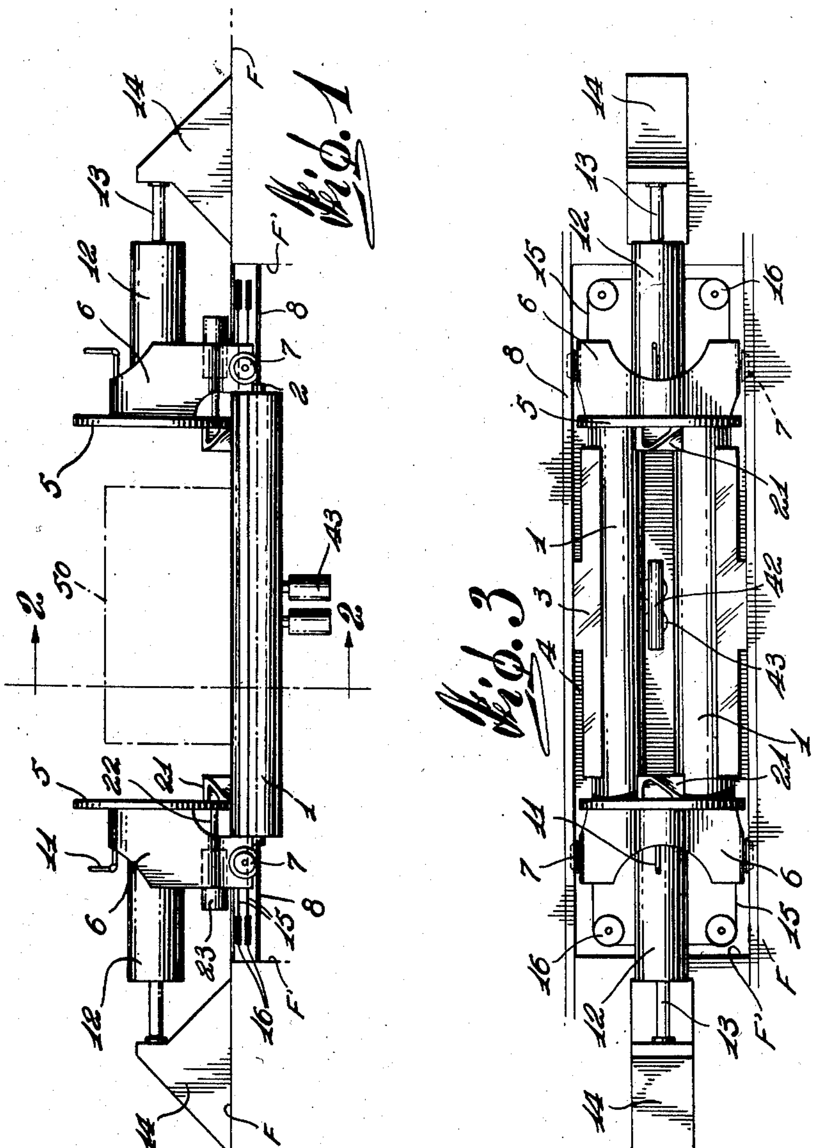
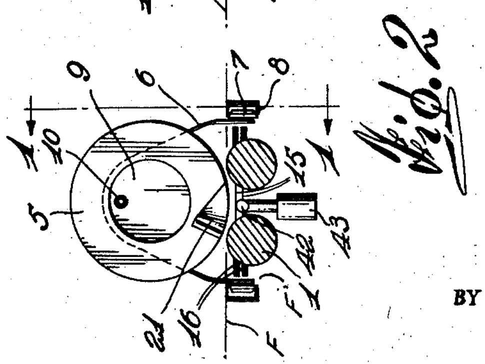
Aug. 27, 1957 C. M. GIBSON 2,803,935

ROLL WRAPPING MACHINE

Filed July 19, 1956 5 Sheets-Sheet 1





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ROLL WRAPPING MACHINE

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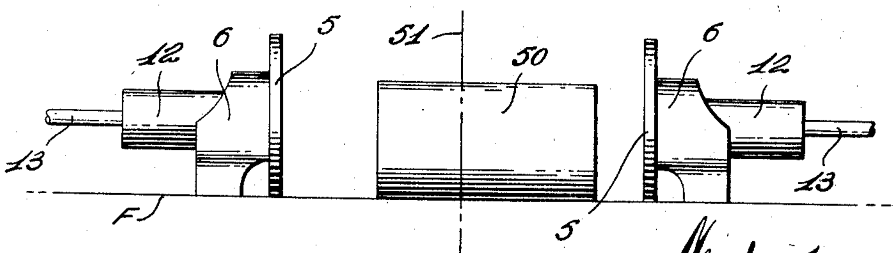

