

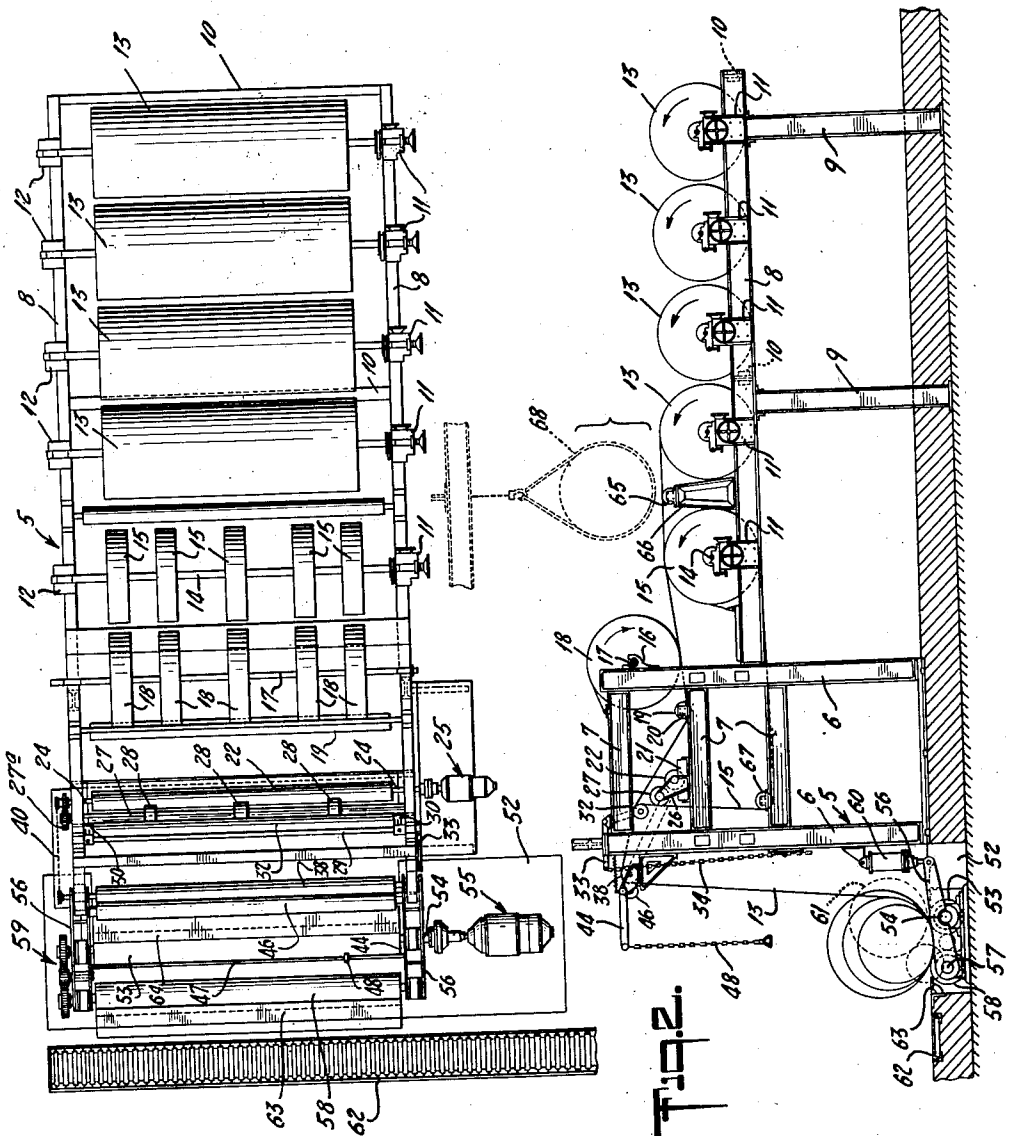
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ROLL WRAPPING MACHINE

