Oct. 25, 1927. 1,646,497

O. SANDBERG

WRAPPING MACHINE

Filed Jan. 23, 1923 4 Sheets-Sheet 1

Fig. I.

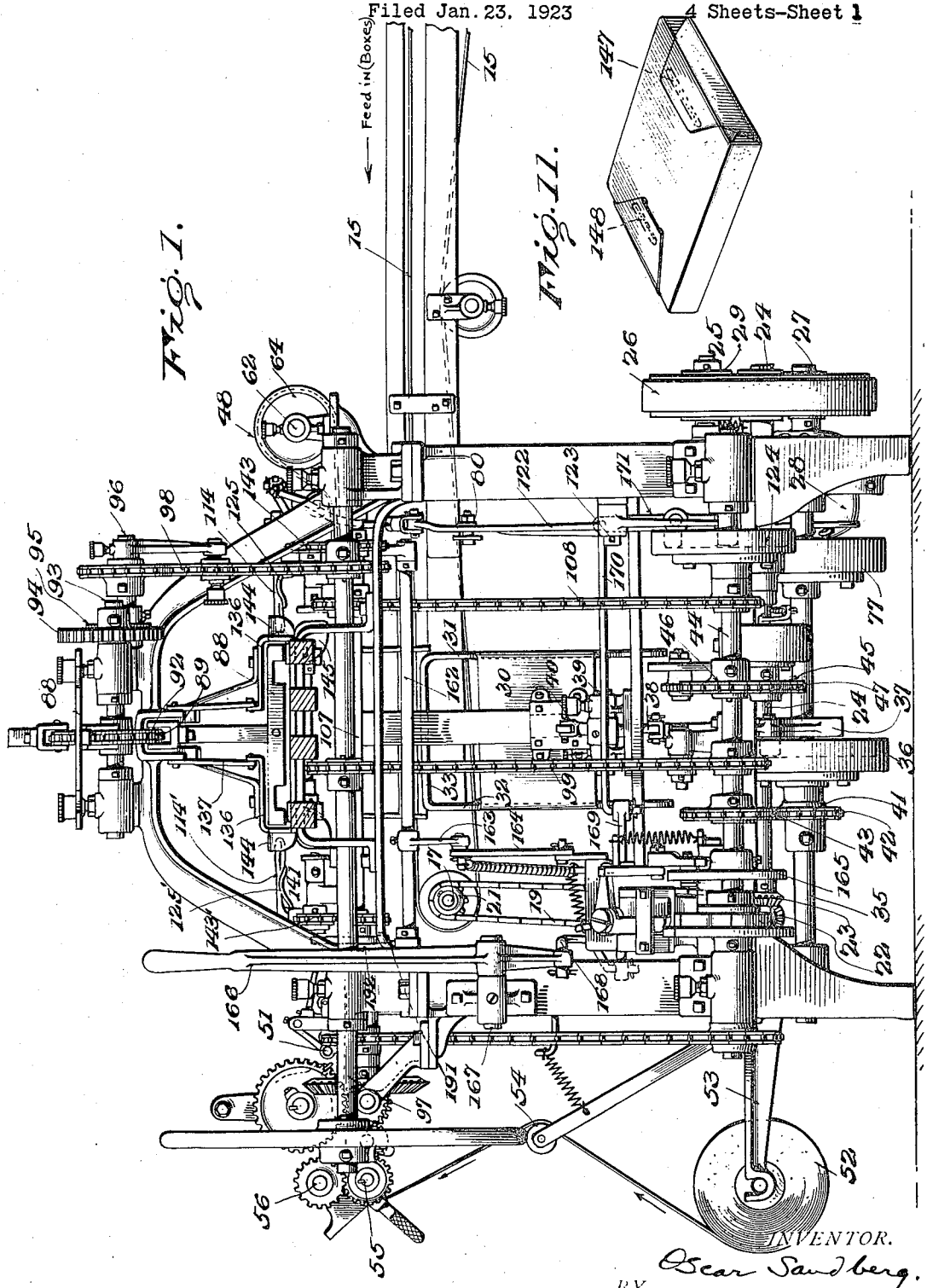


Fig. II.

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Filed Jan. 23, 1923 4 Sheets-Sheet 2

