United States Patent [19]

Brenner et al.

[11] **3,924,375**

[45] **Dec. 9, 1975**

[54] **AUTOMATIC CRIMPER**

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[73] Assignee: **Beloit Corporation,** Beloit, Wis.

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[21] Appl. No.: **472,523**

[52] **U.S. Cl.** **53/380;** 53/211

[51] **Int. Cl.²** **B65B 11/04**

[58] **Field of Search** ..... 53/380, 211; 93/77 R

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Primary Examiner—Travis S. McGehee

Attorney, Agent, or Firm—Hill, Gross, Simpson, Van Santen, Steadman, Chiara & Simpson

[57] **ABSTRACT**

A crimping device especially adapted for crimping the projecting ends of a dual wrapper, i.e. bubble pack sheet and craft paper, wrapped about a roll of paper, or the like, inwardly onto the ends of the roll where the roll is suspended rotatably above the device. Crimpers having successively operable turning rollers, tucking fingers and crimping and flattening rollers and supported by respective adjustably mounted carriages act on the projecting ends of the wrapper. After the projecting ends have been completely crimped and flattened, the crimpers are retracted and glue guns are moved into position and apply glue to the flattened crimps for attaching head disks to the roll ends.

24 Claims, 9 Drawing Figures

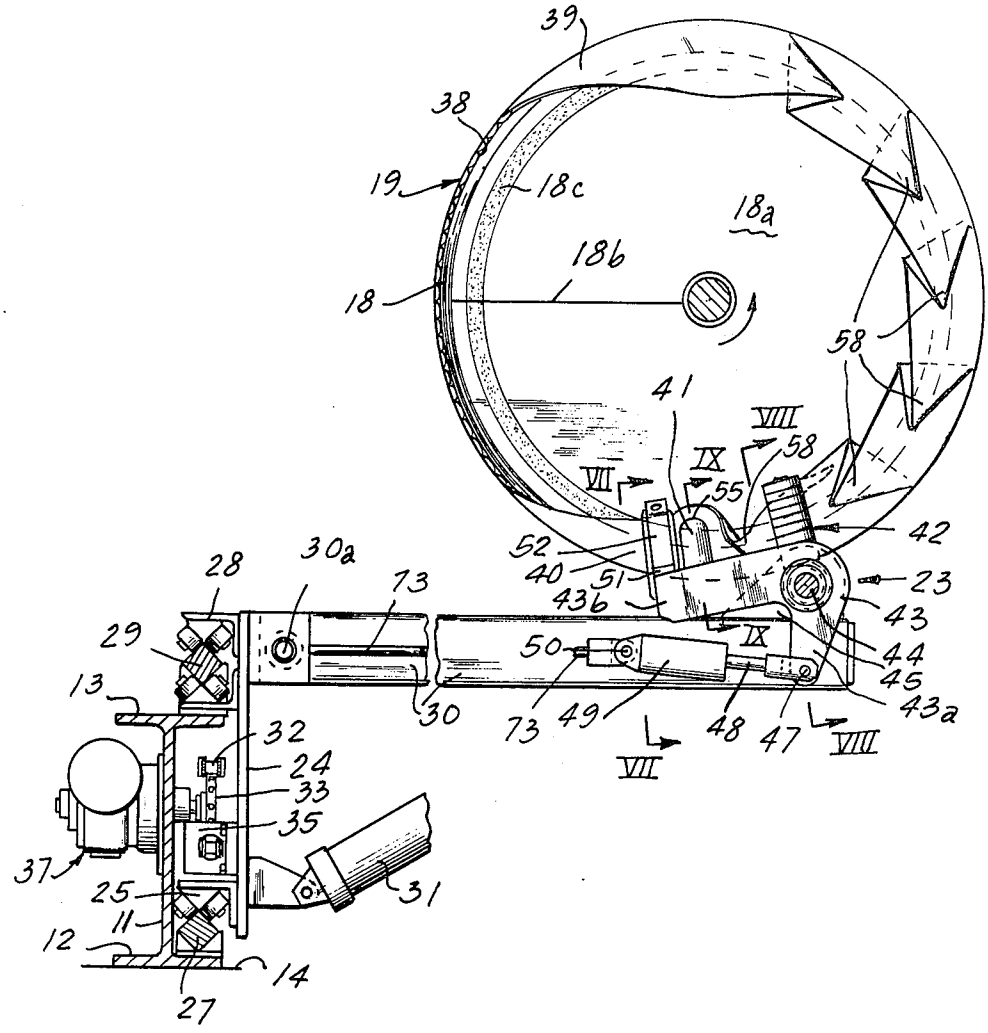
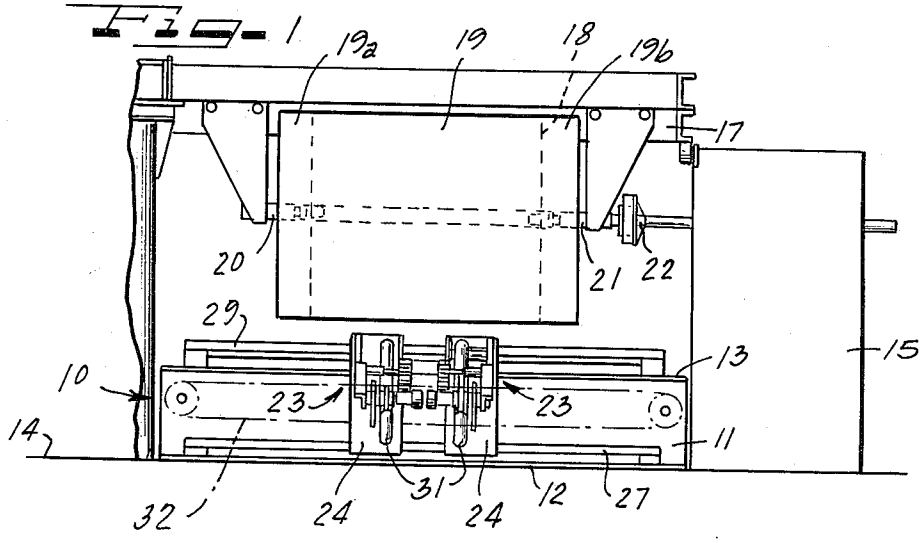


