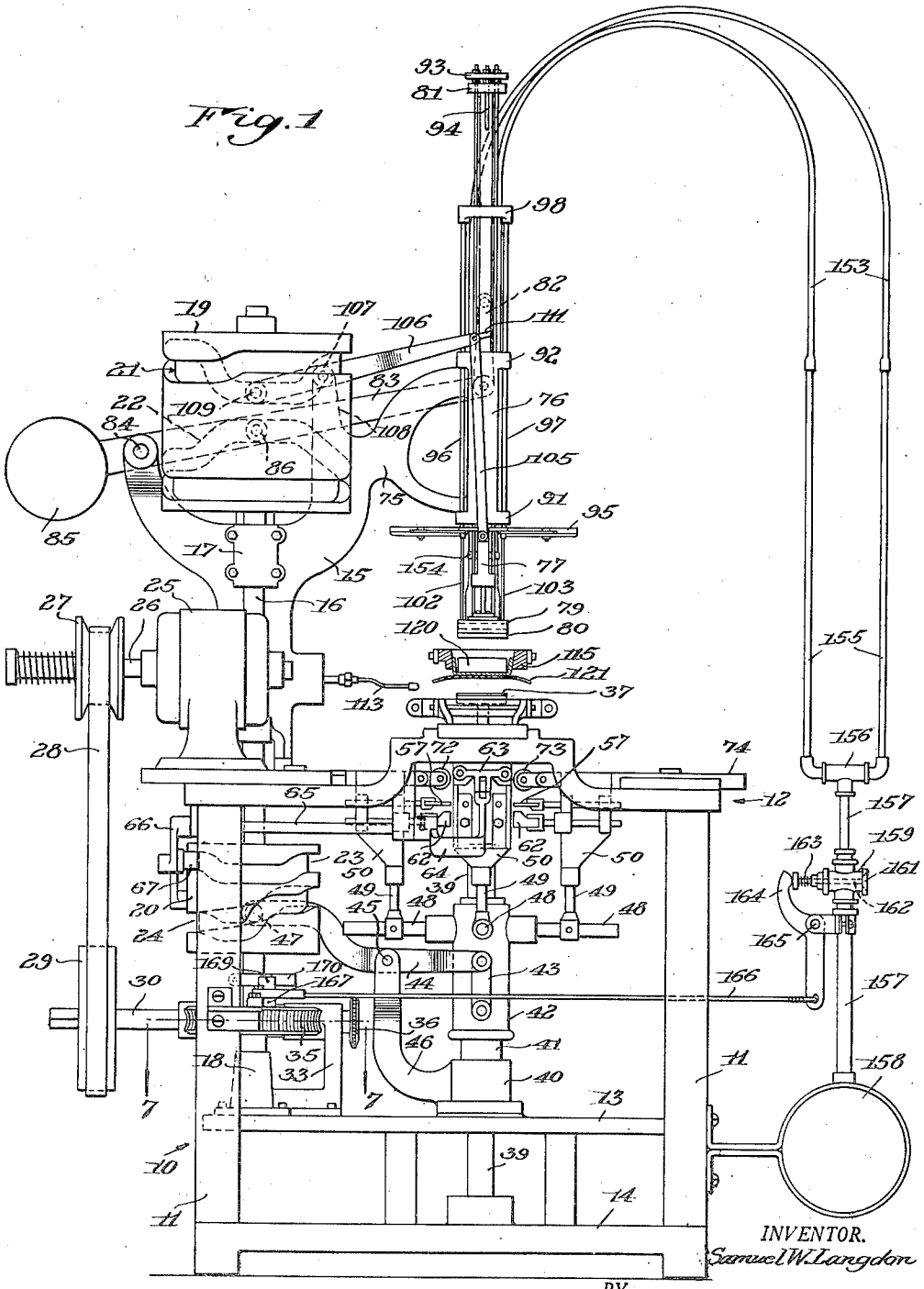
July 29, 1952 S. W. LANGDON 2,604,828

BOXMAKING MACHINE

Filed Jan. 22, 1949 4 Sheets-Sheet 1

Fig. 1



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BOXMAKING MACHINE

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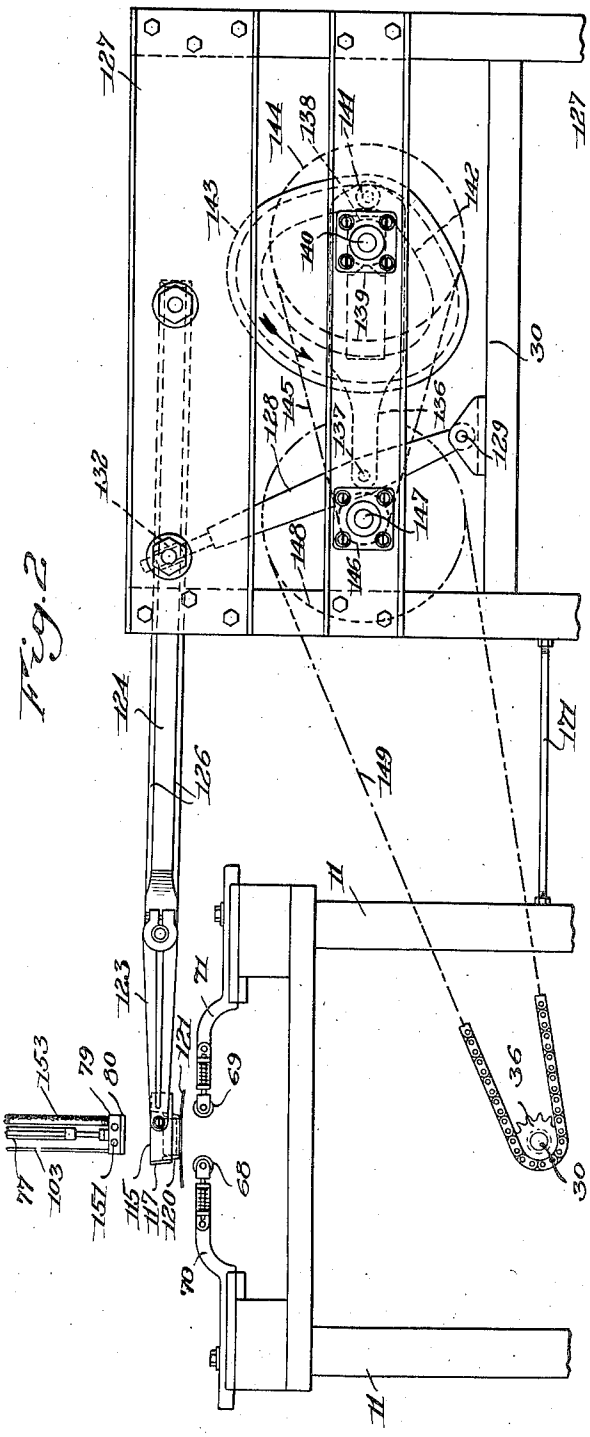