Fig. 4

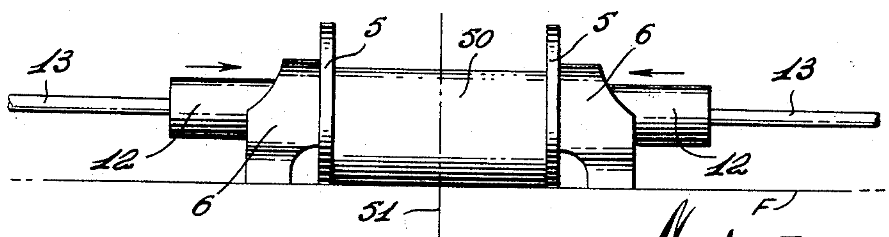

Fig. 5

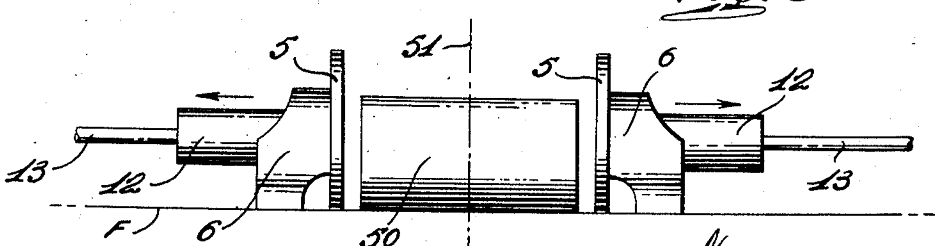

Fig. 6

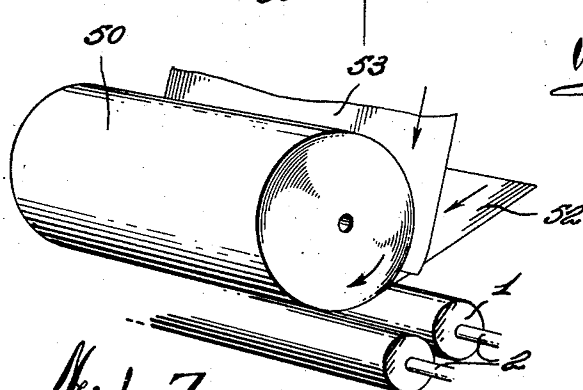

Fig. 7

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ROLL WRAPPING MACHINE

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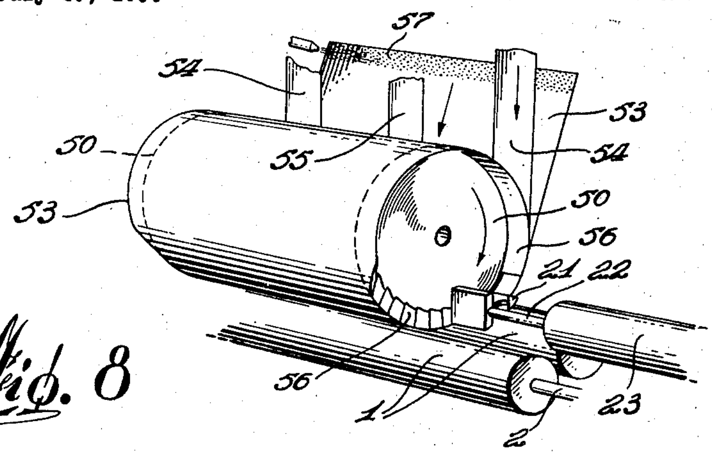