Fig. 1



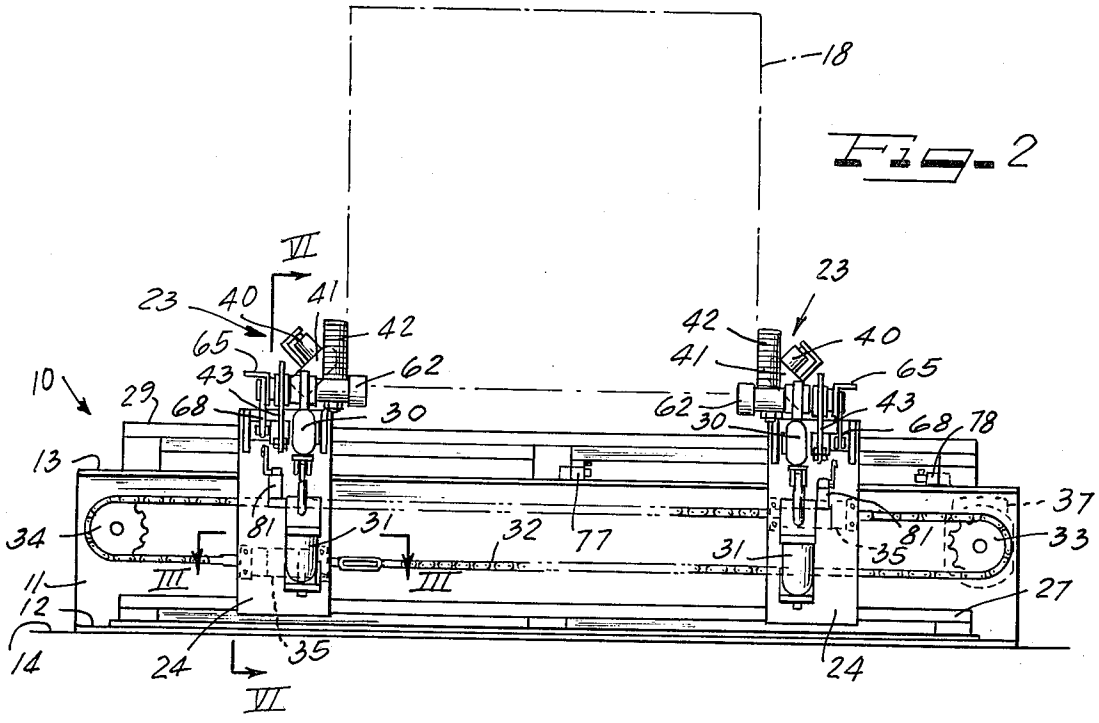
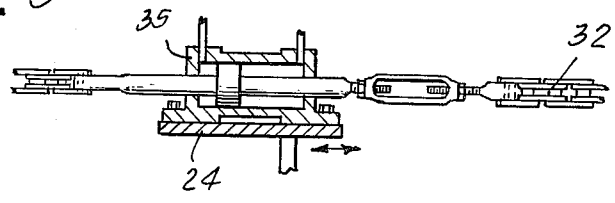