2,564,594

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2 Sheets-Sheet 1



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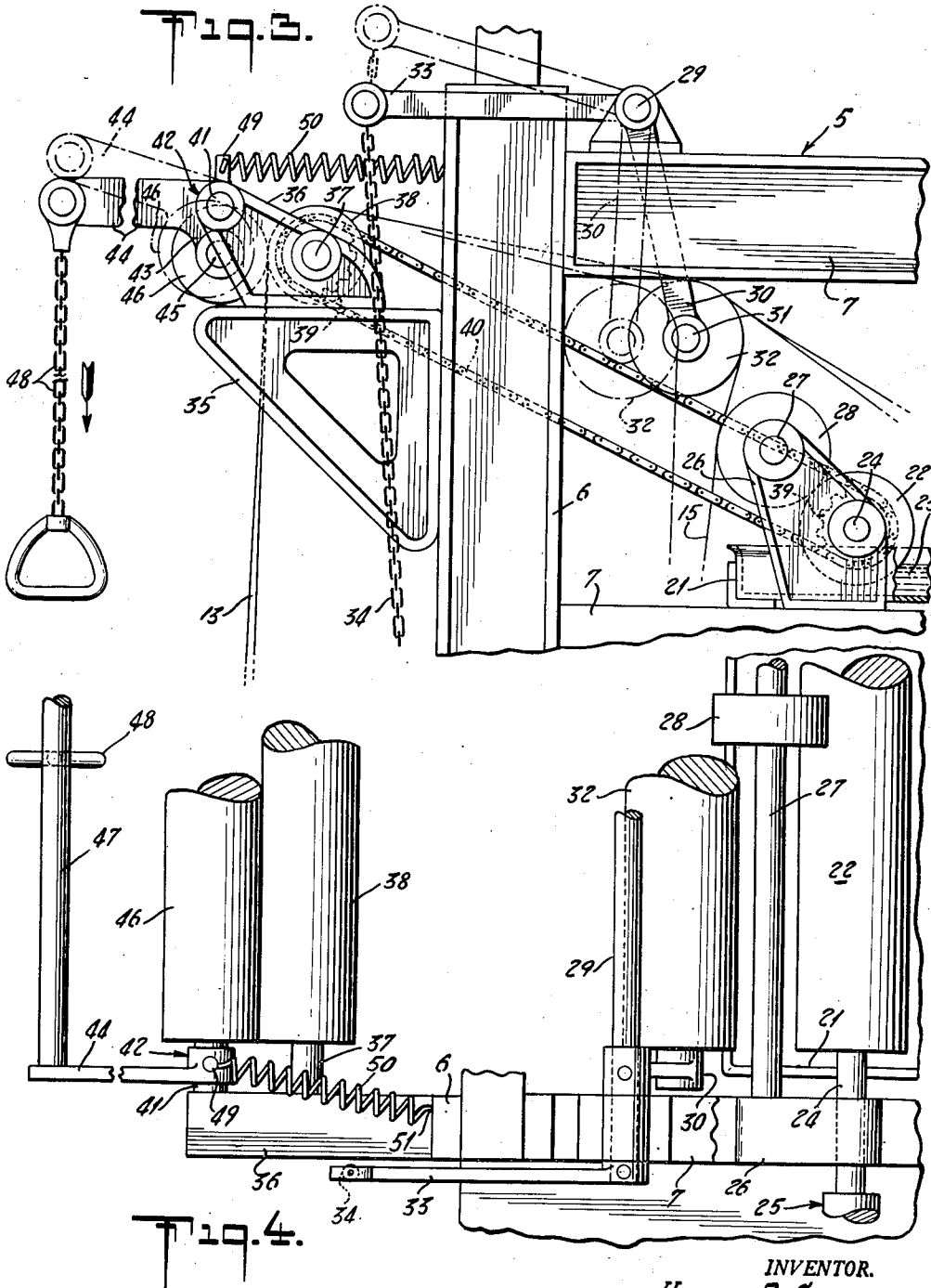
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# UNITED STATES PATENT OFFICE

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## ROLL WRAPPING MACHINE

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2 Claims. (Cl. 93--2)

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This invention relates to new and useful improvements in wrapping machinery and particularly seeks to provide a novel machine for applying one or more convolutely-wound layers of wrapping paper around the outside of a large roll of paper such as newsprint.

Machines have been heretofore devised for completely automatically applying such wrappers to large paper rolls but such machines have either proved to be too expensive to warrant the cost of installation or have been too inflexible in the sizes of paper rolls that they were designed to handle. This invention seeks to provide a machine which will mechanically wrap large rolls of paper but which is so constructed that a minimum number of movable mechanical elements are involved in the construction and operation thereof.

It is therefore an object of this invention to provide a novel roll wrapping machine which is adapted to withdraw wrapping paper from a supply roll, feed it across a glue-applying station and down to the large roll of paper around which the wrapper is to be placed.

