June 7, 1966 R. R. MILLER 3,254,886

AUTOMATIC WRAPPER FEEDER

Filed Dec. 26, 1963 4 Sheets-Sheet 1

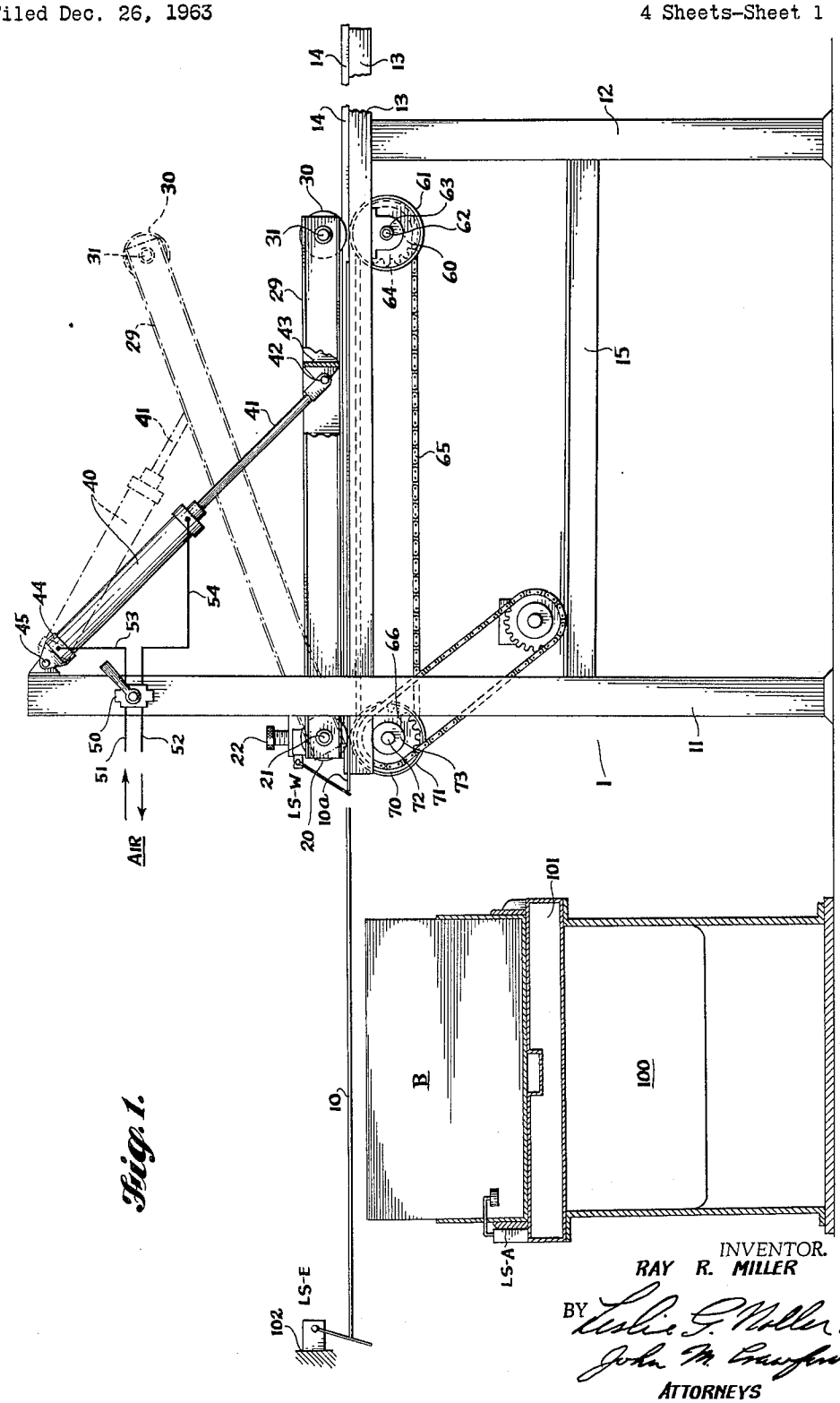


Fig. 1.