Fig. 8

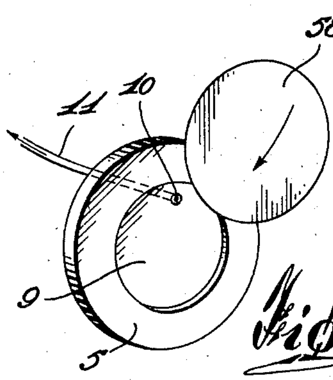

Fig. 9

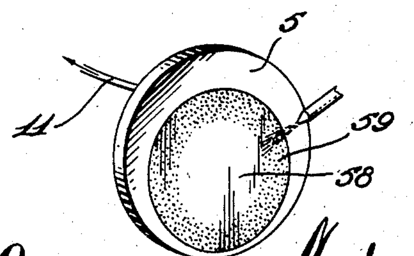

Fig. 10

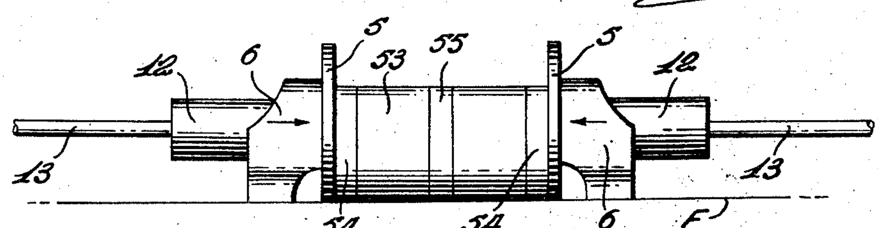

Fig. 11

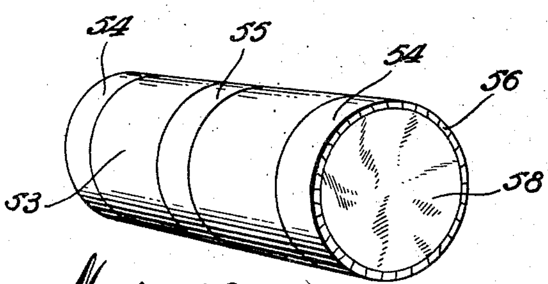

Fig. 12

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Fig. 13

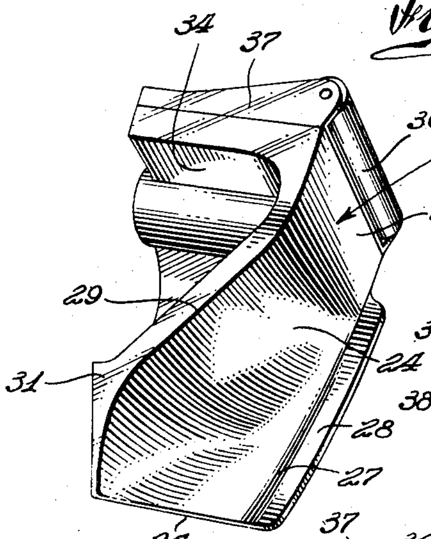


Fig. 14

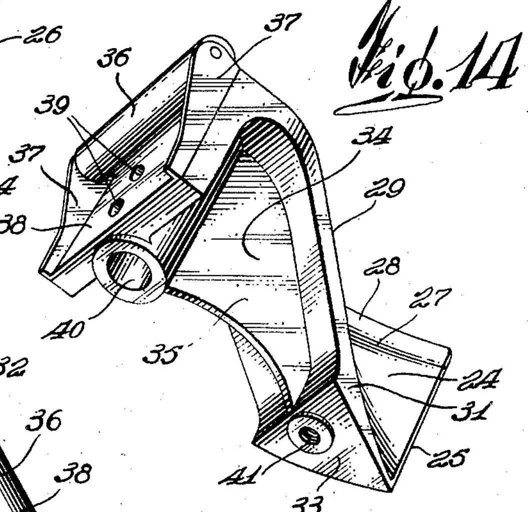
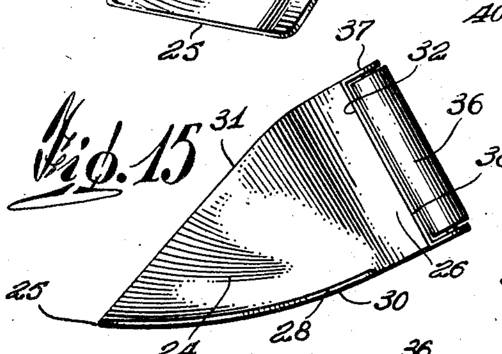