Another object of this invention is to provide a machine of the character described in which upper drawrolls are provided for initially withdrawing wrapping paper from the supply roll and feeding it to the wrapping station of the machine.

Another object of this invention is to provide a machine of the character stated in which the large roll of paper to be wrapped is positioned on a pair of operatively driven carrier rolls so that the carrier rolls and paper roll together cooperate to continue the withdrawal of the wrapping paper from a supply roll thereof while permitting discontinuance of the operative drive of the initially employed upper drawrolls.

Another object of this invention is to provide a machine of the character stated in which a supply of wrapping paper is carried on a backstand of sufficient size that a plurality of rolls of wrapping paper may be supported thereon.

A further object of this invention is to provide a machine of the character stated in which one of the main carrier rolls supporting the large paper roll to be wrapped is supported by a pivotal frame operable to move the wrapped roll of paper from its position on the carrying rolls onto a slightly inclined receiving floor from which the wrapped roll is removed for further finishing operations by crimping and heading machines.

With these and other objects in view, the nature of which will be more apparent, the invention will be more fully understood by reference to the

drawings, the accompanying detailed description, and the appended claims.

In the drawings,

Fig. 1 is a top plan view of a roll wrapping machine constructed in accordance with this invention;

Fig. 2 is a partly sectionalized side elevation thereof;

Fig. 3 is an enlarged side elevation of the glue applicator and drawroll elements of Fig. 2; and

Fig. 4 is a fragmentary top plan view of portions of the mechanism illustrated in side elevation in Fig. 3.

Referring to the drawings in detail the invention as illustrated is embodied in a roll wrapping machine which includes a main frame generally indicated at 5 which is formed from structural steel and includes on each side a pair of upright girders 6, 6, horizontal spacing girders 7 and rearwardly extending girders 8, the middle and end portions of which are supported by vertical girders 9. The side assemblies included by the girders 8 and 9 are held together by horizontally disposed spacing members 10 to form a backstand for the machine. The girders 8 are provided with a plurality of adjustable bearing assemblies 11 on one side and fixed bearings 12 on the other side. As illustrated in Figs. 1 and 2 of the drawings the four rearmost bearing assemblies 11 and 12 are so spaced as to support four supply rolls 13 of wrapping paper. The foremost pair of bearing assemblies 11 and 12 carried by the rearwardly extending girders 8 supports a transversely disposed shaft 14 upon which is mounted a plurality of rolls 15 of relatively narrow wrapping or banding paper usable for a purpose which will be hereinafter more fully described. The rear face of the upper part of one of the upright girders 6, on each side of the machine is provided with an open top bearing 16 adapted to support a transversely disposed shaft 17 carrying a plurality of rolls 18 of relatively narrow wrapping or banding paper which function in a manner similar to the rolls 15, as will also be hereinafter more fully described.

An idler roll 19 is supported on bearings 20, 20 on the middle horizontal members 7 of the main frame. Immediately ahead of the idler roll 19 and also supported upon the same horizontal girders 7 is a glue pot 21 adapted to hold glue or other adhesive for application to the strips of banding paper to be withdrawn from the rolls 15 carried on the shaft 14. A fountain roll 22 is journaled in suitable bearings on either end of the glue pot 21 and is partially immersed in ad-

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hesive 23 maintained in the glue pot. The fountain roll 22 is operably connected by a shaft 24 to a motor and reduction gear-driving unit generally indicated at 25.

Each end of the glue pot 21 is provided with an upstanding bracket 26 in which is journaled a horizontal shaft 27 carrying a plurality of glue applicator or transfer wheels 28 equal in number to and in alignment with the corresponding rolls 15 of banding paper. The shaft 27 is positively driven from the shaft 24 through the medium of spur gears 27a affixed to the shafts.

A rock shaft 29 is rotatably mounted on the upper girders 7 in a position above and slightly offset from the vertical plane passing through the shaft 27 carrying the glue transfer wheels. The shaft 29 is provided with a pair of spaced depending arms 30, 30 which rotatably support the ends of a shaft 31 upon which is rigidly affixed a web shifting roll 32. A forwardly extending arm 33 is rigidly affixed to one end of the rock shaft 29 and is provided at its upper end with a chain 34 by which the rock shaft and its associated shifting roll 32 can be manually manipulated.