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Filed Dec. 26, 1963 4 Sheets-Sheet 2

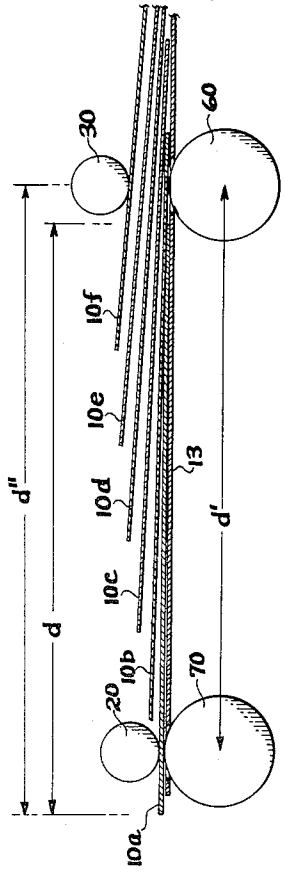


Fig. 1.

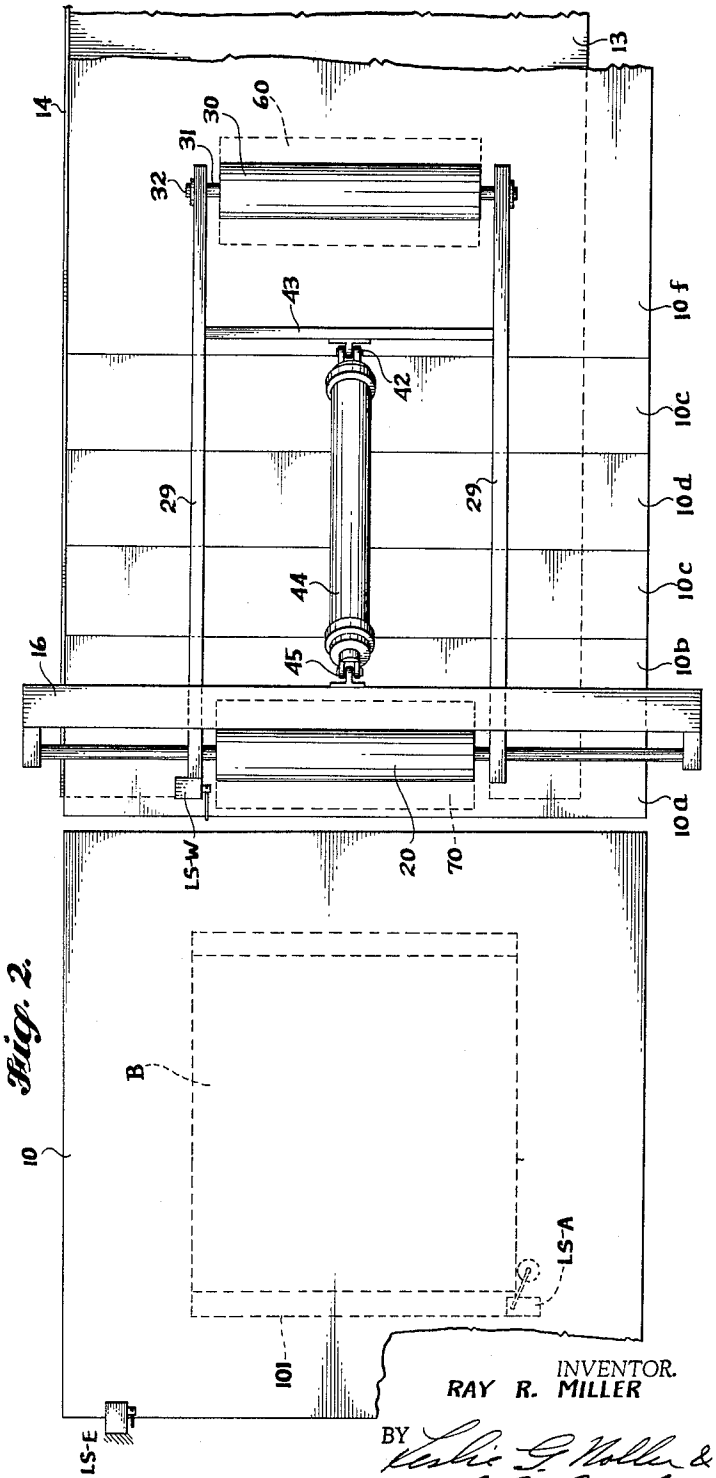


Fig. 2.