Fig. 15



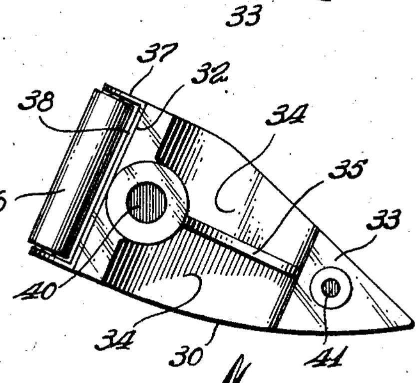


Fig. 16

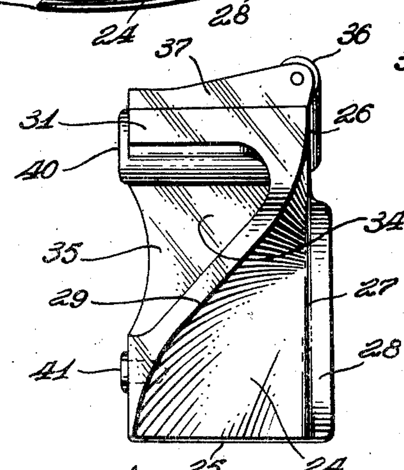


Fig. 17

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ROLL WRAPPING MACHINE

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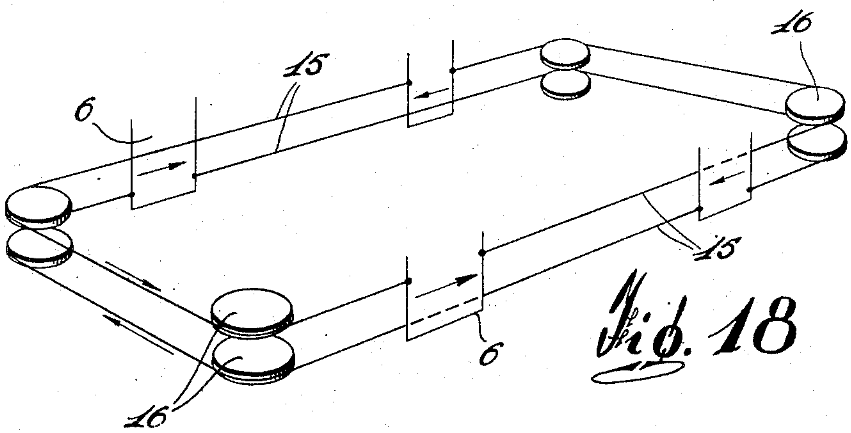

Fig. 18

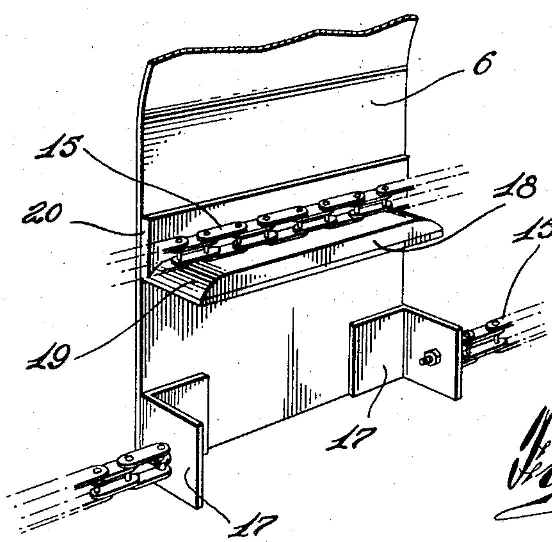

Fig. 19

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2,803,935
Patented Aug. 27, 1957

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ROLL WRAPPING MACHINE

Cedric Marold Gibson, Mount Royal, Quebec, Canada

Application July 19, 1956, Serial No. 598,889
11 Claims. (Cl. 53—380)

The present invention relates to a method and a machine for wrapping rolls and more particularly newsprint paper rolls.

Because of the very large quantities of newsprint paper manufactured and shipped throughout the world, the main use of this machine will be for wrapping rolls of newsprint paper.

Rolls of newsprint paper normally vary in length from 18" to 72" and in diameter from 28" to 40" and the weight of each roll of paper varies from 200 to approximately 1600 lbs. Production of various sizes of rolls varies in quantity or number of rolls per ton according to orders on hand at any one time. The production of newsprint paper is normally carried out throughout the full 24 hour period each day, generally in three 8 hour working shifts, not including Sundays. The actual number of rolls produced in one 24 hour day at any one mill may run from 100 or 200 up to possibly 1800 or 2000 rolls in the larger mills. Approximately ten and one half million tons of newsprint paper is manufactured per year in the world at the present time.