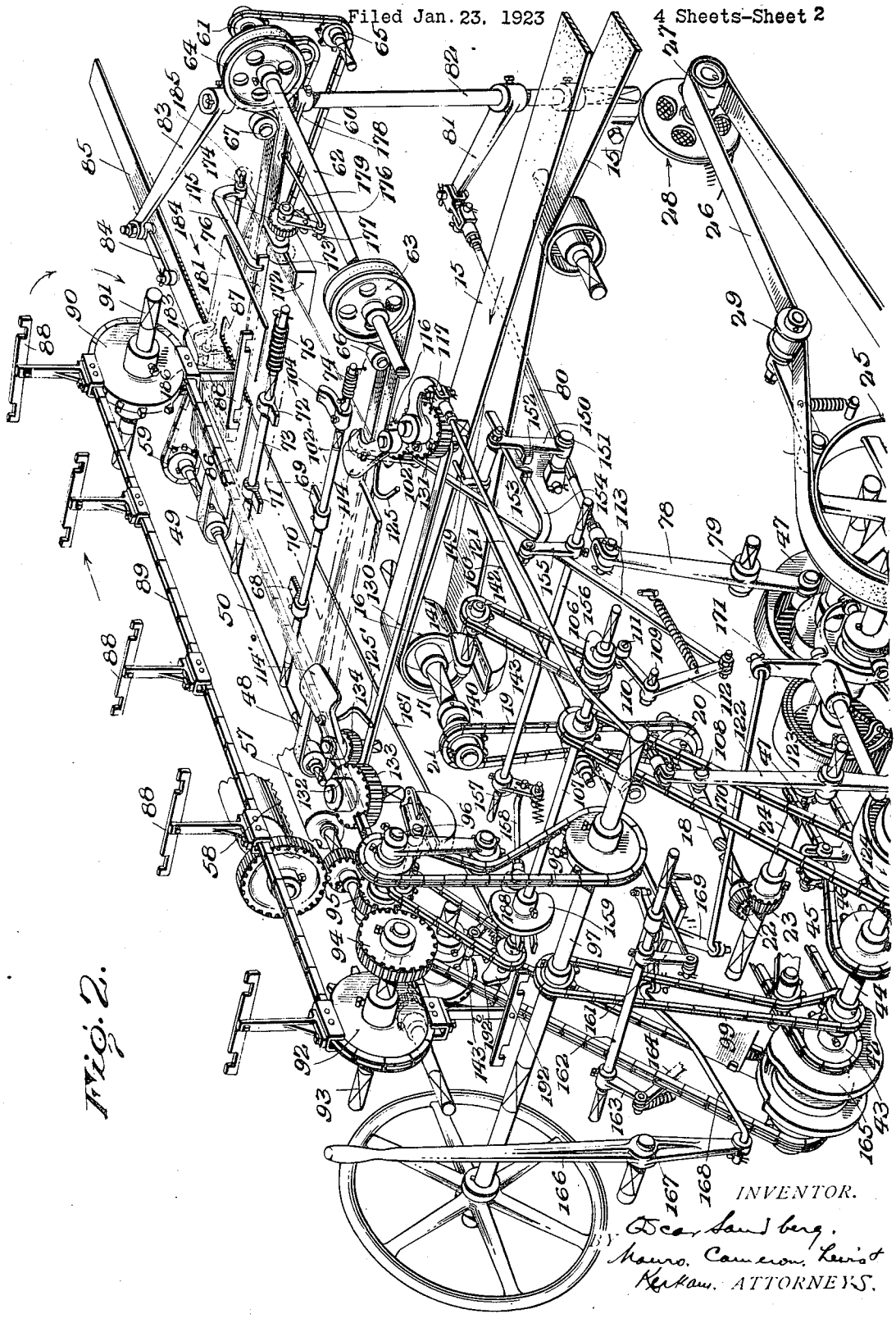


Fig. 2.