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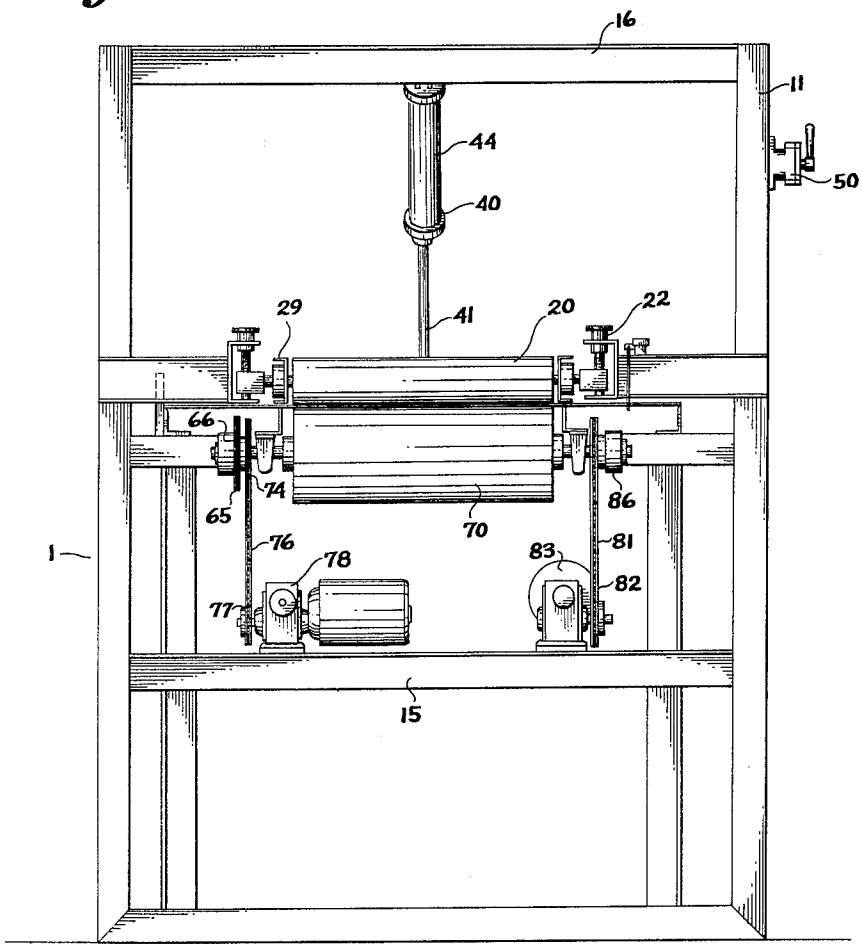
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AUTOMATIC WRAPPER FEEDER

Filed Dec. 26, 1963 4 Sheets-Sheet 3

Fig. 3.