The present method of wrapping rolls of newsprint paper is by laying on the floor a pre-cut length of wrapping paper which is then rolled onto the wrapping paper and rolled up and the overhanging ends of the wrapping paper are crimped into the ends of the roll by hand. Reinforcing bands or strips of wrapping paper, generally 10" to 12" wide, are included in the above operation. These bands may be placed inside or outside of the main wrapping paper and may be located at each end of the roll and sometimes at the center also. Glue is applied to one side of the band paper. The wrapped rolls are then rolled between two heated steel discs which are brought together by means of air cylinders and the hand crimped ends are thereby compressed tightly up against the end of the roll of paper, an inside heavy paper disc having previously been inserted in the end of the roll before the hand crimping was done as stated above. The heated discs are then relieved from the ends of the wrapped roll and an outside end disc of heavy paper on which glue has been applied, is inserted. The heated discs are then again pressed up against the ends of the wrapped roll of newsprint until the glue is dry, thus sealing the ends of the roll. The completely wrapped roll of newsprint paper is then rolled onto a platform scale where it is weighed and marked ready for shipment.

The object of this invention is to reduce the cost of this operation per ton of paper manufactured and to provide a better wrapping job by reducing the amount of labour required, reducing the amount of floor space required, providing a more convenient method and centralization of operations.

With the machine according to the present invention two operators are required as a minimum for each 8 hour shift. Their work would include wrapping, crimping and heading the paper rolls complete for weighing and marking. With two operators and presuming that they would bring the rolls of newsprint paper from the discharge end of the paper machine or machines, look after lining up various widths of rolls in an average size storage space in front of the roll wrapping machine, wrap, crimp and apply head discs, prepare the head discs and apply glue to the same, load the machine with rolls of wrapping paper and band rolls, and in fact carry out all the above operations, it is estimated from present experience that two operators could handle an average of one roll every three minutes or 20 rolls per hour amounting to a total of 480 rolls per 24 hour day. With one extra helper one roll could be wrapped every 2 minutes or 30 rolls per hour amounting to 720 rolls per 24 hour day. With two extra helpers and assuming that all four could act as operators performing any or all operations, one roll could be wrapped every minute or 60 rolls per hour amounting to 1440 rolls per 24 hour day.

The above compares with the labour requirements of the conventional hand wrapping method according to which seven to eleven men per shift or twenty-one to thirty-three men per 24 hour day are required to hand wrap 1000 rolls per 24 hour day.

The present invention will be more clearly understood with reference to the attached drawings in which:

Figure 1 is a side elevation of an embodiment of the invention;

Figure 2 is a cross-section on line 2—2 of Figure 1;

Figure 3 is a top view of Figure 1;

Figures 4 to 6 are diagrammatic side elevations of the machine shown at various stages of the centering operation;

Figure 7 is a perspective view showing the rollers, roll and wrapping paper at the start of the wrapping operation;

Figure 8 is a perspective view as in Figure 7, showing the bands and the crimping operation;

Figures 9 and 10 are details of one header during the application of the paper disk;

Figure 11 is a diagrammatic side elevation of the machine in the heading operation;

Figure 12 is a perspective view of the completely wrapped roll;

Figures 13, 14 and 15 are perspective views and Figures 16 and 17 are plan views showing the crimper in detail;

Figure 18 is a diagrammatic perspective view of the chains and the points of attachment of these chains to the header frames;

Figure 19 is a perspective detail of one point of attachment of the chain to the header frame.

Referring now more particularly to the drawings in which like reference characters indicate like elements throughout, the machine comprises two horizontal rollers 1, one or both motor driven, capable of rotating on their axis by means of shaft 2 projecting from the ends of said rollers and resting on a bearing (not shown); the rollers 1 are disposed within a rectangular opening F' within the floor F slightly below floor level, and in the same horizontal plane at a short distance from each other. Plates 3, flush with the floor and slightly above the rollers, bridge the gaps between the edges of the floor and the rollers.