Fig. 2

Fig. 3



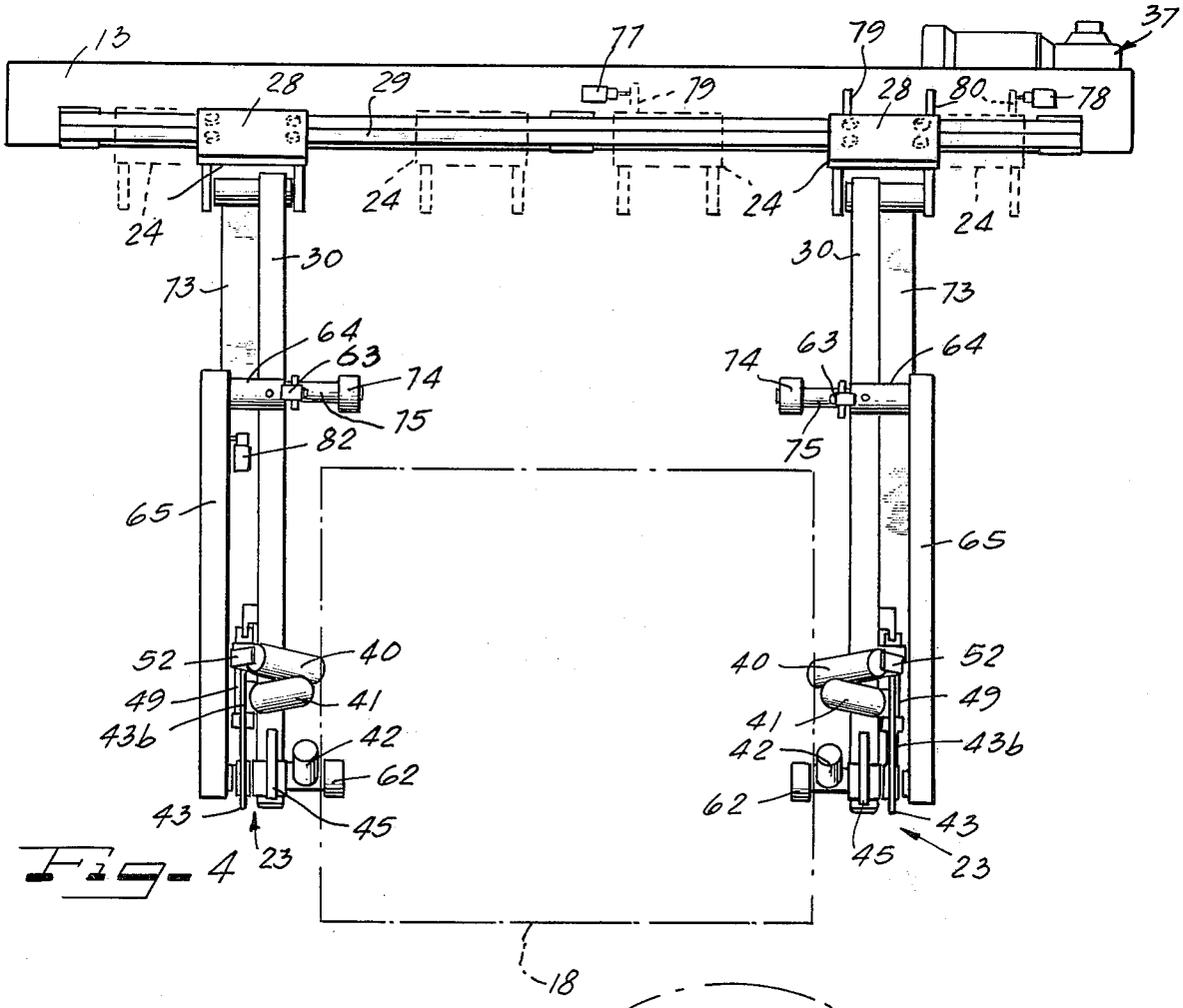

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Fig. 4

Fig. 5

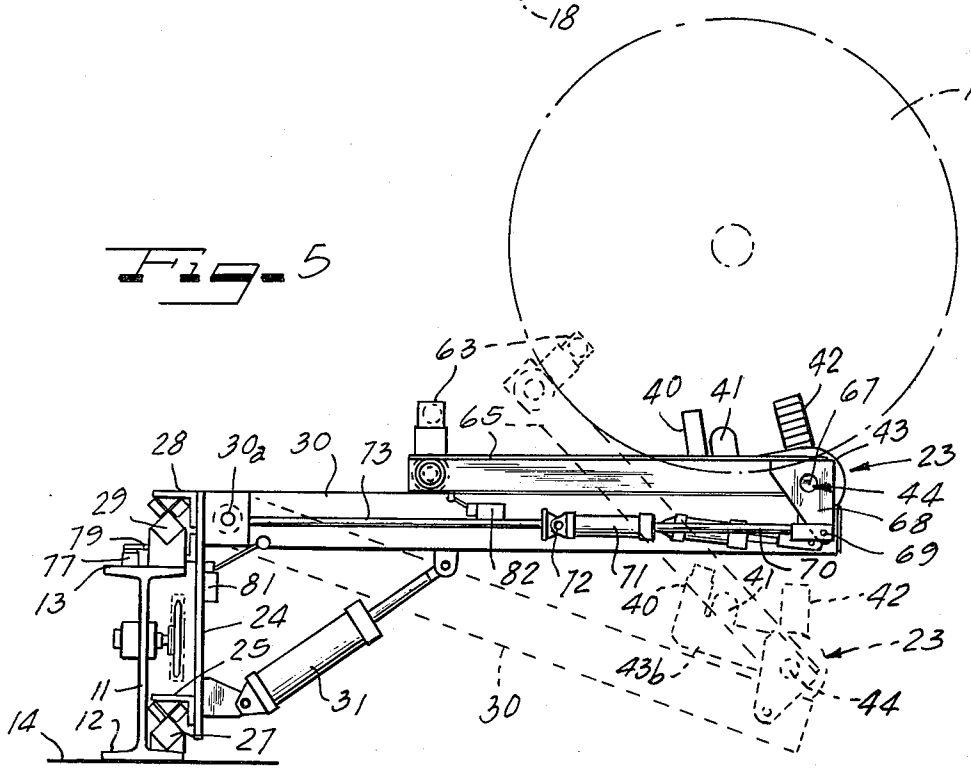
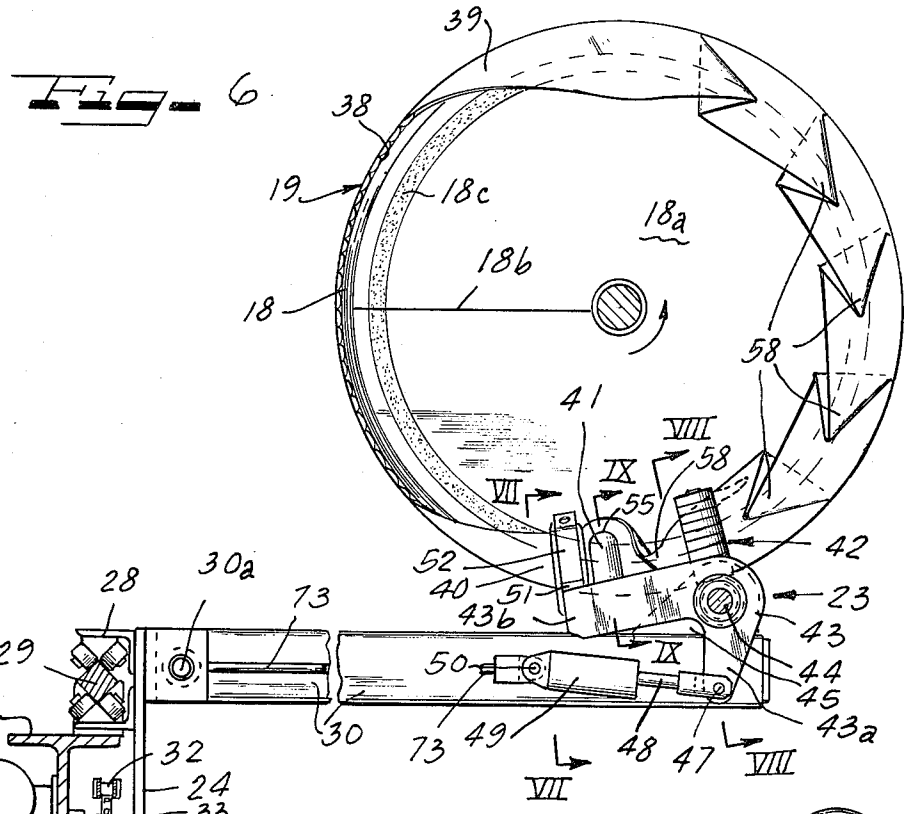