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AUTOMATIC WRAPPER FEEDER

Filed Dec. 26, 1963 4 Sheets-Sheet 4

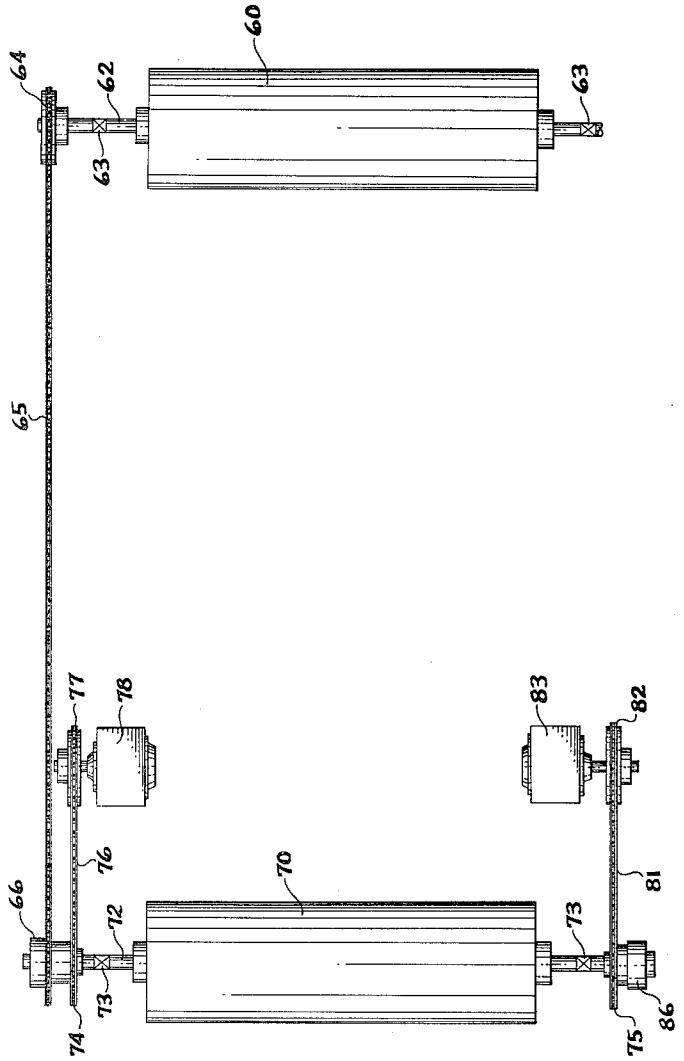


Fig. 4.

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3,254,886

AUTOMATIC WRAPPER FEEDER

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Filed Dec. 26, 1963, Ser. No. 333,450
4 Claims. (Cl. 271—3)

This invention relates to equipment for wrapping baled materials. It is particularly concerned with equipment which is designed to place suitable wrapper sheets in a folding position onto bales of pulp in an automatic folder-sealer machine.

Although not necessarily limited thereto, the present invention has been developed for use in association with the pulp bale wrapper folder-sealer machine disclosed and claimed in my copending application, Serial No. 333,405 filed concurrently herewith. In fact, a portion of the machine therein disclosed is illustrated in schematic form in the present application to show the manner in which the present invention can be associated with the folder-sealer invention.

In the past manual feeding of paper sheets was required if the sheets being fed were not of sufficient thickness and strength to allow the use of a metering gate, such as that shown as element **15** in the patent to Johnson et al. No. 2,996,862 issued August 22, 1961, to separate the sheet being fed from the sheets to be later fed.

Also manual feeding has been required whenever the sheets being fed were too porous to be fed individually by a vacuum pickup means. For example, the feeding mechanism presently used to feed pulp wrapper sheets to a printing machine utilizes a pin clawing means to pick up each pulp wrapper from a stack and place it in the printer. Obviously pin claw feeding means damage the wrappers by producing scrape marks and punctures which provide openings for ingress of contaminates into the pulp package. Attempts to use a vacuum pickup means for the same feeding action have been unsuccessful because of the porous nature of the pulp wrapper. If sufficient vacuum is used to insure picking up at least one wrapper sheet, often times a second sheet will also be picked up. If the vacuum is reduced to insure that no additional sheets are picked up there is no assurance that even the top sheet will be picked up by the vacuum means.

The principal object of the present invention is to provide a generally improved automatic pulp wrapper feeder.

Another object is to provide a wrapper feeder that will feed pulp sheets individually without injuring the surface of the sheets.