There are two header assemblies which comprise vertical disk shaped header plates 5 facing each other and disposed transversely with respect to the rollers 1, and sheet metal frames 6 supporting the plates 5 in the above named position, each frame being movably mounted on two wheels 7 positioned to run on tracks 8 disposed outwardly of the rollers. The plates 3 are provided with longitudinal cuts 4 to allow passage of the header frames. Each header plate 5 has a centrally recessed portion 9 (see Figure 9) and at the top of said recessed portion is an opening **10**, surrounded by rubber or other airtight material, and connected to a source of suction through pipe **11**. The header assemblies are driven by fluid pressure cylinders **12** attached to the frame **6**, the piston rods **13** of said cylinders **12** being connected to buttresses **14**. The header assemblies are connected to each other by two endless chains **15**, shown diagrammatically in Figure 18 positioned one above the other and riding on sprocket wheels **16**. Each chain is attached to each header on one side only, these sides being opposite to each other and to each side of each header; only one chain is attached (see Figure 19) by means of angle brackets **17**, while the other chain rides freely on a horizontal wooden shoe **18** rounded at its extremities **19** and supported by an angle bracket **20** which is secured to the frame **6**. This arrangement keeps the header assemblies at equal distances from the centre of the machine, or centre of the rollers **1**, at all times, said assembly having been so positioned initially.

Each header assembly comprises a crimper **21** formed of an integral piece of cast metal, movable through the header plate **5** in the direction of movement of the header assembly. Each crimper **21** is driven by the piston rod **22** of cylinder **23** attached to the header frame **6**. The left hand crimper is shown in detail in Figures 13 to 17; the other crimper has a similar shape but is a mirror image of the illustrated crimper. The crimper comprises a twisted operating surface **24** limited at its ends by mutually perpendicular straight edges **25** and **26** and at its sides by a curved edge **27** extending partially in a lip **28**, and by a planar ogee curved edge **29**. The rest of the crimper is formed by a cylindrical surface **30** adjacent the curved edge **27**, plane surfaces **31** and **32** adjacent the ogee curved edge **29** and the edge **26**, and a plane surface **33** as the remaining face. In the present preferred embodiment, the back of the crimper is cut out, as shown at **34**, for purposes of economy; a thin reinforcing plate-like portion or web **35** being left. During operation, the crimper is positioned with the edge **25** horizontal, the curved edge **27** adjacent the bottom portion of the edge of the paper roll, the lip **28** under the roll and the edge **26** adjacent the end faces of the roll. The outstanding margin **56** (see Figures 7 and 8) of the wrapping paper upon rotation of the roll is engaged by edge **25** and gradually folded against the end face of the roll by the operating surface **24** and the edge **26**. The radius of curvature of the curved edge **27** is of the same order of magnitude as the radius of the paper roll. The crimper **21** may be further provided with a roller **36** slightly projecting beyond the edge **26** and held by the ears **37** of a plate **38** which is attached to the plane surface **32** of the crimper by means of screws (not shown) adapted to pass through holes **39**. Two tubular holes **40** and **41** are provided in the crimper **21**; hole **40** accommodates the piston rod **22** of the cylinder **23** also fastened by the last mentioned screws and the threaded hole **41** accommodates a supporting shaft (not shown) screwed into said hole **41** and freely slidable in a bearing (not shown) attached to the header frame **6**.

As shown in Figures 1 to 3, a lifting device is positioned off centre between the rollers **1**, said lifting device comprising a horizontal shaft **42** driven by vertically disposed cylinders **43**.

The operation of the machine is as follows: a roll of paper **50** is rolled onto the rollers **1** without attempting to centre it (Figure 4). The headers **5** position the paper centrally with respect to the center line **51** which is also the centre line of the wrapping paper (Figure 5). The headers **5** are then displaced outwardly (Figure 6). A short portion **52** of the paper of the roll is unrolled and the slightly wider wrapping paper **53** is inserted between the roll and the unrolled portion **52** (Figure 7). The roll is then rotated by rollers **1** in the direction of the arrows of Figure 7 until the cylindrical surface of the roll is completely covered by the wrapping paper **53**. Two reinforcing side bands **54**, which are disposed marginally flush with the wrapping paper and a central band **55**, all of said bands having previously been coated with adhesive on their inside face, are inserted on the same side of the wrapping paper **53** as the roll **50**. The above mentioned rotation is continued and simultaneously the outstanding margins **56** of the wrapping paper **53** and bands **54** are crimped against the end faces of the roll by the crimpers **21** which have, in the meantime, been impelled from behind the header plates **5** by the cylinders **23**. Adhesive is applied to the end margin **57** of the wrapping paper **53**. On further rotation, the bands **54** and **55** become external with respect to said wrapping paper **53**. When the bands **54** and **55** are completely rolled on the roll **50**, the machine is stopped and the crimpers **21** are pulled back behind the plates **5**. A paper disk **58** slightly smaller in radius than the roll **50** is brought in contact with the opening **10** and held there by suction (Figure 9). A disk **58** is thus applied on each header plate **5**. A layer of adhesive is applied only to the margin of the disk **58** and the headers are again brought against the ends of the roll to apply the disks **58** to said ends. The headers are provided with heating means (not shown) to speed the drying of the adhesive, and a substantial pressure is provided (Figure 11). The headers are then pulled back and the completely wrapped roll is ejected by the lifting device **42**, **43** on the side opposite to that from which said roll entered the machine. Figure 12 shows the completely wrapped roll.