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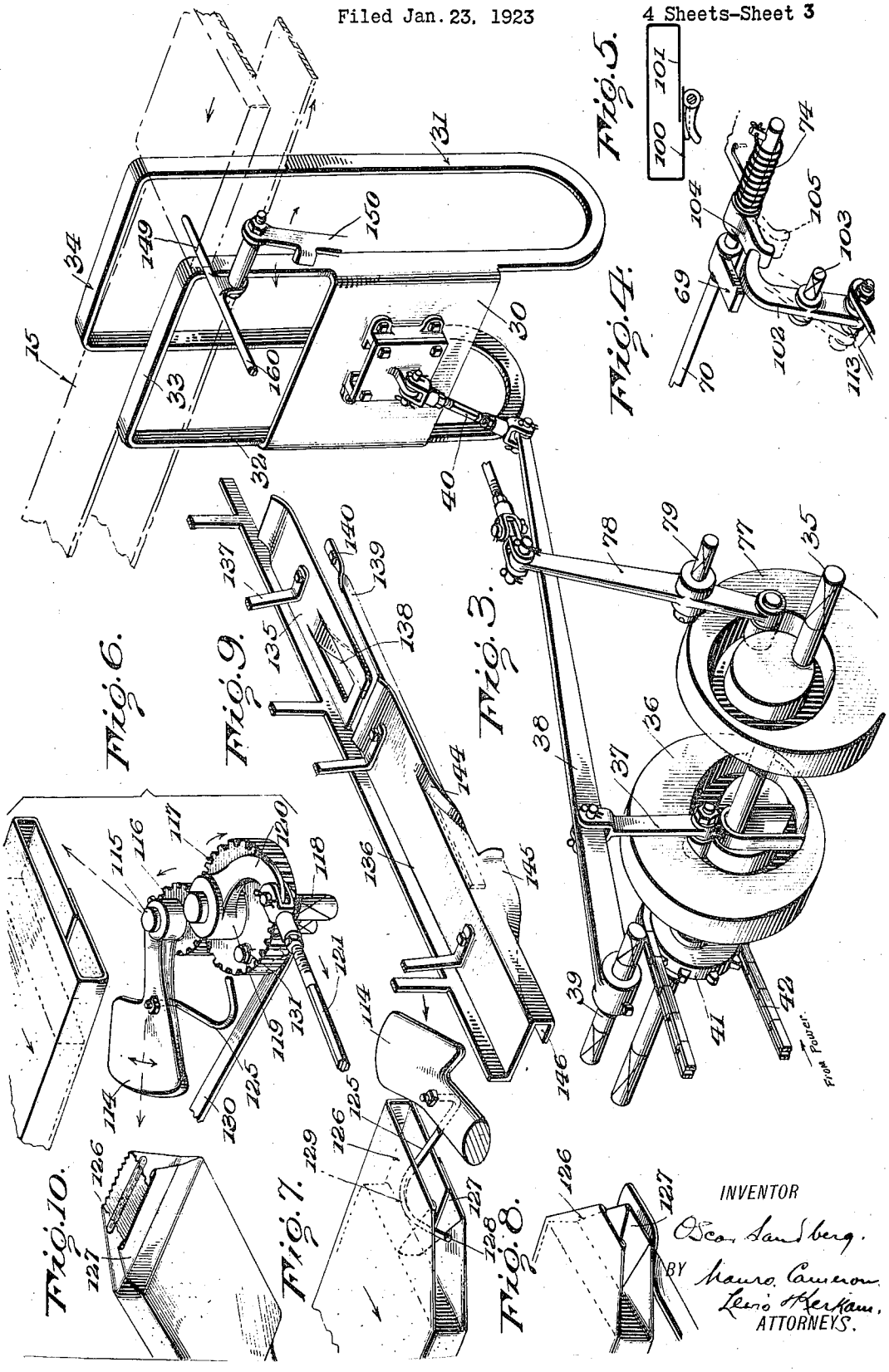
1,646,497