Another object is to provide a wrapper feeder which will feed sheets which are not thick enough or strong enough to be fed through a metering gate.

Additionally, an object of the invention is to provide a wrapper feeder which is manually loaded permitting accurate alignment of the wrapper sheets along one edge.

Still another object is to provide a wrapper feeder which will feed sheets which are too porous to be fed individually by a vacuum pickup means.

How the foregoing objects, together with such other objects as may appear hereinafter, or are incident to my invention, are obtained is illustrated in preferred form in the accompanying drawings. Various changes may be made, however. in the construction and arrangement of parts in the machine and certain features may be used without the use of other features. All such modifications are intended to be within the scope of the appended claims.

In the drawings:

FIGURE 1 is an elevation view, partly in section,

showing the over-all wrapper feeding machine and a schematic view of a typical automatic folding machine to illustrate the application of the present invention thereto,

FIGURE 2 is a plan view of FIGURE 1,

FIGURE 3 is an end elevation view of the wrapper feeding machine,

FIGURE 4 is a schematic diagram of the drive means for the wrapper feeding machine,

FIGURE 5 is a schematic showing of a typical placement of wrapper sheets in the wrapper feeding machine.

Referring now to FIGURES 1, 2 and 3, the invention is shown embodied in a paper feeder having a frame **1** for supporting and feeding a wrapper sheet **10** and consisting of forward upstanding members **11**, rearward upstanding members **12**, table top **13**, table guide **14**, and supports **15** placed wherever necessary for rigidity. Mounted on frame **1** is front nip roll **20** supported by front nip roll axle **21** which is adjustably mounted on forward upstanding members **11** by adjustable spring loaded supports **22**. Also supported on front nip roll axle **21** is rear nip roll frame **29** which supports rear nip roll **30** by means of rear nip roll axle **31** and bearings **32**. Rear nip roll frame positioning motor **40** is pivotally mounted at its piston end **41** at pivot **42** which is secured to rear nip roll frame cross support **43** which in turn is secured at each end to rear nip roll frame **29**. Motor **40** is pivotally supported at its cylinder end **44** at pivot **45** which is secured to upper frame cross support **16** which in turn is secured at each end to forward upstanding frame members **11**.

Rear nip roll frame positioning motor **40** is double acting and is controlled by air motor manual control valve **50** which has leading to it; an air supply line **51** and from it, an air exhaust line **52**, a forward air conduit **53** which leads to the forward end of cylinder **44** and a rearward air conduit **54** which leads to the rearward end of cylinder **44**.

Mounted below rear nip roll **30** is rear drive roll **60** having a surface **61** and an axle **62** which is mounted in bearings **63** which are secured to the table top **13**. Mounted at one end of axle **62** is a sprocket **64** which supports low-speed drive chain **65** which is also supported by overrunning clutch **66** mounted on forward drive roll axle **72**.

Mounted below front nip roll **20** is forward drive roll **70** having a surface **71** which is supported by axle **72** through bearing support **73** which is also secured to table top **13**. Limit switch LS–W is mounted upon upright member **11** just forward of the front nip roll **20**.

As shown in FIGURES 1 and 2 automatic folder **100**, having a folder bed **101** which supports a bale B, is located forward of the automatic feeder frame **1** and has a wrapper backstop **102** which supports a wrapper backstop limit switch LS–E, shown in the deflected position due to the presence of top wrapper sheet **10**. Bale folder **100** also supports a bale conveyor limit switch LS–A, which indicates when actuated that the bale B is in position on the folder **100** to receive a top wrapper sheet **10**.