Fig. 2

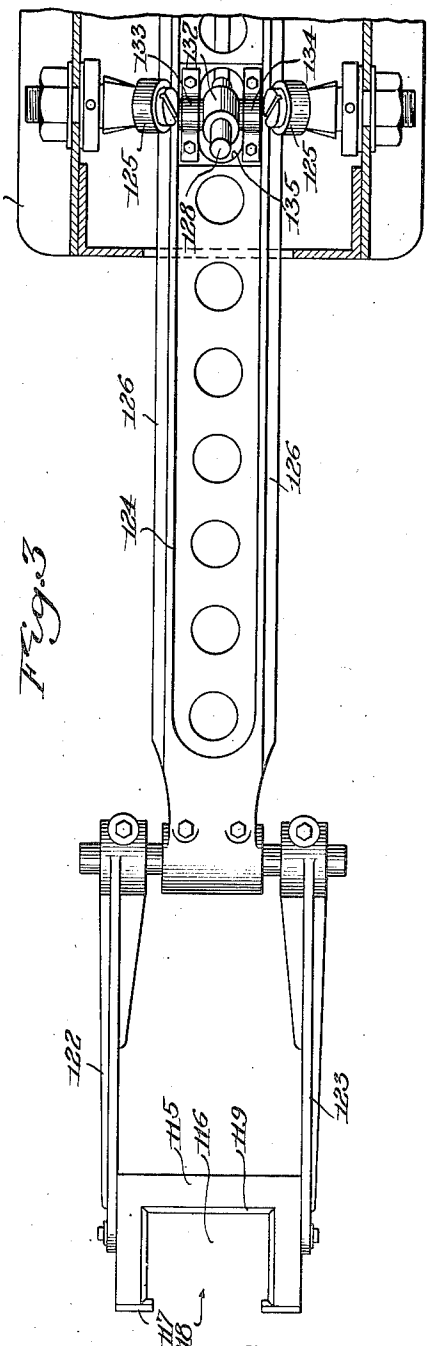


Fig. 3

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BOXMAKING MACHINE

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Fig. 4

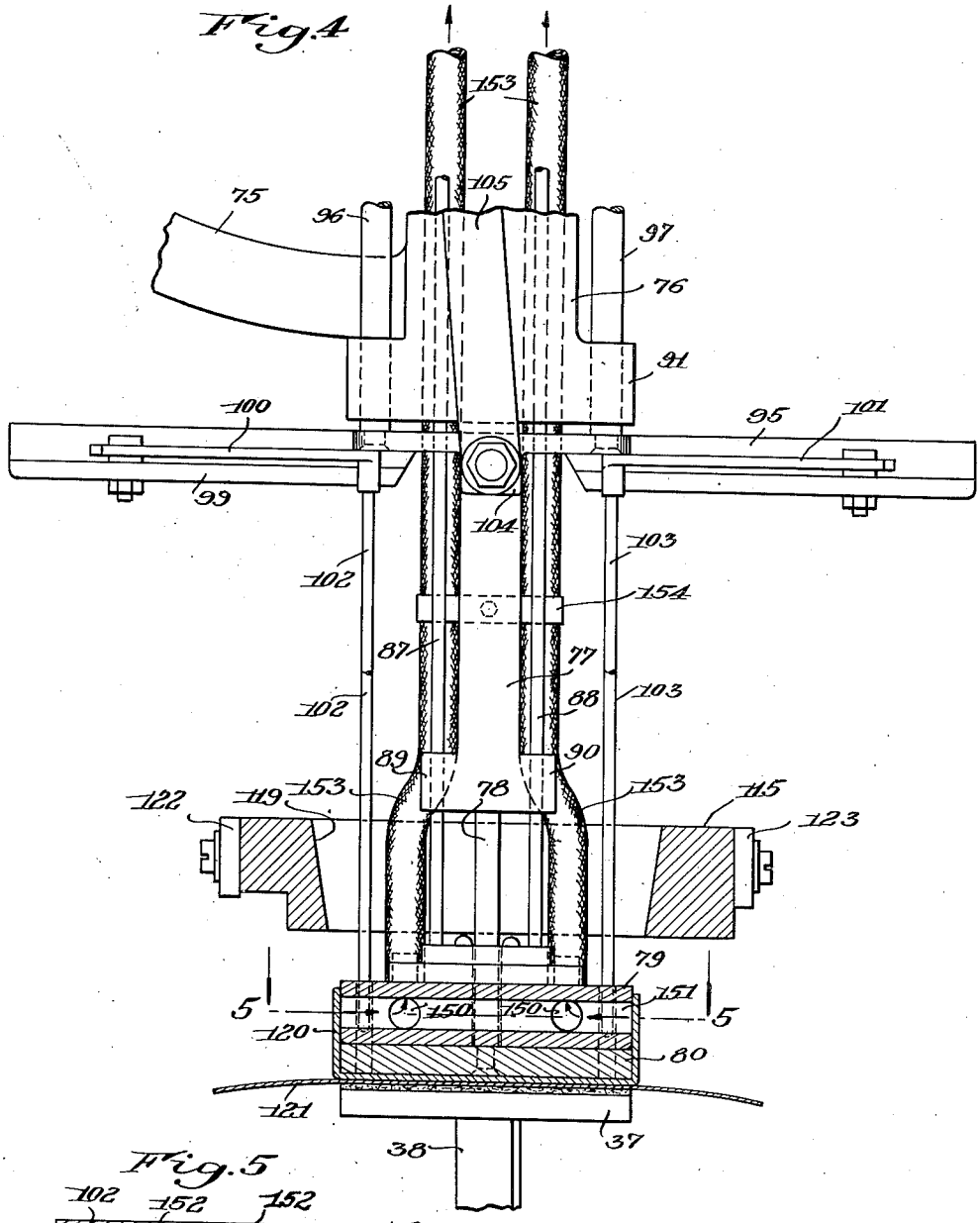
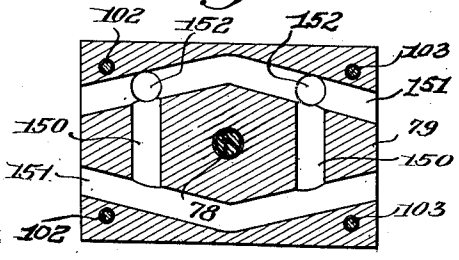