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WRAPPING MACHINE

Filed Jan. 23, 1923

4 Sheets-Sheet 3



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WRAPPING MACHINE

Filed Jan. 23, 1923

4 Sheets-Sheet 4

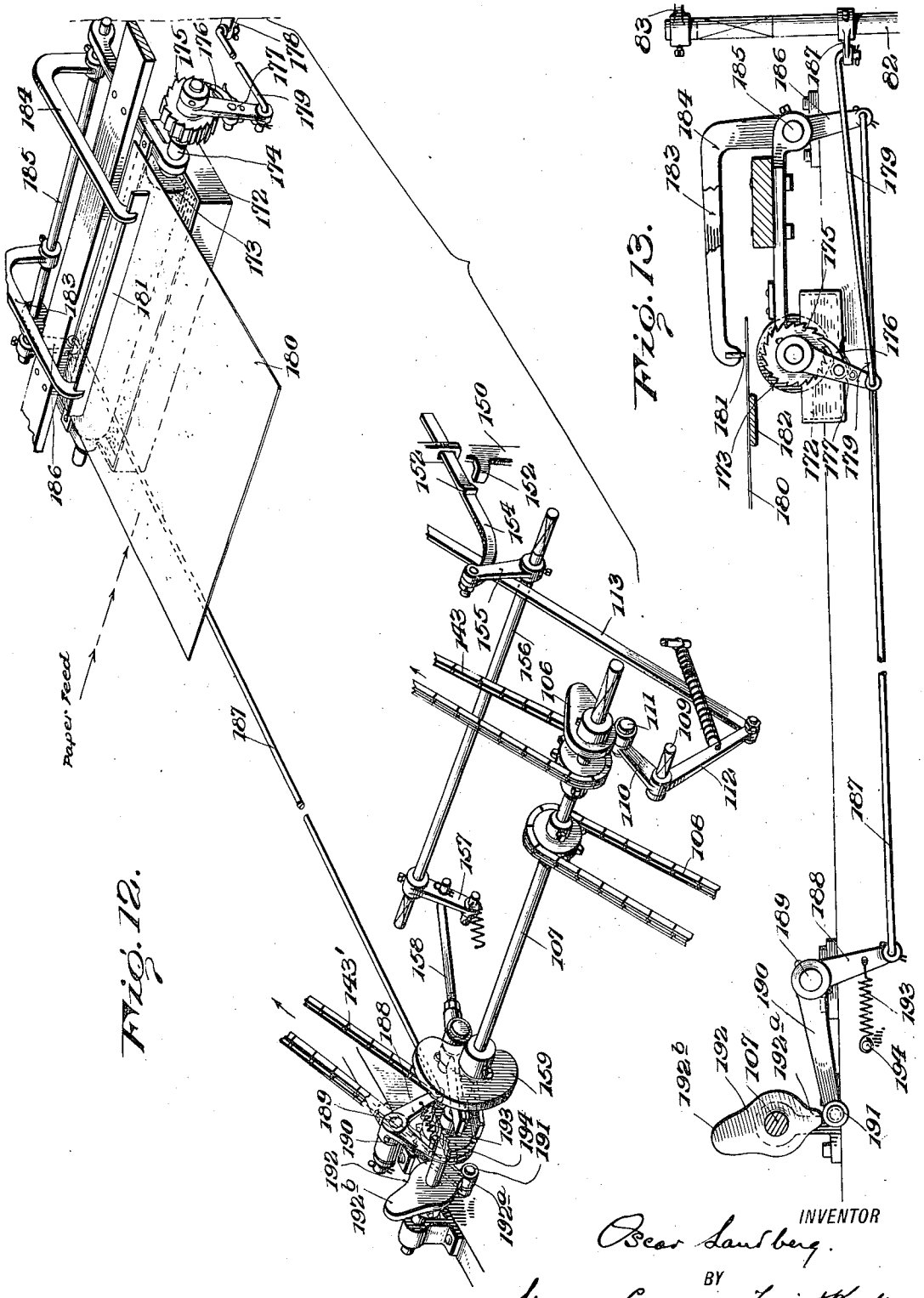


Fig. 12.

Fig. 13.

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UNITED STATES PATENT OFFICE.

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WRAPPING MACHINE.

Application filed January 23, 1923. Serial No. 614,448.

The present invention is an improvement in wrapping machines for cartons and the like, particularly of the flat type used for packing bacon. These cartons have heretofore been wrapped by hand as they presented a very difficult problem in automatic wrapping, in view of the fact that the height of the package was only a small fraction of either of its other two dimensions.

To successfully and automatically wrap and seal such a package, it is necessary that the folders shall operate on the projecting ends of the wrapper and that the flaps be folded about the ends of the package. In view of the limitations of space on the ends of these cartons, the problem of automatically, continuously and quickly wrapping such cartons at a speed of fifty or more per minute has presented great difficulty.

The problem has, however, been solved by means of a folder that, in its preferred embodiment, first operates to fold the front end flap and thereafter fold the rear end flap, the top and bottom flaps being folded by stationary folders. In this embodiment, after the front end flap is folded, a spacer automatically operates to hold the upper and lower end flaps in position, in order that the projecting ends of the wrapper shall be properly presented to the folder for the making of the rear end flap. This front and rear end flap folder is preferably a unitary structure mounted on a vertical axis that is operated by a suitable cam to effect first the folding of the front end flap and thereafter the folding of the rear end flap.

A further feature of the invention is the provision of a latching device for holding in a lowered position, as the carton is moved forward from the elevator, the yielding pivoted fingers that engage the front face of the carton at the time the rear face is engaged by the follower on the continuous conveyor. Heretofore these fingers have been free to press against the wrapper on the under side of the carton, and it has been found, particularly with the type of carton under consideration, that they acted as a drag on, and tended to displace, the under rear flap. Accordingly, automatic latching means have been provided that engage said fingers after they have acted on the front under flap and are about to pass into engagement with the rear under flap of the wrapper and hold them depressed preferably below the level of the table or support.

The invention will be better understood by reference to the accompanying drawings, illustrating one expression of the inventive idea, and wherein—

Fig. 1 is an end elevation, the infeed belt for the cartons being shown on the right and the paper-feed mechanism on the left;

Fig. 2 is a perspective view showing the manner in which the various parts are driven;

Fig. 3 is a perspective showing the elevator for raising the cartons from the infeed belt, the cam for the same, and the cam for operating the rear bottom flap folder;

Fig. 4 is a perspective view showing the latch for holding depressed the yielding pivoted fingers that engage the wrapper on the front and under faces of the carton;

Fig. 5 is a detail showing the manner in which the fingers engage the front under flap of the wrapper;

Fig. 6 is a perspective view illustrating the movable end flap folder about to make the front end flap;

Fig. 7 is a similar view showing the front end flap completed and the spacing element holding the upper and lower end flaps spaced apart with the movable flap folder about to make the rear end flap;

Fig. 8 is a perspective view showing a wrapper with the front and rear end flaps completed and the stationary folder about to make the bottom end flap;

Fig. 9 is a perspective view showing the stationary top and bottom end flap folders;

Fig. 10 is a view showing the bottom end flap completed and the wrapper in position to have the top end flap formed;

Fig. 11 is a perspective view showing one form of carton as wrapped on the machine;

Fig. 12 is a perspective view of mechanism for applying a strip of adhesive to the wrapper; and

Fig. 13 is a corresponding elevation partly in section.