A pair of triangularly shaped mounting lugs 35 are rigidly affixed to the forward sides of one pair of the vertical girders 6 and are each provided with an upstanding portion 36. The bracket portions 36 rotatably support a shaft 37 carrying a driven feed roll 38. The roll 38 is adapted to be continuously driven from the reduction gear driving unit 25 through sprocket gears 39 carried by the shafts 24 and 37 and a sprocket chain 40.

A rock shaft 41 is journaled in the upper portion of the brackets 36 and carries adjacent each end thereof a bell crank generally indicated at 42 having a relatively short depending portion 43 and a relatively long forwardly projecting portion 44. A shaft 45 is journaled in the depending portion 43 of the bell cranks and carries an idler feed roll 46 which is adapted to be moved into and out of driven relationship with the roll 38 in order to initiate or stop feed movement of the various webs of paper as will be hereinafter more fully described. The forwardly projecting arms 44 of the bell cranks are spanned by a rigidly affixed rod 47 to form a bail from the central portion of which a chain 48 depends downwardly and provides the means by which manual manipulation of the feed roll 46 may be effected. At least one of the bell cranks 42 may be provided with an upstanding lug or stud 49 to which is affixed one end of a tension spring 50 having its other end affixed to the nearest vertical girder 6 as indicated at 51.

A rectangular pit 52 is formed in the base or floor upon which the machine is mounted and is located immediately adjacent the lead pair of upright girders 6. The pit 52 is proportioned to receive suitable operatively driven carrying rolls which support and rotate a roll of paper to be wrapped, as will be described in greater detail. To this end a relatively heavy roll 53 is rigidly affixed to a shaft 54 and adapted to be driven through the medium of a reduction gear motor drive generally indicated at 55. A fabricated rock arm assembly 56 is pivotally supported at its midpoint on each end of the shaft 54. The forwardly projecting ends of the rock arms 56 rotatably carry a shaft 57 identical with the shaft 54 upon which is mounted a roll 58 identical with the roll 53. The roll 58 is positively driven from the shaft 54 through the medium of gearing generally indicated at 59 so arranged that both of the rolls 53

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and 58 rotate in the same direction in order to provide for substantially positive rotation of the newsprint roll which is carried thereon for purposes of applying the wrapping paper thereto. The rearward ends of the rock arms 56 are operatively connected to a pair of air or hydraulic piston and cylinder assemblies 60 so that the roll 58 may be raised from its position shown in Fig. 2 of the drawings to a position indicated by dotted lines which places it above the roll 53 a distance sufficient that a newsprint roll carried thereon will be rolled onto the machine floor as indicated by the dotted line position 61.

A stationary roller-type conveyor 62 is inset into the building floor in spaced parallel relation to the pit 52 and provides the means by which fresh rolls of newsprint may be moved into position for wrapping operations on this machine. As a newsprint roll is moved along the conveyor 62 it is stopped in alignment with the wrapping machine and rolled into operative engagement with the carrier rolls 53 and 58 across a hinged plate 63 which spans the void between the edge of the pit and the associated surface of the carrier roll 58. A similar plate 64 is hingedly secured to the opposite side of the pit 52 and spans the void between the pit wall and the associated carrier roll 53.

When this machine is prepared for operation a plurality of the supply rolls 13 of wrapping paper is mounted on the back portion of the frame, a supply of the relatively narrow rolls 15 of outer banding paper are mounted on the shaft 14 and a similar number of rolls 18 of the inner banding paper are mounted on the shaft 17. In normal operation a web of wrapping paper is led from only one of the supply rolls 13 thereof at a time. With respect to the narrow rolls 15 and 18 of banding paper the supply rolls 15 are employed as the outer banding wrappers for all shipments whereas the rolls 18 of inner banding paper generally are employed only for export shipment. Accordingly, the use of the banding rolls 18 is determined entirely by the nature of the shipment to be effected.