Fig. 5



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2,604,828

BOXMAKING MACHINE

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4 Sheets-Sheet 4

Fig. 6

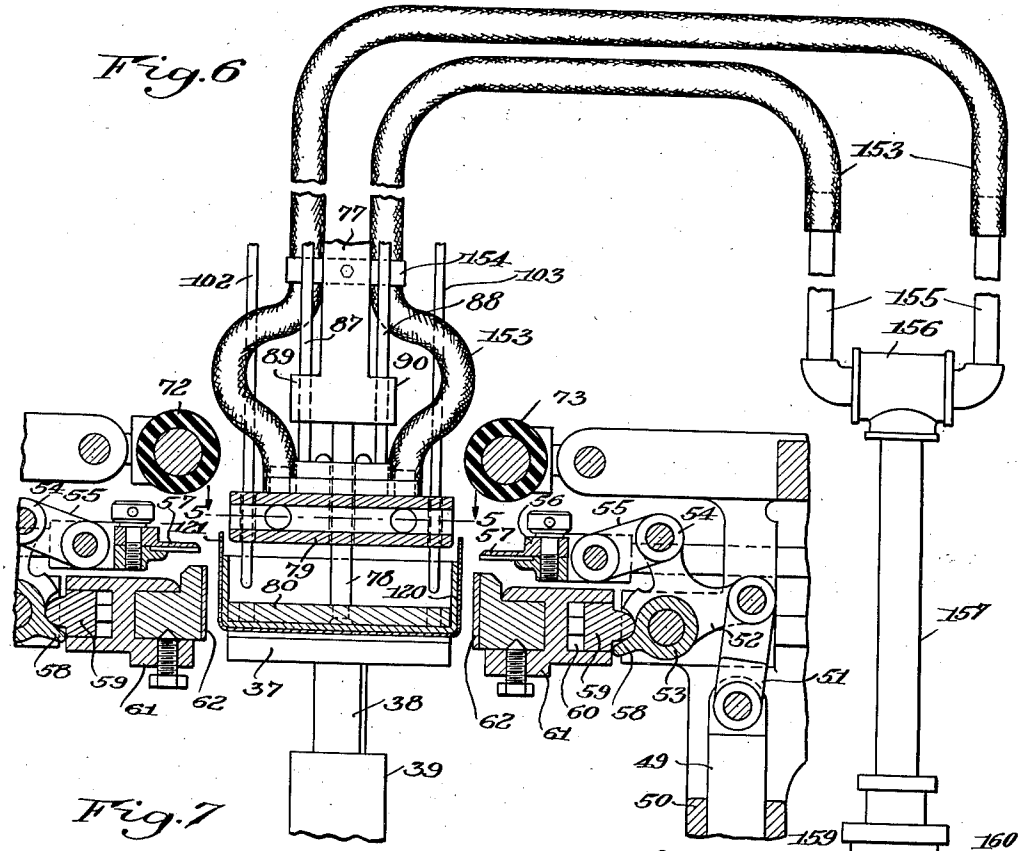
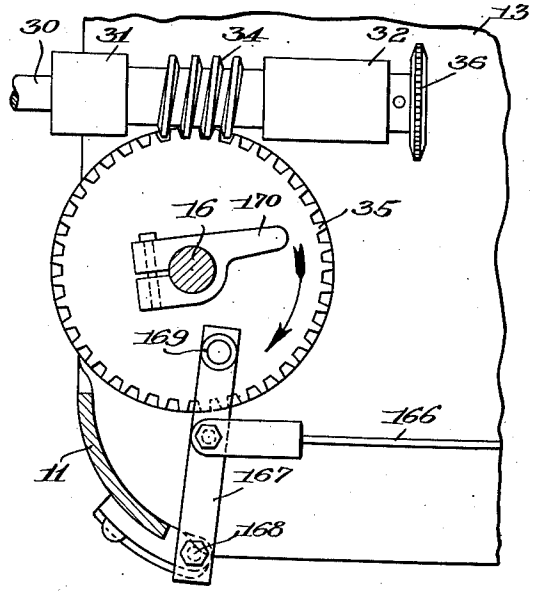