Referring to the drawings wherein like reference numerals indicate like parts, 15 indicates the usual infeed belt on which the cartons are manually or automatically deposited and by which they are introduced

into the machine. As shown, this belt passes around a pulley 16 mounted on shaft 17, which latter is driven from a shaft 18 through a chain 19 passing around sprockets 20 and 21, the shaft 18 being provided with a bevel gear 22 that meshes with a bevel gear 23 on shaft 24. This shaft 24 carries a pulley 25 around which passes a drive belt 26 which also passes around a pulley 27 on the shaft of the armature of the motor 28. A belt tightener 29 may be provided if desired.

When the carton has reached the desired position on the belt 15 to be raised into engagement with the followers on the wrapping conveyor, it is spaced immediately over the elevator 30 (Fig. 3). This elevator is preferably constituted by a pair of U-shaped members 31 and 32 connected by horizontal portions 33 and 34 and so arranged that when the elevator is raised the portions 33 and 34 will pass upwardly on either side of the infeed belt 15 and will raise the carton from the belt and in position to be removed from the elevator by a follower on the wrapping conveyor. As best shown in Figs. 2 and 3, this elevator is operated from a shaft 35 which carries a cam 36 that operates through cam strap 37, lever 38 pivoted at 39 and link 40 to raise and lower said elevator. The shaft 35 is provided with a sprocket wheel 41 about which passes a sprocket chain 42 which also passes around a sprocket wheel 43 carried by a shaft 44. This shaft 44 is driven from shaft 24 by a sprocket chain 45 engaging a sprocket wheel 46 on shaft 44 and a sprocket 47 on shaft 24.

The carton is raised by the elevator into engagement with the under surface of a wrapper which is moved into position over the carton in any suitable manner as by a pair of belts 48 and 49 passing around pulleys on a shaft 50. The sheets are supported on these belts and the upper surface of the sheets may be engaged by suitable tension rollers 51 (Fig. 1). The paper is fed from the roll 52 carried in brackets 53, the web passing around roller 54 through rollers 55 and 56 and between the roller 57 and the knife 58 which severs the web into wrappers of proper size. If desired, the feed belts 48 and 49 may be driven only when a sheet is being moved into position above the carton on the elevator, and if this is desired the said belts may be driven from shaft 50 which carries a sprocket wheel 59 around which passes a sprocket chain 60 and which also passes around a sprocket wheel 61 on shaft 62 that carries pulleys 63 and 64 around which the belts 48 and 49 also pass. Sprocket wheel 65 is provided to position the chain 60, and belt tighteners 66 and 67 may be utilized if desired.

As the carton is forced upwardly against the wrapper, the upper face of the wrapper is engaged by fingers 68 and 69 on shaft 70 and 71 and 72 on shaft 73. Shaft 70 has associated therewith a coiled spring 74 to hold its fingers yieldingly in engagement with the wrapper on the carton, and shaft 73 has a similar spring 75 for the same purpose. As the carton is forced upwardly against the wrapper, these yielding fingers will pass from engagement with the top of the wrapper down into engagement with the front and rear ends of the same. At this time the rear under flap holder 76 operates to fold the rear under flap of the wrapper. This folder is operated from cam 77 on shaft 35 through a lever 78 pivoted at 79, and link 80, arm 81 on vertical shaft 82, arm 83 on said shaft, and link 84, one end of which is connected to arm 83 and the other end to the shank 85 of the folder 76. This folder 76 is provided with a pair of slots 86 and 87 that, as the folder moves forwardly to perform its function, pass around the enlargments of the pivoted fingers 71 and 72 and also around the U-shaped members 31 and 32 of the elevator.

After the rear under flap has been folded, the carton is engaged by one of a plurality of followers 88 carried on the wrapping conveyor 89. This conveyor preferably passes around a sprocket wheel 90 on shaft 91 and a sprocket wheel 92 on shaft 93. The shaft 93 carries a gear 94 that meshes with a pinion 95 on shaft 96, and this latter shaft is driven from a shaft 97 through a sprocket chain 98 passing around suitable sprocket wheels on said shafts. Shaft 97 is driven from shaft 44 through sprocket chain 99. As the carton is moved forwardly under the influence of the follower 88, the front under flap 100 (see Fig. 5) is folded over the rear under flap 101. The moving carton has forced the fingers 68, 69 upwardly, then forwardly in an anti-clockwise direction as the carton is progressed in a horizontal direction and, as this movement of the carton continues, these fingers engage the front under flap 100 of the wrapper. This engagement of the fingers with the flap 100 is desirable as it smooths the wrapper and wraps it closely about the carton, but it has been experienced that, when these fingers pass out of engagement with the front under flap 100 and into engagement with the rear under flap 101, they tend to pull this latter flap out of place. Means have accordingly been provided to permit these fingers to act on the front under flap but to prevent them from acting on the rear under flap. As shown particularly in Fig. 4, these means consist of a latching member 102 pivoted at 103 and being adapted to engage a finger 104 carried on the shaft 70. This latching member 102 is cam-operated, and its movements are timed so that it will be rocked