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Fig. 6



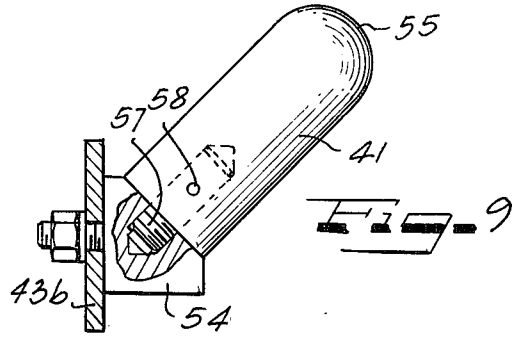


Fig. 9

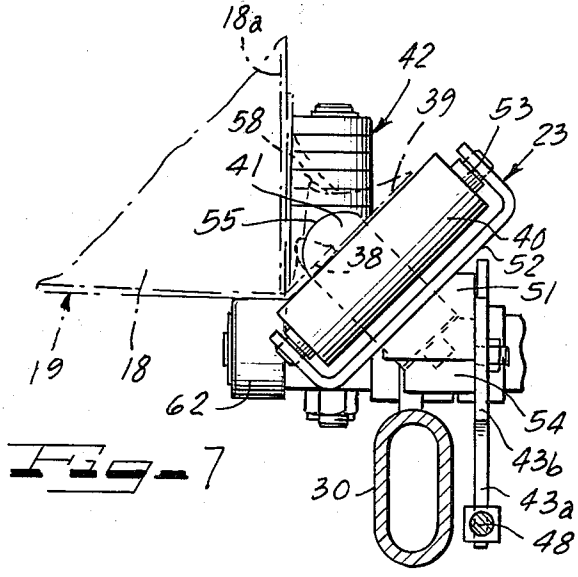


Fig. 7

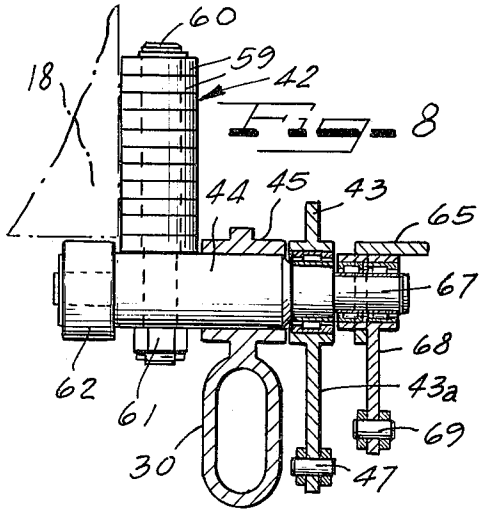


Fig. 8

AUTOMATIC CRIMPER

This invention relates to new and improved apparatus for crimping the projecting ends of wrappers on paper rolls or the like, and is more particularly concerned with such apparatus for acting on rolls suspended rotatably for wrapping.

Rolls of pressure-sensitive record sheet paper of the kind having a coating on at least one surface thereof provided with minute, multiple-droplet-retaining pressure-rupturable capsule units for supplying marking liquid are difficult to handle by mechanical equipment without damage to the at least outer layers of the pressure-sensitive paper, in contrast to ordinary rolls of paper which are relatively unaffected by uneven, concentrated, casual loading and contact pressures encountered along the circumference of the rolls during handling.

Although efficient devices have been provided for wrapping and crimping ordinary paper rolls, U.S. Pat. No. 3,342,014 being referred to by way of example, such apparatus is not satisfactory for handling rolls of pressure-sensitive record sheet paper. A system has been devised whereby such rolls of paper are wrapped while rotatably suspended and without any damaging peripheral contact with the rolls. In order to wrap such rolls for subsequent handling in the manner of ordinary rolls of paper, a dual wrapper is applied thereabout comprising an inner wrapper of so-called bubble pack material about which a paper wrapper is applied. This dual wrapper arrangement complicates crimping, and because the freshly wrapped rolls are rotatably suspended makes it difficult, if not impossible to use prior crimping devices.

An important object of the present invention is to overcome the lack of suitable apparatus for crimping dual wrapped rotatably suspended rolls and to provide new and improved apparatus for this purpose.

Another object of the invention is to provide new and improved automatic crimping apparatus.

A further object of the invention is to provide new and improved apparatus for crimping wrapped rolls and applying head disk attaching adhesive to the crimps.

Still another object of the invention is to provide a new and improved crimper especially suitable for acting on rotatably suspended rolls.

Yet another object of the invention is to provide a new and improved crimper particularly suitable for crimping dual wrapped rolls wherein a protective bubble pack wrap is used.

Other objects, features and advantages of the invention will be readily apparent from the following description of a preferred embodiment thereof, taken in conjunction with the accompanying drawings although variations and modifications may be effected without departing from the spirit and scope of the novel concepts embodied in the disclosure, and in which:

FIG. 1 is a front elevational view of apparatus embodying features of the invention;

FIG. 2 is a similar view showing the apparatus in an operating relation to a roll;

FIG. 3 is an enlarged fragmentary sectional detail view taken substantially along the line III—III of FIG. 2;

FIG. 4 is a top plan view of the apparatus;

FIG. 5 is an end elevational view of the apparatus;

FIG. 6 is an enlarged fragmental vertical sectional detail view taken substantially along the line VI—VI of FIG. 2;

FIG. 7 is an enlarged fragmentary sectional elevational view taken substantially along the VII—VII of FIG. 6;

FIG. 8 is a fragmentary enlarged sectional elevational detail view taken substantially along the line VIII—VIII of FIG. 6; and

FIG. 9 is an enlarged fragmentary sectional elevational detail view taken substantially along the line IX—IX of FIG. 6.