Fig. 7



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Patented July 29, 1952

2,604,828

UNITED STATES PATENT OFFICE

2,604,828

BOXMAKING MACHINE

Samuel W. Langdon, Rochester, N. Y., assignor of one-half to Harold J. Nagle and one-half to Reginald A. Nagle, both of Rochester, N. Y.

Application January 22, 1949, Serial No. 72,217

6 Claims. (Cl. 93—54.2)

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This invention relates to box making machines and, more particularly, to machines for folding a glued wrapper sheet about a box blank of cardboard or similar material. Machines of this character are known in which an adhesively associated blank and wrapper are automatically fed to and placed on the platen of a box making machine, but such machines involve the difficulties of moving and positioning a glued wrapper sheet over the platen without curling it and smearing the machine parts with glue, as well as lack of attachment of the blank and wrapper to the form block. Machines are known also in which an attendant applies and holds an adhesively associated blank and wrapper on an upper section of the form block until gripped between it and a lower section for presentation to the folding tools, but such machines require the manual labor of an attendant and are also less accurate and less rapid in production than is desirable in such machines. Other machines are known in which the blank and wrapper assembly are manually applied by an attendant to the form block which is provided with means for gripping the assembly operated automatically by the motion of the form block, but such machines are subject to the same limitations and are not adapted for handling the loose side walls of an unstayed box.

One object of the invention, therefore, is to provide an improved machine of a more automatic, reliable and efficient nature.

Another object is the provision of such a machine having fully automatic form block means for gripping and holding a blank and wrapper assembly supplied by a feeding means, without manual handling.

Another object is to supply a machine of the above nature having fully automatic means for feeding a blank and wrapper from a machine for assembling the same, for gripping and holding the assembly on the form block during the operations thereon by the folding tools, and for ejecting the complete box, rapidly and automatically and without manual handling.

Another object is to produce such a machine particularly adapted for wrapping unstayed boxes.

Another object is to produce a machine of the above character in which the blank and wrapper assembly is automatically fed to and accurately positioned on the form block and in which the form block comprises simple and practical means for effectively gripping and holding the assembly without marking or defacing the same.

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To these and other ends the invention resides in certain improvements and combinations of parts, all as will be hereinafter more fully described, the novel features being pointed out in the claims at the end of the specification.

In the drawings:

Fig. 1 is a side elevation of a box wrapping machine comprising means for feeding box blanks and wrappers thereto in accordance with the present invention;

Fig. 2 is a fragmentary, side elevation of the machine as viewed from the right in Fig. 1;

Fig. 3 is an enlarged, top plan view of certain of the parts shown in Fig. 2, partly in section and partly broken away;

Fig. 4 is an enlarged, sectional elevation of the form block mechanism as shown in Fig. 1 but with the parts in a different position;

Fig. 5 is a sectional view of the upper form block on the line 5—5 in Fig. 4;

Fig. 6 is a view of the form block mechanism similar to Fig. 4, but with the parts in a different position and showing some of the wrapping tools, and

Fig. 7 is an enlarged, sectional view on the line 7—7 in Fig. 1.

My co-pending patent application, Serial No. 72,218, filed January 22, 1949, Method and Apparatus for Wrapping Boxes, discloses the combination with a wrapper gluing machine and its delivery belt of mechanism for automatically feeding, registering and assembling a box blank and a wrapper, with a central panel of the blank adhesively secured to the wrapper and its side walls bent and folded upwardly therefrom, together with transfer means for receiving the blank and wrapper assembly and transferring it to a wrapping machine. The present invention relates more particularly to mechanism for automatically feeding the blank and wrapper assemblies to the wrapping machine and improvements in the form block mechanism of the latter for gripping and presenting the blank and wrapper assembly to the wrapping tools.

The present invention comprises an improved wrapping machine which may be generally of the type disclosed in the patent to Philip S. Smith, No. 691,329, and the patent to Reifsnyder et al., No. 1,131,792, more particularly in regard to the wrapping tools and the mechanism for operating the same and for raising and lowering the form block means to carry the blank and wrapper assembly through a cycle of cooperation with such tools to complete and eject a finished box from the machine. My invention provides a machine of this type with improved means oper-

ating automatically in timed coordination with the wrapping machine, for feeding a blank and wrapper assembly and for gripping and holding the same on the form block means to carry it through the path in which it is operated on and completed by the wrapping tools and ejected from the machine, as will now be described.