forward into engagement with the finger 104 just before the pivoted members 68 and 69 are about to pass out of engagement with the front under flap 100. When it is moved to so engage the finger 104, it operates to rock the same downwardly into the dotted line position 105, thus rocking the shaft 70 and depressing the fingers 68 and 69 out of contact with the wrapper. As shown (see Fig. 2), this latching member is operated by a cam 106 on shaft 107, which latter is driven from shaft 44 through a chain 108 passing around sprockets on said shaft. The cam 106 operates a bell-crank lever pivoted at 109, one arm 110 of which carries a roller 111 that engages said cam and the other arm 112 of which is connected to one end of a link 113, the other end of which link is connected to the latching member 102.

The carton with the front and rear under flaps folded is now progressed by the follower 88 into position for the folding of the front and rear end flaps. As here shown, the front and rear end flaps on one end of the carton are folded by a single folded member 114 pivoted on a vertical shaft 115 that carries a pinion 116 meshing with a gear 117 carried on shaft 118. The shaft 118 has keyed thereto a collar 119 from which projects an arm 120 to which is connected one end of a link 121, the other end of which is connected to the upper end of a lever 122 pivoted at 123 and operated by a cam 124 mounted on shaft 44. The folder 114 first operates (see Fig. 6) to make the front end flap fold, and thereafter, under the influence of said cam 124, the said folder operates in a counter-clockwise direction to effect the rear end flap fold. In order that the wrapper may be properly held for the making of the rear end fold, a spacer member 125 is preferably mounted on the folder 114 and passes between the upper end flap 126 and the lower end flap 127 immediately after the front end fold has been made. This spacer 125 is twisted in two planes so that the point 128 thereof will engage the under flap 127 at the same time that the bend 129 is engaging the top flap 126. As shown in Fig. 7, the folder 114 has made the front end fold and the spacer is in position between the upper and lower flaps to hold the wrapper in position, and the folder 114 is about to move in a counterclockwise direction under the influence of cam 124 to make the rear end fold. As shown in Fig. 8, the front and rear end folds have been made and the upper flaps 126 and 127 are now ready to be folded. In order that like movements may be imparted to an identical mechanism on the other side of the machine to fold the other end flaps, one end of a link 130 is connected to a pin 131 carried by gear 117, and the other end of said link 130 is connected to a pin 132 carried by a gear 133 identical in all respects to gear 117, said gear 133 meshing with a pinion 134, identical to pinion 116, and mounted on a shaft that carries the folder 114′ identical to folder 114. It will of course be understood that, through the connections described, when the folder 114 is moving in a clockwise direction, the folder 114′ will be moving in a counterclockwise direction and vice versa.

After these front and rear end flaps have been folded and the wrapper is in the position illustrated in Fig. 8, the end flaps 126 and 127 pass into engagement with stationary means for effecting their folding. As shown particularly in Figs. 8 and 9, the lateral margins of the carton pass under plates 135 and 136. The former is secured to the frame of the machine in any suitable manner as by a bracket 137, and a spring tongue 138 is formed therefrom and presses upon the top of the carton. The stationary folder for the under end flap is in the form of a twisted bar 139 secured at 140 to the frame of the machine, and this bar acts in the well known manner to fold the under rear flap as shown in Fig. 10. At this time the adhesive may be applied to the under face of the flap 126 if desired. It is sometimes desired, even though the wrapper be of waxed paper, to apply adhesive to this flap, but this is not at all necessary, it being only necessary to apply heat to the waxed paper if it is desired to effect the sealing of the flaps in this manner. If it is desired, however, to use additional adhesive in the sealing of the flaps, this may be applied to the under surface of the flap 126 by a glue-applying member 141 (see Fig. 2) carried on shaft 142 and receiving glue from a receptacle 143 carried by the frame of the machine. The shaft 142 is driven from shaft 107 by a sprocket chain 143. An identical glue-applying construction is provided for the other upper end flap.

After the glue has been so applied, the upper end flap 126 is folded by the construction shown in Fig. 9. As there illustrated, the plate 136 is provided with a curved portion 144 that initiates the fold, the flap being gradually turned sharply down over the end of the carton by the part 145 and finally completely turned under the bottom of the carton by the part 146. This operation effects a wrapping and sealing as indicated in Fig. 11, in which the lines of glue 147 and 148 are shown on the bottom of the wrapper. It will of course be understood that the sealing may be effected on the ends of the cartons and that the flaps need not be so long as to effect the sealing on the bottom of the carton. If it were designed to seal the flaps on the ends of the carton, it would not be necessary or desirable to employ the part 146 of the upper end flap folder.