On reference to FIGS. 1 and 2, crimping apparatus 10 embodying the present invention is constructed and arranged as a self-contained automatically operable unit comprising a base frame 11, desirably in the form of a large I-beam (FIG. 5) having opposite longitudinal edge flanges 12 and 13 with the flange 12 resting on and suitably secured to a floor 14 and the flange 13 located along the upper edge of the frame. Thereby the crimping apparatus 10 is adapted to be operationally mounted at a crimping station represented by a stand 15 (FIG. 1) to which a rotary carriage 17 transports a paper roll 18 about which a wrapper 19 has been wrapped at another station and transported by the carriage 17 to the crimping station 15. As thus delivered to the crimping station, the roll 18 is suspended rotatably on a horizontal axis on mandrels 20 and 21, the mandrel 21 having means thereon for detachably coupling it with a rotator 22 carried by the stand 15. It will be understood that the mandrels 20 and 21 are supported by the carriage 17 in a manner to accommodate paper rolls of various lengths and diameters within desirable ranges.

As delivered to the crimping station 15, the wrapper of the elevated suspended roll 18 has opposite ends 19*a* and 19*b* which project beyond the respective ends of the roll 18. It is for the purpose of crimping the projecting ends 19*a* and 19*b* that the crimping apparatus 10 is located below the suspended roll 18 at the crimping station 15. Accordingly, the horizontal frame 11 is of suitable length and is so located on an axis parallel to the axis of the roll 18 in registration in the crimping station 15 to mount a pair of equal and opposite crimpers 23 for simultaneously crimping the ends 19*a* and 19*b*.

Means for adjustably supporting the crimpers 23 on the frame 11 to accommodate wrapped rolls of various lengths and diameters comprise respective carriage 24 for each of the crimpers. Conveniently, each of the carriages 24 comprises a vertical plate having means thereon for horizontal running along the frame 11 and suitably comprising a lower wheeled trolley 25 running along a track bar 27 mounted on the lower frame flange 12, and an upper wheeled trolley 28 running along a track bar 29 mounted on the upper frame flange 13.

In order to enable movement of the crimpers 23 from a clearance relation to the rolls to be worked on into crimping position relative to the rolls, each of the crimpers 23 is mounted on its carriage 24 by means of a vertically movable mounting arm 30 pivotally attached on a horizontal axis to the upper portion of the carriage 24 and supporting the crimper on its distal end portion. The length of the arms 30 is such that the crimpers 23 can be raised from a lowered clearance position as shown in dash outline in FIG. 5, into a crimping position as shown in full outline by means of a fluid operated actuator 31 preferably of the piston and cylinder rectilinear type.

For effecting relative adjustments of the crimpers **23** for rolls of different lengths, the carriages **24** are coupled for relative unison horizontal adjustment by means of an endless flexible element **32** in the form of a sprocket chain trained over a driving sprocket **33** carried by one end portion of the frame **11** and trained over a complementary idler sprocket **34** on the opposite end portion of the frame. Each of the carriages **24** has means for coupling it to the chain **32** herein comprising a pneumatic coupler **35** carried by one of the carriages **24** and connected to the lower run of the chain and a similar pneumatic coupler **35** connecting the other of the carriages **24** to the upper run of the chain. Through this arrangement, driving of the chain **32** in one direction will cause the carriages **24** to run toward one another and driving of the chain **32** in the opposite direction will cause the carriages to separate. For example, in FIG. **1** the carriages **24** are shown as contiguous to one another, whereas in FIG. **2** the carriages are shown as substantially separated. Thereby the crimpers **23** can be adjusted to crimp the wrapper ends of a fairly wide range of a fairly wide range of roll lengths. Any suitable powered driving and transmission gear unit **37** may be provided for selectively driving the sprocket **33** in either rotary direction and for holding the chain **32** immovable in any selected adjusted position.

In a preferred arrangement, the sprocket chain **32** is adapted to be adjusted by the power unit **37** to the approximate length of the roll **18** to be worked on and to stop the crimpers **23** at a slightly oversized position for the particular length of roll, and the pneumatic couplers **35** are employed to adjust the carriages **24** and thereby the crimpers **23** to the exact roll size, and after crimping has been completed to release the crimpers from the crimped wrapper end. For this purpose, the pneumatic couplers are of the double ended piston type as shown in FIG. **3**, so that the carriages **24** can be shifted horizontally throughout a limited range relative to the driving and control chain **32**.

Each of the crimpers **23** comprises means for efficiently crimping dual wrapping material in the wrapper **19**, especially suitable for protectively wrapping pressure sensitive paper rolls. Such wrapping, as best seen in FIG. **6** comprises an inner protective wrapper of bubble wrap material **38** and an outer wrap **39** paper such as kraft paper. Because of the added protective bubble wrap material comprising a plastic sheet of some resilience and in any event carrying a fairly closely spaced all-over pattern of resilient trapped air bubbles, ordinary crimping devices such as used where a simple kraft paper wraper is employed, will not function properly. However, the problem is solved by the present invention through use of the crimpers **23** each of which comprises a first member **40** for starting displacement of the projecting wrapper ends **19***a* and **19***b* from cylindrical relation to the end of the roll **18** toward the roll end, a second member **41** which operates after the first member to tuck the displaced ends toward the roll end, and a third member **42** following the tucking member **41** for rolling the tucks into flat successive crimps against the roll ends.