In order to prevent the web of paper being pulled from the supply roll 13 from exerting too much frictional drag on the rolls 15 of banding paper an intermediate idler roll 65 may be mounted upon a suitable stand 66 in such a manner that the upper surface of the idler roll lies in the same horizontal plane as the top surface of the supply roll 13 when full. The paper web from the roll 13 thus passes over the idler roll 65 and the rolls 15 of outer banding paper and then it passes under the rolls 18 of inner banding paper and the idler roll 19. The web is then passed upwardly over the web-shifting roll 32 and thence over the driven feed roll 38 and downwardly between the nip formed by it and the idler feed roll 46. At this point the web from the supply roll 13 is extending downwardly at the front end of the machine in position to be placed around a roll of newsprint to be wrapped. The operator of the machine at this time will manually apply a relatively wide stripe of adhesive to the leading end of the wrapper and will pull down on the chain 48 on the bell crank 44 to move the idler feed roll 46 into pressure engagement with the driven feed roll 38 so that the web from the supply roll 13 will be positively advanced. As the lower end of the web comes down into such a position that it can overlie the main carrier rolls 53 and 58 the operator will release the control chain 48 to relieve the driving pres-

sure of the feed roll 38 and thus stop the feed of the web. The roll of newsprint to be wrapped is then rolled from its position on the conveyor 62 onto a position where it is supported by the carrier rolls 53 and 58 and rests on the free end of the wrapper. The driving motor 55 is then started by suitable controls (not shown) to drive the carrier rolls and thus rotate the newsprint roll together with the wrapper from the supply roll 13 which will be drawn along the path previously described as the result of the frictional engagement created by the weight of the newsprint roll on the carrier rolls. The motor 55 will continue to be operated until the desired number of convoluted wraps have been made around the newsprint roll and then stopped.

When outer and inner bands are to be applied simultaneously with the application of the wrapper from a supply roll 13 the outer banding wrappers will be fed from the under side of the supply rolls 15, then under an idler roll 67 rotatably supported on the main frame beneath the glue pot 21, thence upwardly over the web-shifting roll 32 into juxtaposition on the under side of the web being withdrawn from the main wrapper supply roll 13 and from that point on will, of course, move simultaneously with the main web of paper. As a general rule it is necessary for the outer banding wrappers 15 to be adhesively secured to the main wrapper web 13 and this is effected through the glue pot, fountain roll and applicator wheel assembly.

When the machine has been placed into operation and the outer banding wrapper is to be adhesively secured to the main wrapper the operator will pull downwardly on the control chain 34 to shift the web-shifting roll 32 to the full line position shown in Figs. 2 and 3 of the drawings and the outer banding wrapper will pick up adhesive from the applicator wheels 28 and will be adhered to the main wrapper 13 as the combined webs pass over the driven feed roll 38. At such time as the machine is to be stopped for any appreciable length of time the operator merely releases the chain 34 and the natural tension imposed by the banding web 15 on the shifting roll 32 will cause the roll 32 to be moved to the left as viewed in Figs. 2 and 3 and thus effect disengagement of the banding wrapper from the glue applicator wheels 28.

Whenever inner bands are to be employed the webs from the supply rolls 18 of the inner banding paper are fed from the under side thereof to a position overlying the upper surface of the main wrapper web from the supply roll 13 prior to the time at which it passes under the idler roll 19 so that the inner banding paper and main wrapper will be maintained in juxtaposition and will be fed simultaneously by either the upper feed rolls 38 and 46 or the main carrier rolls 53 and 58 in cooperation with the newsprint roll being wrapped.

After the desired number of convolutions of wrapping paper have been applied to the newsprint roll and the driving mechanisms of the machine have been stopped the operator manually applies a broad stripe of adhesive across the front face of the combined webs as they extend downwardly between the upper feed rolls and the wrapped newsprint roll and then cuts the combined web along a line approximately medially of the stripe of adhesive. The stub end is, of course, then wrapped around the newsprint roll to complete the wrapping operation and the cylinder assemblies 60 are then actuated

through suitable controls (not shown) to remove the wrapped newsprint roll from its position on the carrier rolls and to impart a moderate rolling motion of it along the floor upon which the wrapping machine is mounted so that it can be readily moved from the wrapping station to a subsequent operating station where another machine will crimp the ends of the wrapper in preparation to receive the usual roll heads.