It is desirable that the paper-feed shall be controlled by the cartons on the infeed belt so that, if no carton is present in position on the infeed belt 15, no wrapper will be fed in position. As shown, a detector 149 is carried by an arm 150 pivoted at 151. When a carton engages the detector 149, a lug 152 on the arm 150 is moved behind a lug 153 on slide 154 which is reciprocated transversely of the infeed belt 15 through an arm 155, shaft 156, arm 157, link 158 and cam 159 on shaft 107. This operates to withdraw the detector from the path of the cartons and operates through link 160, arm 161 on shaft 162 and suitable members 163 and 164 to operate the clutch mechanism 165 on shaft 44 to effect the feed of paper from the roll 52, and also to effect the operation of the cutting mechanism. As this clutch mechanism is preferably the same as that shown in Johnson Patent No. 1,270.416, no further description of the same is necessary. The operation of the machine is preferably controlled manually by the usual lever 166 pivoted at 167 that operates through links 168, bell-crank 169, link 170 and fork 171 to open and close the clutch on shaft 24.

It is sometimes desirable to put a strip of glue on the wrapper as it is being fed into the machine so that when the package is first banded by the wrapper, the oscillating edges of the wrapper will adhere. Preferably, the strip of glue is put on the wrapper near its rear edge (as seen in Fig. 12), this part of the wrapper constituting the rear bottom fold. As shown in Figs. 12 and 13, 172 is the adhesive container in which rotates a roller 173 mounted on a shaft 174. This shaft carries a ratchet 175 that is intermittently rotated through the agency of a pawl 176 carried by an arm 177. This arm is moved from shaft 82 through the medium of an arm 178 and a link 179. The sheet of paper 180, as seen in Fig. 12, is in position to have a strip of glue applied to the top of the same near the rear edge thereof by means of a glue-applying member 181. At this time the sheet is supported near its rear edge by a strip 182 (see Fig. 13). The glue-applying member 181 is carried by a pair of arms 183, 184 mounted on a shaft 185. This shaft carries an arm 186 to the free end of which is connected one end of a link 187. The other end of said link is connected to one arm 188 of a bell-crank lever pivoted at 189, the other arm 190 of which bell-crank lever carries a roller 191 and is engaged by a cam 192 keyed to the shaft 107. This cam operates to move the glue-applying member 181 into contact with the wrapper 180 and also to move the glue-applying member 181 a further distance to engage it with the roller 173. In order to perform these functions, said cam 192 is provided with two rises 192^a and 192^b. When the rise 192^a engages the bell-crank lever, the glue-applying member 181 is moved into engagement with the wrapper, and when rise 192^b engages the bell-crank lever, the glue-applying member 181 is moved a further distance into engagement with the roller 173. The parts are moved in a reverse direction by means of a spring 193, one end of which is connected to arm 188 of the bell-crank lever, and the other end of which is anchored at 194 to the frame of the machine.

After the glue has been applied along the rear edge of the wrapper, the latter is associated with the carton by a means heretofore described, and the overlapping edges of the wrapper are secured together by this line of adhesive.

While for the purposes of illustration, the invention has been described and shown in considerable detail, it is to be understood that the invention is not limited to the particular mechanical embodiments herein set forth but that the inventive idea is susceptible of various mechanical expressions within the limits of the appended claims.

What is claimed is:—

1. In a device of the character described, the combination of an endless conveyor for cartons, means for feeding wrappers to the cartons above the latter, means for applying a strip of glue to the wrapper at the rear thereof, and means for folding a wrapper about each carton, said means including a member for turning the rear portion of the wrapper up against the bottom of the carton with the glue strip disposed outwardly.

2. In a device of the character described, the combination of an infeed belt for cartons to be wrapped, a wrapping conveyor provided with followers, and a vertically reciprocating elevator engaging each carton on each side of said belt and raising the same into the path of said followers.

3. In a device of the character described, the combination of an infeed belt for cartons to be wrapped, a wrapping conveyor provided with followers, and a vertically reciprocating elevator provided with U-shaped members engaging each carton on each side of said belt and raising the same into the path of movement of said followers.

4. In a device of the character described, an endless carton conveyor provided with followers, means for engaging a carton with a wrapper and moving the same into the path of one of said followers, a yielding member in the line of conveyor travel for engaging the front bottom flaps of the wrapper to hold it closely against the bottom of the carton, and means automatically moving said yielding member away from the carton before it can engage the rear bottom flap of the wrapper.

5. In a device of the character described, a continuously movable endless carton con-

veyor provided with followers, means for engaging a carton with a wrapper and moving the same into the path of one of said followers, a yielding member in the line of conveyor travel for engaging the front bottom flap of the wrapper to hold it closely against the bottom of the carton, and cam operated means moving said yielding member away from the carton before it can engage the rear under flap of the wrapper.

6. In a device of the character described, folding devices, a wrapping conveyor for progressing wrapped cartons past said devices, a pair of yielding members engaging the front under flap of the wrapper, and means for moving said members away from the wrapper before they engage the rear under flap.