In an efficient construction and arrangement, the members **40, 41** and **42** of each of the crimpers **23** are mounted in a manner not only to enable the supporting arm **30** to swing the members into and out of crimping position relative to the roll **18** about the pivotal connection **30***a* of the arm with its carriage **24**, as best viewed in FIG. **5**, but also to provide for easy starting of the crimping operation and to accommodate roll diameter variables. Means for this purpose include a bell crank shaped vertical plane mounting plate **43** carrying the displacement starting member **40** and the tucking member **41**. Means for pivotally supporting the mounting plate **43** on the arm **30** comprise a pivot shaft **44** (FIGS. **6** and **8**) fixedly supported on a rigid mounting bracket **45** on the upper side of the distal end portion of the arm **30**. From its pivotal connection with the shaft **44**, a short arm **43***a* of the bell crank member **43** extends downwardly along the outer side of the associated arm **30** and by means of a pivotal connection **47** is coupled to a piston rod of an air cylinder actuator **49** having pivotal mounting means **50** at its closed end attaching the actuator to the adjacent side of the arm **30**. By means of the actuator **49**, the bell crank member **43** s adapted to be rotatably adjusted about the pivot provided by the shaft **44** for controlling the attitude of a long arm **43***b* which projects generally toward the carriage **24** and provides on its distal end portion support for the displacement member **40** and the tucking member **41**.

Means for mounting the displacement member **40** on the mount arm **43***b* comprise a rigid bracket block **51** supporting a generally U-shape bracket **52** carrying the member **40** in the form of a roller rotatable on a shaft **53**. The construction and arrangement are such that the displacement roller **40** is carried on an inclined axis so that the roller periphery can partially underlie the corner at the lower edge of the roll **18** and extend upwardly and outwardly relative to the adjacent end of the roll to engage the wrapper end and displace the wrapper end toward the roll end bendably about the roll edge. An included angle of about 45° between the end face of the roll **18** to be wrapped and the axis of the displacement roller **40** has been found satisfactory for efficient turning up starting displacement of the wrapper end from its normal original cylindrical extension, as the roll **18** turns relatively toward the displacement roller **40**, as indicated by the directional arrow in FIG. **6**.

Mounting of the tucking member **41** is immediately adjacent to the displacement roller **40** so that the projecting wrapper end as turned by the displacement roller will be tucked toward the paper roll end. For this purpose, means comprising a mounting bracket block **54** carried rigidly by the mounting plate arm **43***b* supports the tucking member **41** in the form of a rigid tucking mandrel finger (FIGS. **7** and **9**) provided with a rounded, semispherical tucking tip **55**. Mounting of the tucking finger **41** is in a manner to project from the mounting block **54** on an axis normal to the axis of the displacement roller **40** and toward the turned up wrapper end and to push the wrapper end close to the end of the paper roll **18**. Means for fixedly securing the finger **41** to the mounting block **54** comprise a threaded stub rod **57** extending axially into the base end of the finger and fixed as by means of a pin **58**. At its opposite end the rod **57** is threaded into the block **54**.

After each successive tuck **58** (FIG. **6**) is started by the tucking finger **41**, the tuck-rolling member **42** functions to flatten the tucks and the intervening portions of the wrapper end against the end of the roll **18**. For this purpose, the member **42** comprises a stack of thick roller disks **59** (FIGS. **6, 7** and **8**) rotatably mounted on a fixed shaft **60** having its axis parallel to the paper roll end and slightly toed-in toward the tip **55** of the tucking

finger 41 for efficient rolling of the tucks 58. Convenient mounting of the flattening roller 42 in adequately spaced relation to the tucking finger 41 to accommodate the tucks 58 therebetween is by securing the flattening roller shaft 60 on the fixed shaft 44 which projects from the bracket 45 for this purpose. At its lower end portion, the roller shaft 60 extends through the shaft 44 and is secured thereto as by means of a threaded nut 61.

Flattening of the tucks 58 and the intervening portions of the wrapper end against the paper roll end desirably also secures the crimped wrapper end in place against an end disk 18*a* which has been previously applied to the end of the roll, as at, or in advance of the wrapping station. In a desirable form the disk 18*a* comprises a paper board disk having a radial split 18*b* and carries on its outer face adjacent to its perimeter an annular band of adhesive 18*c* such as a suitable glue which remains sufficiently tacky till crimping has been effected to secure the crimped wrapper end positively to the end disk 18*a*. For efficiency in adhesive attachment of the crimped wrapper end, the bubble wrap 38 is sufficiently shorter than the kraft wrapper 39 to assure pressing of the kraft wrapper end portion against and into adhesive engagement with adhesive band 18*c*.

In a cycle of operation, after the wrapped roll 18 has been transported by the carriage 17 into position over the retracted crimpers 23 which have been moved by actuation of the carriages 24 into proper orientation with the respective opposite ends of the roll 18, the carriages are raised from an inactive depressed roll clearing position as generally shown in dash outline in FIG. 5, into crimping position as shown in full outline. In order to assure smooth and progressive turning, tucking and rolling of the wrapper ends 19*a* and 19*b*, the crimpers 23 are controlled by the actuators 49 through the bell crank mounts 43 to raise the displacement rollers 40 higher than the rolling rollers 42 so that as the arms 30 are swung up by the actuators 31, the displacement rollers 40 will make initial contact with the projecting wrapper ends and start their turning displacement. The tucking fingers 41 will then follow and start the first tuck whereafter the flattening rollers 42 come into play. As the displacement rollers 40 moves into wrapper end turning position, the actuators 49 yield to avoid placing undue pressure against the edges of the roll 18 while nevertheless maintaining the rollers 40 in firm wrapper end turning relation to the roll edges. This also maintains the tucking fingers 41 firmly in position. At the same time a roll feeler and crimper orientation member in the form of a roller 62 (FIGS. 2, 4, 7 and 8) on the inner end portion of the shaft 44 of each of the crimpers 23 engages rollingly with the perimeter of the wrapped roll inwardly adjacent to the wrapper extension that is being crimped. This determines the extend of elevation of the crimper supporting arm 30 in each instance.