Referring more particularly to the drawings, the present embodiment of the invention comprises a wrapping machine frame, indicated generally at 10, having legs 11 supporting a table top indicated generally at 12, as well as intermediate and lower shelves, 13 and 14. Rising from one side of the table 12 is a standard 15 for supporting the form block means and its operating mechanism, as hereafter described. A main operating shaft 16 is rotatably mounted in vertical position in bearings on the frame, such as a bearing 17 on standard 15 and a bearing 18 on shelf 13. Fixed on this shaft are upper and lower cam drums, 19 and 20. The upper of these drums 19 is formed with upper and lower cam grooves, 21 and 22, respectively, for operating the stripper and form block means. The lower cam 20 is formed with grooves, 23 and 24, respectively, for operating the several wrapping tools, as hereafter described.

The means for driving shaft 16 preferably comprises an electric motor 25 mounted on the table top 12 and having its shaft 26 provided with a pulley 27 driving a belt 28. The belt passes at its other end around a pulley 29 fixed on a jack shaft 30 mounted in bearings, as 31 and 32, on a supporting bracket 33 on platform 13. Shaft 30 carries a worm 34 meshing with a worm gear 35 fixed on shaft 16 for rotating the same. Shaft 30 has fixed on its inner end a sprocket wheel 36 for driving the coordinated blank and wrapper feeding means hereafter described.

The table top 12 has a central opening through which the form block means is vertically reciprocated to carry the blank and wrapper assembly into cooperation with a platen and wrapping tools arranged on the main frame adjacent the table opening, as well understood in the art.

During such wrapping operations, the blank and wrapper assembly is secured to and pressed down by the form block means against a resiliently yieldable platen 37 on the upper end of a plunger 38 sliding vertically in a bearing in a tube 39 fixed in the frame. A coiled compression spring (not shown) in tube 39 bears against the lower end of plunger 38 and holds platen 37 in yielding cooperation with the form block means and a blank and wrapper assembly carried thereby during the wrapping operations.

For operating the several wrapping tools, shelf 13 has fixed thereon a hub 40 in which is fixed an upwardly extending tube 41 supporting a sleeve 42 for limited vertical sliding movement to actuate certain of the wrapping tools. The sleeve is actuated vertically by a link 43 pivoted thereto and to one end of a lever 44 which is pivotally supported at 45 intermediate its ends on an arm 46 carried by the hub 40. The other end of lever 44 carries a cam follower or roller 47 running in the groove 24 of cam drum 20.

Sleeve 42 has four arms 48 projecting horizontally from its upper end at right angles with one another, as shown, and each carrying a vertically extending plunger 49. The upper end of each plunger 49 slides in a bearing in a casing 50 (Fig. 6) depending from the table top and is pivotally connected in the casing by a link 51 with one arm 52 of a lever 53 mounted for oscillation on the casing. The lever has another arm 54 pivotally

connected by a link 55 with a slide 56 reciprocating in a guideway in the table top and carrying a turn-in tool 57 for turning-in the adjacent edge of the wrapper over the top of the blank wall, as well understood in the art. Lever 53 is provided also with a finger 58 operating against a curved shoulder on a block 59 sliding in a recess 60 of a slide 61 and yieldably pressed toward the lever 53 by spring means in the recess (not shown). Slide 61 reciprocates in a guideway on the table top and carries a presser block 62 for holding and pressing the wrapper against the side wall of the blank as described in said Patent No. 1,131,792, and well understood in the art, similar turn-in tools and presser blocks being provided on all four sides of the blank assembly and actuated by similar means.

The usual corner lap tools (not shown), of any known or suitable design, are carried by two slides one of which is indicated generally at 63 (Fig. 1), movable oppositely in guideways in the table top, to turn-in the four corner flaps of the wrapper at the ends of the box. Each of these slides is actuated by a lever, indicated generally at 64, which is operated by connection with a rock shaft 65 on the frame, connected by a link (not shown) with a lever 66 provided with a follower or roller 67 running in the groove 23 of the lower cam drum 20. These corner lap tools and their actuating means are generally similar in construction to those disclosed in said patents, to which reference may be had for a more particular description, the details thereof forming no part of the present invention.

The usual side rollers, 68 and 69, are yieldably carried on slides, 70 and 71, respectively, which are adjustably mounted in guideways on opposite sides of the table, as shown, for folding up the side walls of the wrapper as the blank and wrapper assembly is moved downwardly by the form blocks, as hereafter described. Below these side rollers and at right angles therewith are the usual end rollers, 72 and 73 (Figs. 1 and 6), carried by slides, as 74 (Fig. 1), adjustably mounted in guideways on the table, these rollers being positioned to fold up the end walls of the wrapper, as well understood in the art.

For supporting the form block mechanism, the standard 15 has a forked bracket arm 75 (Figs. 1 and 4) on which a vertically extending plate 76 is fixed to provide bearings for several of the parts. Sliding vertically in a guideway in this plate is a plunger 77 having fixed in its lower end a depending rod 78 movable through an opening in an upper chambered form block 79 below which the rod is fixed to and supports a lower form block 80. Plunger 77 carries at its upper end a cross head 81, for a purpose to be later described, and the plunger is reciprocated vertically by means comprising a link 82 pivotally connected thereto and to one end of a lever 83, which is preferably mounted at 84 on an arm of the standard 15. Beyond the mounting, the lever carries a counterbalance weight 85. Between its mounting 84 and its connection with the plunger, the lever, is provided with a roller follower 86 running in the groove 22 of the upper cam drum 19, so that, as the drum rotates, the lever is rocked to reciprocate the plunger and the lower form block 80.