7. In a device of the character described, folding devices, a wrapping conveyor for progressing wrapped cartons past said devices, a pair of yielding members engaging the front under flap of the wrapper, and a pivoted latch operated to move said members away from the wrappers before they engage the rear under flap.

8. In a device of the character described, the combination of a continuously moving carton-feeding and wrapper-folding mechanism, the latter including an element movable toward and away from the path of travel of the cartons and operating to form the front and rear end folds on one end of the carton, and other means for forming the other folds.

9. In a device of the character described, the combination of a continuously movable carton-feeding and wrapper-folding mechanism, the latter including a pivoted element movable to form first the front end fold and then the rear end fold on one end of the carton, and other means for forming the other folds.

10. In a device of the character described, the combination of an endless carton-feeding conveyor and a wrapper-folding mechanism, the latter including an oscillating element movable toward and away from the line of conveyor travel to first form the front end fold and then to form the rear end fold on one end of the carton, and other means for forming the other folds.

11. In a device of the character described, the combination of an endless carton-feeding conveyor and a wrapper-folding mechanism, the latter including a pivoted element movable first in one direction to form the front end fold and then in the opposite direction to form the rear end fold on one end of the carton, and other means for forming the other folds.

12. In a device of the character described, the combination of continuously operating carton feeding and wrapper-folding mechanism, the latter including an element movable toward and away from the line of carton travel to form the front and rear end folds on one end of the carton, a similar element on the other side of the machine, connections between said elements, and other means for forming the other folds.

13. In a device of the character described, the combination of an endless carton-feeding conveyor and a wrapper-folding mechanism, the latter including a pivoted element movable to form first the front end fold and then the rear end fold on one end of the carton, a similar element on the other side of the machine, connections between said elements, and other means for forming the other folds.

14. In a device of the character described, the combination of continuously operating carton-feeding and wrapper-folding mechanism, the latter including an oscillating element movable toward and away from the line of carton travel first to form the front end fold and then to form the rear end fold on one end of the carton, a similar element on the other side of the machine, connections between said elements, and other means for forming the other folds.

15. In a device of the character described, the combination of a continuously moving endless carton-feeding conveyor and a wrapper-folding mechanism, the latter including a pivoted element movable first in one direction to form the front end fold and then in the opposite direction to form the rear end fold on one end of the carton, a similar element on the other side of the machine, connections between said elements, and other means for forming the other folds.

16. In a device of the character described, the combination of carton-feeding and wrapper-folding mechanism, means for successively folding the front and rear end flaps, means engaging the top and bottom end flaps after the front end flap has been made and before the rear end flap has been folded, and other means for forming the other flaps.

17. In a device of the character described, the combination of carton-feeding and wrapper-folding mechanism, means for successively folding the front and rear end flaps, means carried by said folding means and engaging the top and bottom end flaps after the front end flap has been made and before the rear end flap has been folded, and other means for forming the other flaps.

18. In a device of the character described, the combination of a carton-feeding and wrapper-folding mechanism, a single pivoted element successively folding the front and rear end flaps at one end of the carton, means engaging between the top and bottom end flaps after the front end flap has been made and before the rear end flap has been folded, and other means for forming the other flaps.

19. In a device of the character described,

the combination of carton-feeding and wrapper-folding mechanism, a single pivoted element successively folding the front and rear end flaps at one end of the carton, means carried by said element and engaging between the top and bottom end flaps after the front end flap has been made and before the rear end flap has been folded, and other means for forming the other flaps.

20. In a device of the character described, the combination of carton-feeding and wrapper-folding mechanism, a single pivoted element successively folding the front and rear end flaps at one end of the carton, a similar element on the other side of the machine and connections between said elements, spacing means carried by each element and engaging between the top and bottom end flaps after the front end flap has been made and before the rear end flap is folded, and other means for forming the other flaps.

21. In a device of the character described, the combination of a continuously operating carton-feeding and wrapper-folding mechanism, vertically pivoted members operating to successively fold the front and rear end flaps, means applying adhesive to one of the remaining end flaps, and means for folding said remaining end flaps.

22. In a device of the character described, the combination of a continuously operating carton-feeding and wrapper-folding mechanism, vertically pivoted members operating to successively fold the front and rear end flaps, means applying adhesive to the under face of the top end flap, means for folding the bottom end flap, and means for thereafter folding said top end flap.

23. In a device of the character described, the combination of a continuously operating carton-feeding and wrapper-folding mechanism, vertically pivoted members operating to successively fold the front and rear end flaps, means applying adhesive to one of the remaining end flaps, means folding the bottom end flap, and means thereafter folding the top end flap and sealing the same against the bottom of the carton.

24. In a device of the character described, the combination of a continuously operating carton-feeding and wrapper-folding mechanism, vertically pivoted members operating to successively fold the front and rear end flaps, means folding one of the remaining end flaps, means applying adhesive to the other end flap and sealing the same against the opposite face of the carton.

In testimony whereof I have signed this specification.

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