After crimping of the entire projecting ends 19*a* and 19*b* of the roll wrapper 19 has been completed as, for example, when the paper roll has turned about 1¼ revolution, the actuators 31 function automatically to depress and lower the crimpers 23 from the roll. At the same time means for applying adhesive to the crimped roll ends for receiving and holding end cover disks are activated. Herein such means comprise respective glue guns 63 (FIGS. 4 and 5) which are carried by respective mounts 64 on distal end portions of respective rocker arms 65 in overlying relation to the arms 30 and normally lying thereagainst with the glue guns 63 in clearance relation to the paper roll being worked on. When the respective crimper supporting arms 30 swing down at the end of a crimping cycle, the glue gun arms 65 are automatically raised as shown in dash outline in FIG. 5, to bring the glue guns 63 into position for spraying glue onto the flattened crimps 58. For this purpose, each of the arms 65 is pivotally mounted on its proximal end on an outwardly projecting end portion 67 (FIG. 8) of the fixed shaft 44. Attached to the pivoted end of the arm 65 in each instance are actuating means including a downwardly extending lever arm 68 fixed to the arm 65 and suitably coupled at its lower end portion as by means of a pivot pin 69 to an end of a piston rod 70 of an air cylinder 71 suitably anchored by means of a pivoted clevis 72 to the arm 30 as on an end portion of a longitudinal integral fin 73 along the outer side of the arm 30. By operation of the actuator 71, the arms 65 are swung upwardly coincident with lowering of the crimper arms 30, until feeler and orientation rollers 74 carried by inwardly projecting shafts 75 below the glue guns 63 engage the perimeter of the wrapped and crimped roll. This assures that the glue guns 63 will be properly aligned with the flattened crimps 58 so that in the continuing rotation of the roll 18 through another full rotation a uniform band of adhesive will be applied to each of the crimped wrapper ends for subsequently receiving and firmly securing a protective head or end disk. Automatically upon completion of the crimp gluing cycle, the glue guns 62 shut off and the glue gun arms 65 are lowered onto the arms 30 until another gluing cycle is called for.

In a practical example of a roll processing system incorporating the crimping apparatus 10 of the present invention, a capacity is contemplated for handling rolls of pressure-sensitive, sometimes referred to as carbonless, paper within a range of about 20 inches to 42 inches in diameter and about 6½ inches to 52 inches in length, with a flow-through of about 1 minute per complete cycle including crimping and gluing. To accomplish this, of course, various and sundry operating control means will be used, both electrical and pneumatic, including suitable electrical circuitry having switches, control circuits, timers, photoelectric and/or mechanical sensors, etc., compressed air supply source, supply ducts, valves, etc., as desired for controlling the sequence of operations described, both for automatic cycling and manual control at any desired point in the operating cycle. Such circuitry and control and supply means may also include features for operation and control of, or at least corelation of, related apparatus where the crimping apparatus 10 is part of a system that may include a loading station, a roll wrapping station, the crimping station and an unloading station. For example, limit switches 77 and 78 (FIGS. 2 and 4) of the micro-switch type may be mounted on the upper frame flange 13 in position to be actuated by respective stops 79 and 80 on the right hand one of the trolleys 28 for limiting respectively approaching and separating ranges of movements of the carriages 24. A control limit switch 81 (FIGS. 2 and 5) may be mounted on each of the carriages 24 for actuation by the associated arm fins 73 in the lowered condition of the associated arm 30. A limit switch 82 may be mounted on each of the fins 73 for actuation by the associated glue gun arms 65.

It will be understood that variations and modifications may be effected without departing from the spirit

and scope of the novel concepts of this invention.

We claim as our invention:

1. Apparatus for crimping the projecting end of roll wrapper onto the end of a paper roll, comprising:
a first member mounted on a diagonal axis to engage the projecting end of the wrapper adjacent the edge of the roll and to extend divergently relative to the end face of the roll for starting displacement of the projecting wrapper end from cylindrical relation to the roll end toward the roll end;
a second member which operates after the first member to tuck the displaced end toward the roll end; and
a third member following the tucking member for rolling the tucks into flat successive crimps against the roll end.

2. Apparatus according to claim 1, wherein said first member comprises a roller.

3. Apparatus according to claim 1, wherein said second member comprises a fixed tucking finger mounted to project generally toward the end of a roll carrying the wrapper, and said third member comprises a roller toed toward the tucking finger.

4. apparatus for crimping the projecting end of roll wrapper onto the end of a paper roll, comprising:
a first member for starting displacement of the projecting wrapper end from cylindrical relation to the roll end toward the roll end;
a second member which operates after the first member to tuck the displaced end toward the roll end;
a third member following the tucking member for rolling the tucks into flat successive crimps against the roll end; and
said second member comprising a fixed tucking finger having a semicylindrical tucking tip.

5. Apparatus for crimping the projecting end of roll wrapper onto the end of a paper roll, comprising:
a first member for starting displacement of the projecting wrapper end from cylindrical relation to the roll end toward the roll end;
a second member which operates after the first member to tuck the displaced end toward the roll end;
a third member following the tucking member for rolling the tucks into flat successive crimps against the roll end; and
said first member being a roller, said second member being a fixed finger, and said third member being a roller.

6. Apparatus for crimping the projecting end of roll wrapper onto the end of a paper roll, comprising:
a first member for starting displacement of the projecting wrapper end from cylindrical relation to the roll end toward the roll end;
a second member which operates after the first member to tuck the displaced end toward the roll end;
a third member following the tucking member for rolling the tucks into flat successive crimps against the roll end;
a crimper mount carrying said members;
means for moving said mount between a nonoperating position and a crimping position; and
means for extending said first member into first engagement with the projecting roll wrapper end during movement of the crimper mount into the crimping position, followed by movement of the second and third members respectively into crimping position.

7. Apparatus for crimping the projecting end of roll wrapper onto the end of a paper roll, comprising:
a first member for starting displacement of the projecting wrapper end from cylindrical relation to the roll end toward the roll end;
a second member which operates after the first member to tuck the displaced end toward the roll end;
a third member following the tucking member for rolling the tucks into flat successive crimps against the roll end; and
said first member comprising a roller, and a bracket supporting said roller.