A suitable drive means for the automatic feeder is shown in FIGURE 4. Low speed drive chain **76** is supported by low speed driven sprocket **74** and by low speed drive sprocket **77** which is connected to low speed drive means **78**. High-speed drive chain **81** is supported by high-speed driven sprocket **75** and by high-speed drive sprocket **82** which is connected to high-speed drive means **83**. The igh-speed and low-speed drive terminology is adopted for convenience only since it is obvious that each drive could be the same speed, however, better control is possible in the preferred drive scheme shown. For slow speed operation slow speed drive means **78** is energized which rotates forward drive roll axle **72** which in turn drives overrun-

ning clutch **66** which supports and rotates low speed drive chain **65** turning sprocket **64**, rear drive roll axle **62** and rear drive roll **60** at a low speed. For high speed operation, high speed drive means **83** is energized to rotate high speed drive sprocket **82** which supports and rotates high speed drive chain **81** which turns forward drive roll high speed driven sprocket **75** turning forward drive roll axle **72** and forward drive roll **70** at a high speed. During low speed operation overrunning clutch **86** disengages high speed driven sprocket **75** so that forward drive roll axle **72** can rotate at a low speed without rotating high speed driven sprocket **75**. Likewise, in high speed operation overrunning clutch **66** disengages low speed driven sprocket **74** so that forward drive roll axle **72** can operate at a high speed without rotation of low speed driven sprocket **74** or rotation of rear drive roll sprocket **64**.

FIGURE 5 shows a typical placement of wrappers **10** on table top **13** in schematic form for clarity. A number of wrapper sheets **10** are placed in offset relation to one another upon table top **13** with one edge accurately aligned upon guide **14**. Rear nip roll **30** is lowered to close the nip between itself and rear drive roll **60**. The wrappers **10** are supported upon rear drive roll **60** through an opening in table top **13**. It should be noted that the lowermost wrapper **10***a* is gripped between the front nip roll **20** and the forward drive roll **70** and is free from the nip formed between rear drive roll **60** and rear nip roll **30**. The next most low wrapper sheet, **10***b* is still within the nip formed between the rear nip roll **30** and rear drive roll **60**. With this arrangement of wrapper sheets it is possible to propel the wrapper by means of front nip roll **20** and forward drive roll **70** at a high speed out of the stack of wrappers without tearing or otherwise pulling apart the wrapper sheet being propelled. If, however, the distance between the nip formed between rolls **20** and **70** and the nip formed between the rolls **30** and **60** were greater than the present distance there would be no assurance that the wrapper would be fed into the nip between rolls **20** and **70** once the sheet was free from the nip formed between rolls **30** and **60**. If the rolls **20** and **70** were closer to the rolls **30** and **60** the wrapper sheet **10** which would be in position to feed the folder **100** would still be in the nip between rolls **30** and **60** and could not be propelled by means of rolls **20** and **70** without injuring the wrapper sheet in the process. Thus it is seen that the distance between the forward nip formed between rolls **20** and **70** and the rearward nip formed between the rolls **30** and **60** is critical in relation to the size of the sheet being fed. This relation can be stated as follows: The distance *d''*, which is the distance between the forward end of wrapper **10***a* as it touches limit switch LS–W to stop the low speed operation and the pressure point between the rear nip roll **30** and rear drive roll **60** must be greater than the length of the sheet **10***a* which is designated as, *d*, and the length of the sheet **10***a*, *d*, must be greater than the distance between the forward rolls **20** and **70** and the rearward rolls **30** and **60**, distance *d'*. Thus *d''* must be greater than *d* which in turn must be greater than *d'*.

It should also be noted that the capacity of the wrapper feeder can be increased to any desired quantity by adding additional sets of rollers **30** and **60** in tandem at a spacing less than distance *d*.

Operation

In general the wrapper feeder is intended to feed a wrapper sheet **10** onto a bale B in position on an automatic folder machine **100**. The wrapper feeding operation is fully automatic and the wrapper sheets **10** are loaded on the feeder machine manually.