The upper form block 79 is fixed to the lower ends of a pair of rods, 87 and 88, sliding in bearings in lugs, 89 and 90, on the lower end of plunger 77, as well as in bearing openings in plate 76. The rods extend upwardly through bearings also in

cross head 81 on the upper end of plunger 77 and are connected together above the plunger by a cross head 93. Cross head 93 has a depending stop rod 94 adjustably fixed thereto, for a purpose hereafter described. A coiled tension spring (not shown) is connected at one end to the plunger 77 and at its other end to the cross head 93, to yieldably hold the upper form block 79 down against the lower form block 80.

The means for stripping the completed boxes from the form blocks comprises a frame 95 (Figs. 1 and 4), fixed to the lower ends of a pair of rods, 96 and 97, which are vertically slidable in bearings in lugs 91 and 92 extending laterally from the ends of plate 76. The rods are connected together at their upper ends by a cross head 98, which is curved to extend around behind the plunger 77 and form block rods 87 and 88. Frame 95 is likewise curved to extend around behind and clear such parts and has a horizontal flange 99 (Fig. 4) on which a pair of arms, 100 and 101, are adjustably mounted. The free ends of these arms carry vertically depending stripper rods, 102 and 103, the lower ends of which slide in openings in the form blocks 79 and 80 for movement therethrough to strip the finished boxes therefrom. Frame 95 has a lug 104 to which is pivotally connected a link 105 pivoted at its upper end to a lever 106 which is pivotally mounted at 107 on an arm 108 of the standard bracket 75. The other end of the lever carries a roller follower 109 running in the groove 21 of the upper cam drum 19, so that rotation of the drum acts to rock the lever and raise and lower the frame 95 and the stripper rods. Lever 106 carries a pad 111 for engagement by the stop rod 94 of the upper form block to temporarily hold it above and separate it from the lower form block through an interval in the operation of the machine, as hereafter described. At 113 is an ejector plunger operated in any known manner, as disclosed, for example, in said patents, for ejecting the finished boxes from the machine.

The means for feeding the blank and wrapper assemblies and registering the same in the path of movement of the form block means comprises, preferably, a collar or fork-like frame 115 (Fig. 3) having therein an opening 116 corresponding in shape and size with the central panel of the blank and in the present instance of rectangular shape, as shown. The outer side 117 of the frame is formed with a gap or opening 118, sufficiently wide to freely clear the plunger means of the form block to allow the fork to be withdrawn after the plunger means has been lowered therethrough. The side walls of the fork or collar opening 116 are flared upwardly and outwardly as at 119, so that the central panel 120 (Fig. 1) of a blank may be passed downwardly therethrough with the upwardly folded side walls of the blank frictionally held by the outwardly flared sides or walls 119 of the fork opening, the blank being held so that its side walls are inclined or flared upwardly and outwardly for readily admitting the form block means into registered engagement with the central panel of the blank. The blank is shown supported by the fork (Fig. 1) in this position with the wrapper 121 adhesively secured to the central panel of the blank projecting below the fork, the blank and wrapper being free from contact with other parts of the machine, but lying in the path of movement of the form block means before its engagement with the platen 37.

Fork 115 is preferably supported between spaced arms 122 and 123 (Fig. 3), fixed on the outer end of a slide 124 supported to reciprocate longitudinally by pairs of spaced rollers 125 engaging bearing surfaces 126 on each side of the slide. Rollers 125 are mounted on the side walls of a frame 127 which supports a mechanism for feeding, registering and adhesively assembling the box blanks with the wrappers, as described in my said copending application, to which reference may be had for further description thereof. A rock arm 128 has its lower end pivotally mounted at 129 on a shelf 130 of the frame and the upper end of the arm is formed with a cylindrical bearing portion sliding in a bearing sleeve 132 on slide 124. Sleeve 132 has laterally extending trunnions 133 supported for rocking movement in bearings 134 on the slide on opposite sides of an opening 135 in which the sleeve is mounted to rock. It is apparent from this construction that rocking movement of arm 128 operates to reciprocate the slide and move its collar or frame 115 transversely into and out of the path of vertical movement of the form block.

The means for rocking arm 128 to reciprocate the transfer collar or fork comprises, preferably, a yoke 136 having one end pivotally connected to the arm at 137 and formed with an elongated bearing opening 138 for a bearing block 139 pivotally mounted on a cross shaft 140 which is rotatably supported in bearings on the frame 127. The opposite end of the yoke carries a roller follower 141 running in an eccentric groove 142 formed in the side of a cam disk 143 fixed on the shaft 140. The shaft has fixed thereon also a sprocket wheel 144 driven by a chain 145 passing around a sprocket wheel 146 fixed on a shaft 147 rotating in bearings on the frame. Fixed on this shaft also is a sprocket wheel 148 engaged by a chain 149 passing around the sprocket 36 on shaft 30 (Fig. 7) of the driving means for the wrapping machine. It is evident from this description that the operation of the wrapping machine, through the above described sprocket chains and wheels, rotates cam 143 to reciprocate yoke 136 and rock arm 128, thereby reciprocating slide 124 and its fork 115 to transfer the blank and wrapper assemblies from the mechanism on frame 127 for assembling the same into registry with the form block means as shown in Fig. 1, ready for descent of the form blocks to carry the assembly through the wrapping tools. The wrapping machine frame 10 and frame 127 carrying the transfer fork or collar are preferably connected rigidly with each other by tie rods, as 171 (Fig. 2).

