention an apparatus in which the various objects hereinabove set forth together with many thoroughly practical advantages are successfully achieved. As various possible embodiments might be made of the mechanical features of the above invention and as the art herein described might be varied in various parts, all without departing from the scope of the invention, it is to be understood that all matter hereinbefore set forth or shown in the accompanying drawings is to be interpreted as illustrative and not in a limiting sense.

What we claim is:

Apparatus for encasing a running length of lace or the like in open width with a second continuous length of material supplied in open width, which comprises, a base, a plurality of channel forming plates secured on said base in a parallel relation to form a channel of desired width and height having the base as its bottom and said plates as its sides, a tube-like member having a cross section of less height than width, said tube-like member comprising a plurality of angularly related portions including a portion extending longitudinally within said channel but spaced from the bottom and sides of said channel, and means for supporting said tube-like member, the other portion of said tube extending upwardly from said channel, means for leading a continuous length of lace or the like into said upwardly extending portion of said tube and through the portion of the tube positioned within said channel, means for supplying a second length of material in open width and feeding it between said tube-like member and said channel with its longitudinal central portion in said channel and its lateral margins turned angularly with respect to said central portion by the sides of the channel respectively, contact members extending across said channel

from opposite sides to fold said turned lateral margins toward one another around said tube-like member, means for securing together said folded over margins to form an envelope, and means for continuously advancing said lengths to cause said length of lace or the like to be continuously advanced through said tube-like member into said envelope formed from said second length of material, whereby there is produced a continuous travelling elongated package comprising said length of lace or the like in open width encased in a continuous envelope formed from said second length of material.

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