It can be seen from the foregoing description that at no time is the wrapping paper, the bands or the disks directly glued to the paper of the roll itself. The wrapping paper and the bands are fed to the machine by means which are the subject of a co-pending application.

While a preferred embodiment according to the present invention has been illustrated and described, it is understood that various modifications may be resorted to without departing from the spirit and scope of the appended claims.

I claim:

1. In a wrapping machine for paper rolls comprising rollers for horizontally supporting and rotating a paper roll, the combination of two header assemblies movable in the direction of the longitudinal axis of said rollers and over said rollers, said header assemblies being driven by a force sufficient to slide said roll longitudinally along said rollers, said header assemblies comprising plates corresponding in area and potential position to the ends of said roll, while said rolls resting in said rollers, with transmission means transmitting the motion of any one of said header assemblies to the other and with crimping means attached to said assemblies.

2. A machine as in claim 1, wherein said header assemblies are initially disposed at equal longitudinal distances from the centers of said rollers and at opposite ends thereof and said transmission means maintain said header assemblies at equal distance from said centres.

3. A machine as in claim 1, wherein said transmission means comprise at least one endless chain attached to only one side of each of said header assemblies, said sides of said headers being opposite to each other.

4. A machine as in claim 1, wherein said transmission means comprise two endless chains disposed one above the other, and each attached to only one side of each of said header assemblies, said sides of said headers being opposite to each other for each of said chains, said sides of each header assembly being opposite to each other for said chains, whereby the motion of any one of said header assemblies results in a quantitatively equal and directionally opposite motion of the other of said header assemblies and said header assemblies are held throughout said motion in perpendicular position with respect to the vertical longitudinal planes of said rollers.

5. In a wrapping machine for paper rolls comprising rollers for horizontally supporting and rotating a paper

roll, the combination of two header assemblies movable in the direction of the longitudinal axis of said rollers and over said rollers, said header assemblies being driven by a power source sufficient to slide said roll longitudinally along said rollers, said header assemblies comprising plates corresponding in area and potential position to the ends of said roll when said roll is resting on said rollers, said plates comprising means for holding and easily releasing paper disks, with transmission means transmitting the motion of any one of said header assemblies to the other and with crimping means attached to said header assemblies and independently movable with respect thereto in the direction of movement of said assemblies.

6. A machine as in claim 5, wherein said paper holding means comprises an opening on the plate surrounded by airtight material and a suction source connected to said opening.

7. A machine as in claim 1, wherein said crimping means comprise a twisted operative surface joining a straight upright edge which, during operation, is adapted to be adjacent the margin of the end of said roll, a straight horizontal edge which is adapted to be positioned, during operation, below the outstanding portion of the wrapping paper, adjacent thereto and externally adjacent to said roll, and a curved edge adjacent to said roll along the entire length of said edge and joining the lower extremity of said upright edge and the extremity of said horizontal edge adjacent to the roll.

8. A machine as in claim 7, wherein said curved edge is extended by a lip adapted to be positioned below the roll.

9. A machine as in claim 1, wherein said crimping means comprise a twisted operative surface joining a straight upright edge which during operation is adjacent to the margin of the end of said roll, a straight horizontal edge positioned during operation below the outstanding portion of the wrapping paper, adjacent thereto and externally adjacent to said roll, a curved edge adjacent to said roll along the entire length of said edge and joining the lower extremity of said upright edge and the extremity of said horizontal edge adjacent the roll, said twisted surface terminating at the top in a planar ogee curve, a plane surface adjacent said ogee curve, a plane surface adjacent said vertical portion and parallel to said horizontal edge, a plane surface opposite said curved edge and a cylindrical surface adjacent said curved edge and said horizontal edge.

10. A machine as in claim 9, wherein the non-operating part of said crimping means is recessed and provided with a reinforcing web.

11. A machine as in claim 1, wherein said crimping means are provided with driving means to produce motion of said crimping means with respect to said assemblies in the direction of movement of said assemblies.

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