The form block means for gripping and carrying the blank and wrapper assemblies from the transfer fork 115 to the platen and wrapping tools comprises the upper form block 79 which is preferably chambered as by passageways 150, as shown in Fig. 5, with portholes 151 opening laterally through the opposite end walls of the block, as shown. Fixed to the block and communicating through openings 152 with its passageways, are a pair of flexible tubes 153, of rubber or the like, supported on the plunger 77, as by means of a bracket 154, so that these tubes may bend and yield as shown in Fig. 6 during the movement of the form blocks together and relatively to each other. Tubes 153 communicate with a source of valve controlled sub-atmospheric pressure as will now be described.

Tubes 153 are connected by pipes 155 (Figs. 1 and 6) communicating through a T-fitting 156 with a pipe line 157 leading to a tank 158 from

which the air is exhausted to a suitable low pressure, by any known and suitable pumping means, as well understood in the art. Pipe 157 contains a valve casing 159 having a port 160 leading to the atmosphere and controlled by a poppet valve 161 on a stem 162 provided with a compression spring 163 for normally holding the valve closed. The opposite end of the stem is engaged by one end of a lever 164 for moving the stem against the spring to open the valve and equalize the pressure in the pipe with the atmosphere. Lever 164 is pivoted at 165 on the pipe and has its other end connected by a rod 166 with the intermediate portion of a lever 167 (Fig. 7) pivoted at 168 on the frame of the wrapping machine. The free end of the lever carries a roller 169 lying in the path of movement of a finger 170 fixed on vertical shaft 16 of the wrapping machine. Finger 170 is adjusted to such a position on the shaft that it strikes roller 169 to relieve the form block suction while the upper form block is separated from the lower block to accommodate the advance of the turn-in tools 57 and to thereafter fold and press the edges of the wrapper against the inner surfaces of the side walls of the blank.

In the operation of the machine, the transfer fork or collar 115 having received a registered blank and wrapper from the mechanism for assembling the same, as described in my copending application, is advanced by its reciprocating mechanism to slide the blank and wrapper off the belt of the assembly mechanism and move the assembly, while supported free of contact with other parts, into registered position below the form block means in its raised position as shown in Fig. 1, the movements of these parts being coordinated in timed relation with one another by the common actuating means described above. The form blocks 79 and 80 descend together between the outwardly flared side walls of the blank and against its central panel, the side walls being drawn in and gripped by the suction created at the lateral ports 151 of the upper form block 79, and the assembly being thus automatically registered with and applied directly to the form blocks before movement by the latter into co-operation with the platen and wrapping tools. After transfer of the assembly to the form blocks, the transfer collar 115 is withdrawn by reciprocation in the opposite direction to position for receiving another assembly. As the form blocks carry the assembly past the side end rolls and corner flap tools to the lowered position in which the turn-in tools 57 advance to turn in the edges of the wrapper, the suction in the upper chambered form block 79 is relieved by the opening of the valve 161 in the suction line, so as to release the blank from the upper form block which is raised to the position shown in Fig. 6. After the wrapper edges are turned in, the upper form block descends to position against the lower block and the suction is reapplied to hold the box on the blocks until raised and striped by the positive action of the stripping means and ejected from the machine.

It is evident from the above description that the invention provides a simple and effective means for automatically feeding a blank and wrapper from an assembly mechanism to the form block means of a wrapping machine, with the glue coated wrapper suspended freely from the center panel of the blank and without contact with other parts. The associated blank and wrapper are thus registered in the path of movement of the form block means and in position to readily and precisely receive the same and be applied directly thereto. The suction feature of the form blocks provides a simple and effective means for automatically gripping and securely holding the blank by its folded side walls and for securely holding the same throughout the wrapping operations, except when the upper form block is raised at which time the assembly is released and regripped by the control of the suction connections. As disclosed in my said copending application, the blank is located in the transfer collar in conjunction with the spotting of the blank on the wrapper, so that but one registration of the blank and wrapper is required, the assembly being then accurately and freely transferred by the collar into registry with the form block of the wrapping machine and applied directly thereto, without further registering adjustments or other manipulation of the blank and wrapper. The wrapping of the box is thus accomplished in a fully automatic manner so as to eliminate the disadvantages of any manual handling of the blank or wrapper and so as to insure, furthermore, the precise registration of the box parts with the wrapping machine, as well as freedom from contact of the glued wrapper surfaces with the machine parts and the smearing of the latter with glue. Such advantageous features contribute economically to the production of accurate and neatly finished work with a minimum of waste and expense.

It will thus be seen that the invention accomplishes its objects and while it has been herein disclosed by reference to the details of a preferred embodiment, it is to be understood that such disclosure is intended in an illustrative, rather than a limiting sense, as it is contemplated that various modifications in the construction and arrangement of the parts will readily occur to those skilled in the art, within the spirit of the invention and the scope of the appended claims.