By reference to Fig. 1 of the drawings it will be observed that five of the rolls 15 of outer banding paper and a similar number of rolls 18 of the inner banding paper have been shown for purposes of illustration only. The drawing also shows that three glue applicator wheels 28 are mounted on their shaft 27. It will be appreciated that the number of glue applicator wheels 28 which are positioned on the shaft 27 at any given time will be equal only to the number of bands of outer wrapper that are to be applied to the newsprint roll. Similarly, the rolls 15 of outer banding paper will be placed in proper alignment with the glue applicator wheels 28 and in the event that there are more of the banding paper rolls carried on the shaft 14 than is required to be applied to the newsprint rolls being wrapped the excess rolls of banding paper serve merely as a reserve supply for continued operations of the machinery. The same arrangement is true with respect to the rolls 18 of inner banding paper and to three additional rolls 13 of the primary supply of wrapping paper. A renewal of the supply of banding paper rolls on their shafts can be effected manually since they are relatively light in weight, but the replenishment of supply of the main rolls 13 of wrapping paper due to their heavy weight must be effected by mechanical means, and to this end it will be observed that in Fig. 2 of the drawings there is indicated at 68 a dotted line representation of an overhead hoist with another supply roll of wrapping paper being moved into position on one of the roll mounts.

In the wrapping of newsprint or other papers which are shipped in large roll form it has been found necessary to apply not only a surface wrapper to the rolls but also to seal the ends thereof in order adequately to protect the paper. To this end when the wrapper is applied to the newsprint or other rolls the width of the web of wrapping paper should be sufficiently greater than the width of the newsprint roll that there will be a substantial overhang at each end. Thus after the wrapped roll of newsprint has been moved from the wrapping station to a subsequent operating station in the finishing room the overhanging ends of the wrapper can be crimped down over the ends of the newsprint roll to protect the outer portions of the ends thereof and also provide surfaces to which adhesive can be applied for the application and retention of circular roll heads which complete the covering and sealing of the wrapped roll. In view of this requirement it will be observed that the glue applicator wheels 28 of the instant machine will always be positioned appreciably within the edge limits of the webs coming from the supply rolls 13 of wrapping paper and that as a general rule the span between the endmost glue applicator wheels 28 will be approximately equal to the length of the roll of paper to be wrapped.

It is, of course, to be understood that various details of arrangements and proportions of parts may be modified within the scope of the appended claims.

I claim:

1. In a machine for wrapping large rolls of paper, a main frame, a supply roll of wrapping paper rotatably supported on said frame, a pair of supply rolls of relatively narrow outer banding paper rotatably supported on same frame and aligned inwardly of the ends of said wrapping paper roll, the distance spanned by said banding paper rolls being substantially equal to the width of the paper roll to be wrapped, means for applying adhesive to one face of each strip of banding paper as it is withdrawn from its supply roll, means to guide said strips of banding paper into juxtaposition with the web being withdrawn from said roll of wrapping paper, a pair of feed rolls for initially withdrawing paper from all of said supply rolls and for pressing the adhesive-coated strips of banding paper into adhering contact with said web of wrapping paper, said feed rolls including a driven feed roll and an idler feed roll, means to move one of said feed rolls into and out of paper feeding engagement with the other of said feed rolls, a pair of horizontally disposed carrier rolls located beneath said feed rolls and adapted to support a roll of paper to be wrapped, means to positively drive said carrier rolls to continue the withdrawal of paper from said supply rolls and effect the application of the same about the paper roll supported thereon, and separately controllable means to move one of said carrier rolls upwardly with respect to the other whereby to effect the removal of the wrapped roll of paper therefrom.

2. In a machine for wrapping large rolls of paper, a main frame, a supply roll of wrapping paper rotatably supported on said frame, a pair of supply rolls of relatively narrow outer banding paper rotatably supported on said frame and aligned inwardly of the ends of said wrapping paper roll, the distance spanned by said banding

paper rolls being substantially equal to the width of the paper roll to be wrapped, means for applying adhesive to one face of each strip of banding paper as it is withdrawn from its supply roll, means for moving the strips of banding paper into and out of adhesive-receiving contact with said adhesive-applying means, means to guide said strips of banding paper into juxtaposition with the web being withdrawn from said roll of wrapping paper, a pair of feed rolls for initially withdrawing paper from all of said supply rolls and for pressing the adhesive-coated strips of banding paper into adhering contact with said web of wrapping paper, said feed rolls including a driven feed roll and an idler feed roll, means to move one of said feed rolls into and out of paper-feeding engagement with the other of said feed rolls, a pair of horizontally disposed carrier rolls located beneath said feed rolls and adapted to support a roll of paper to be wrapped, means to positively drive said carrier rolls to continue the withdrawal of paper from said supply rolls and effect the application of the same about the paper roll supported thereon, and separately controlled means to move one of said carrier rolls upwardly with respect to the other whereby to effect the removal of the wrapped roll of paper therefrom.

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