Several wrapper sheets, **10***a*–**10***f*, are placed on the feeder table top **13** with one edge guided along table guide **14**. The sheets are placed with their leading edges successively from bottom to top set back from the preceding sheet's leading edge. The manual control valve **50** is turned so that the air supply line **51** is connected with forward air conduit **53** and the air exhaust line **52** is connected with the rearward air conduit **54** so that the rear nip roll frame positioning motor **40** is energized to lower rear nip roll frame **29** and rear nip roll **30** down onto the tops of the wrapper sheets **10**, pressurizing the nip formed between the rear nip roll **30** and the rear drive roll **60**. The low speed drive means **78** becomes energized rotating the rear drive roll **60** and the forward drive roll **70** at a low speed causing the lowermost wrapper sheet **10***a* to be fed into the nip formed between forward drive roll **70** and the front nip roll **20** to a point where limit switch LS–W is contacted, de-energizing low speed drive means **78**, stopping the rotation of rear drive roll **60** and forward drive roll **70**. As the bale B is positioned on the folder bed **101** limit switch LS–A is actuated, indicating the bale ready position, energizing the high speed drive means **83** which causes the high speed rotation of forward drive roll **70** propelling the lowermost sheet **10***a* which has now been drawn out of the pressure nip between rear drive roll **60** and rear nip roll **30** onto the bale B. As the wrapper sheet **10***a* is propelled over the bale B it comes into contact with folder backstop **102** actuating limit switch LS–E which de-energizes the high-speed drive means **83**. At this time the wrapper sheet **10***a* has passed limit switch LS–W which permits the lower speed drive means **78** to be energized causing the rear drive roll **60** and forward drive roll **70** to rotate at a low speed feeding the next wrapper **10***b* forward between the forward drive roll **70** and the front nip roll **20** until the limit switch LS–W is again contacted to de-energize the low-speed drive means **78**. This cycle is repeated until the supply of wrapper sheets **10** is consumed.

Having now described my invention and in what manner the same may be used, what I claim as new and desire to protect by Letters Patent is:

1. An apparatus for feeding in succession individual sheets from a stack of sheets having their leading edge imbricated with respect to each other, said sheets having a dimension *d* from their leading edge to their trailing edge comprising in combination;

first means for grasping said sheets at a first position and conveying said sheets away from said first position in a forward direction normal to said leading edge of said sheets to a second position;

second means for grasping said sheets at said second position and for conveying said sheets away from said second position in said forward direction to a third position forward of said second position and for feeding said sheets to a fourth position forward of said third position;

said first and second positions being separated by a dimension *d'*;

said stack of imbricated sheets being positioned between said first and second grasping means;

said first position being separated by a dimension *d''* from said third position;

said dimension *d''* being greater than said dimension *d*, and said dimension *d* being greater than said dimension *d'*;

first sensing means positioned in the path of said sheets at said third position for sensing the presence of said sheets at said third position;

said first sensing means being in an actuated condition responsive to sensing said sheets in said third position;

drive means operatively connected to said first and said second conveying means and responsive to said first sensing means;

said drive means operating at a first speed for driving said first and second conveying means for conveying said sheets from said first position to said third position responsive to said first sensing means being in an unactuated condition and at a second faster speed for conveying said sheets forward of said third position to a fourth position.

2. The apparatus of claim **1** including

second sensing means positioned in the path of said

sheets at said fourth position for sensing the presence of said sheets at said fourth position

said second sensing means being in an actuated condition responsive to sensing said sheets in said fourth position

third sensing means positioned in the path of an object which the sheet is to cover for sensing the presence of said object in the position to be wrapped

said third sensing means being in an actuated condition responsive to sensing said object in said wrapping position.

3. The apparatus of claim **2** wherein

said drive means operating at a second speed to drive said second conveying means for propelling said sheets from said third position to said fourth position responsive to said first and third sensing means being in an actuated condition and said second sensing means being in an unactuated condition.

4. The apparatus of claim **3** wherein said drive means comprises a low-speed drive means and a high-speed drive means

said low-speed drive means being operatively connected to said first and said second conveying means for said first-speed operation

said high-speed drive means being operatively disconnected from said second conveying means for said first-speed operation

said high-speed drive means being operatively connected to said second conveying means and operatively disconnected from said first conveying means for said second-speed operation.

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