8. Apparatus for crimping the projecting end of a roll wrapper onto the end of a paper roll, comprising;
a first member for starting displacement of the projecting wrapper end from cylindrical relation to the roll end toward the roll end;
a second member which operates after the first member to tuck the displaced end toward the roll end;
a third member following the tucking member for rolling the tucks into flat successive crimps against the roll end; and
said third member being a roller comprising a stack of roller disks.

9. Apparatus for crimping the projecting end of roll wrapper onto the end of a paper roll, comprising:
a first member for starting displacement of the projecting wrapper end from cylindrical relation to the roll end toward the roll end;
a second member which operates after the first member to tuck the displaced end toward the roll end;
a third member following the tucking member for rolling the tucks into flat successive crimps against the roll end; and
means for applying glue to the flat crimps.

10. Apparatus according to claim 9, including separate mounts for said members and for said glue applying means, and means for operating said mounts sequentially to move the members into crimping position while the glue applying means are in an inactive position, and for moving the members to inactive position separated from the roll being crimped and thereafter moving the glue applying means into active position for applying glue to the flattened crimps.

11. In combination with means for supporting paper rolls in suspended position on horizontal rotary axes, apparatus for crimping the projecting ends of wrappers on the rolls and comprising:
means mounting a pair of crimpers in normally spaced relation below the rolls;
means for raising the crimpers into crimping relation to the wrapper ends while the rolls are rotating including respective arms pivotally mounted at one of their ends and carrying siad crimpers at their opposite ends for movement into and out of engagement with said projecting wrapper ends;
means for actuating said arms;
a separate carriage pivotally supporting each of said arms;
track means supporting said carriages;
means for moving said carriages along said track means toward and away from each other for adjusting the crimpers for rolls of different lengths; and
means for effecting secondary relative adjustments of the carriages toward and away from one another for efficient initial sizing to roll length and to facilitate separation of the crimpers from the roll ends after completion of a crimping operation.

12. Apparatus in the combination of claim 11, wherein each of the crimpers includes a displacement

starting roller, a tucking finger and a crimp flattening roller, means mounting the flattening roller in a fixed position on the associated arm, a mount pivotally carried by the associated arm and supporting said displacement starting roller and said finger, and means for rocking said mount to advance the displacement starting roller into wrapper end engagement ahead of the finger and the flattening roller during movement of the crimpers by said arms toward the wrapper ends.

13. Apparatus for crimping the projecting wrapper ends of wrapped paper rolls, comprising:

a pair of complementary crimpers;

means for operating said crimpers synchoronously to move into position relative to respective opposite ends of a roll on which the wrapper ends require crimping;

and each of said crimpers having a plurality of members operating successively during relative rotary movement of the roll and the crimpers including a first member for starting displacement of the projecting wrapper ends inwardly toward the roll ends, a second member for tucking the wrapper ends toward the roll ends, and a third member for crimping the wrapper ends and flattening the resulting crimps against the roll ends.

14. Apparatus according to claim **13,** wherein on each of the crimpers the first member comprises a roller, the second member comprises a tucking finger and the third member comprises a roller.

15. Apparatus according to claim **13,** including a pair of supporting arms each of which has one of said crimpers mounted thereon, means supporting said arms pivotally for movement of said crimpers toward and away from the roll, and means for actuating said arms.

16. Apparatus according to claim **15,** wherein said arm mounting means comprise a pair of respective carriages, means shiftably supporting said carriages for movement toward and away from one another, and means for shiftably moving the carriages to accommodate rolls of varying lengths.

17. Apparatus according to claim **16,** including in combination therewith means for suspending the roll above said crimpers and the arms being movable in an up and down direction for moving the crimpers upwardly into crimping relation to the roll and downwardly into clearance relation to the roll.

18. Apparatus according to claims **17,** including means mounting said crimpers on the arms including a rockable mount for said first and second members of each of the crimpers and means for actuating the rockable mount to advance the first member relative to the third member for commencing a crimping operation.

19. Apparatus according to claim **15,** wherein each of said crimpers has a feeler and orientation roller to engage the roll perimeter adjacent to the wrapper ends.

20. Apparatus according to claim **15,** including crimp gluing means carried by said arms, and means for operating said crimp gluing means after the wrapper ends have been crimped.

21. Apparatus according to claim **20,** wherein said crimp gluing means comprise respective glue applying guns, arms mounting said glue applying guns, means pivotally connecting said glue gun arms on said crimper supporting arms, and means for actuating said glue gun arms relative to said crimper carrying arms.

22. In combination with means for supporting paper rolls in suspended position on horizontal rotary axes, apparatus for crimping the projecting ends of wrappers on the rolls and comprising:

means mounting a pair of crimpers in normally spaced relation below the rolls;

means for raising the crimpers into crimping relation to the wrapper ends while rolls are rotating including respective arms pivotally mounted at one of their ends and carrying said crimpers at their opposite ends for movement into and out of engagement with said projecting wrapper ends;

means for actuating said arms;

respective crimp gluing guns;

rocker arms pivotally mounted on said crimper supporting arms and supporting said guns; and

means for actuating said gun carrying arms relative to said crimper arms to move the glue guns into crimp gluing position.

23. Apparatus in the combination of claim **22,** including feeler and orientation rollers carried by said gun carrying arms and engagable with the perimeter of the roll adjacent to the crimped wrapper ends.

24. In combination with means for supporting paper rolls in suspended position on horizontal rotary axes, apparatus for crimping the projecting ends of wrappers on the rolls and comprising:

means mounting a pair of crimpers in normally spaced relation below the rolls;

means for raising the crimpers into crimping relation to the wrapper ends while the rolls are rotating including respective arms pivotally mounted at one of their ends and carrying said crimpers at their opposite ends for movement into and out of engagement with said projecting wrapper ends;

means for actuating said arms;

feeler and orientation rollers carried by said opposite ends of said crimper carrying arms and engagable with the perimeter of the roll adjacent to the wrapper ends.

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