I claim:

1. A box making machine for wrapping unstayed box blanks comprising plunger means having thereon a chambered form block with externally opening ports on opposite lateral faces thereof, a plurality of wrapper applying tools, said block being movable by said plunger means relatively to said tools in a path for folding a wrapper about an unstayed box blank on said block, a transfer fork having its arms spaced to receive said plunger means and forming an opening shaped to receive a central panel of said blank, said opening having outwardly flared sides adapted to have the outwardly flared side walls of said blank frictionally gripped and wedged therein in position for receiving said block therebetween, said fork being thereby adapted to support an adhesively associated blank and wrapper independently of other supporting means and being movable transversely of said path to position said blank and wrapper therein for transfer to said block during movement thereof, mechanism for moving said plunger means and fork and for operating said tools in timed coordination with one another, and a source of sub-atmospheric pressure having a connection with the chamber of said block for gripping and holding said blank on said block by suction.

2. A box blank making machine for wrapping unstayed box blanks comprising plunger means provided with form block means having relatively movable forms, one of said forms being chambered with outwardly opening port means there-

in, a plurality of wrapper applying tools, said block means being movable relatively to said tools in a path for folding a wrapper about an unstayed box blank on said block means, a transfer frame having therein an opening with outwardly flared sides adapted to receive a central panel of said blank with the outwardly flared sides of said blank frictionally wedged and held between the outwardly flared side walls of said opening, the outer of said opening sides having therein an opening for the reception of said plunger means, said frame being adapted to support an adhesively associated blank and wrapper independently of other supporting means and being movable to present said blank and wrapper in the path of said block means for transfer thereto during the movement thereof, mechanism for moving said plunger means and effecting relative separating movement between the forms of said block means in cooperation with said tools, mechanism for moving said transfer frame in timed coordination with said plunger means, a source of sub-atmospheric pressure having a connection with the chamber of said one form for gripping and holding said blank thereon by suction, and means operating in timed coordination with said mechanisms for intermittently relieving the pressure difference between said chamber and the atmosphere during said relative separating movement of said forms to effect alternate gripping and release of said blank and wrapper by said block means.

3. A box making machine for wrapping unstayed box blanks comprising a chambered form block having outwardly opening ports on opposite lateral faces thereof, a plurality of wrapper applying tools, said block being movable in a path relatively to said tools for folding a wrapper about an unstayed box blank on said block, transfer means movable to position an adhesively associated blank and wrapper in the path of said block, said transfer means having therein an opening adapted to admit therethrough a central panel of said blank with the sides of said opening flared outwardly to frictionally grip and wedgingly hold the folded side walls of said blank in outwardly flared position for receiving said form block therebetween, said transfer means being adapted to support and move said blank and wrapper independently of other supporting means, mechanism for moving said block and transfer means and operating said tools in timed coordination with one another, and a source of sub-atmospheric pressure having a connection with the chamber of said block for holding a blank thereon by suction.

4. A box making machine for wrapping unstayed box blanks comprising a chambered form block having outwardly opening ports on opposite lateral faces thereof, a plurality of wrapper applying tools, said block being movable in a path relatively to said tools for folding a wrapper about an unstayed box blank on said block, transfer means movable to position an adhesively associated blank and wrapper in the path of said block, said transfer means having therein an opening adapted to receive a central panel of said blank and said opening having outwardly flared sides to frictionally grip and wedgingly hold the folded side walls of said blank in outwardly flared position for receiving said block, said transfer means being adapted to support and move said blank and wrapper independently of other supporting means, mechanism for moving said block and transfer means and operating said tools in timed coordination with one another, and a source of sub-atmospheric pressure having a connection with the chamber of said block for holding a blank thereon by suction.

5. A box making machine for wrapping unstayed box blanks comprising form block means having relatively movable upper and lower forms, said upper form being chambered with outwardly opening ports on opposite lateral faces thereof, wrapper applying tools, said block means being movable in a path relatively to said tools for folding a wrapper about an unstayed box blank on said block means, transfer means movable transversely of said path to position therein an adhesively associated blank and wrapper for transfer to said block means, said transfer means having therein an opening adapted to admit therethrough a central panel of said blank with the sides of said opening flared outwardly to frictionally grip and wedgingly hold the folded side walls of said blank in outwardly flared position for receiving said block means therebetween, said transfer means being adapted to support and move said blank and wrapper independently of other supporting means, mechanism for moving said block means and effecting relative separating movement between said forms thereof in cooperation with said tools, mechanism for moving said transfer means in timed coordination with said block means, a source of sub-atmospheric pressure having a connection with the chamber of said upper form for holding said blank thereon by suction, and means operating in timed coordination with said mechanisms for intermittently relieving the pressure difference between the chamber of said form and the atmosphere during said relative separating movement of said forms.

6. A box making machine for wrapping unstayed box blanks comprising a plunger, a form block on said plunger provided with suction means having ports opening externally of said block, a platen, a plurality of wrapper applying tools, said block being movable in a path relatively to said platen and tools for wrapping an unstayed box blank on said block with an adhesively associated wrapper sheet, transfer means having a collar with outwardly flared side walls for frictionally and wedgingly embracing and holding side walls bent from a central panel of said blank and for thereby supporting and transferring said blank and wrapper independently of other supporting means, said collar having an opening in a side thereof for receiving said plunger, mechanism for moving said transfer means across said path to apply said blank directly to said block prior to engagement by said blank and wrapper with said platen, a source of atmospheric pressure having a connection with the suction means of said block for holding said blank thereon by suction, and mechanism for moving said block through said collar to grip a blank and wrapper supported thereby and carry the same into engagement with said platen and tools to effect the wrapping of said blank.

SAMUEL W. LANGDON.

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