May 5, 1931. H. J. GOSS 1,803,698

BLANK PREPARING MECHANISM FOR BOX MAKING MACHINES

Filed Aug. 19, 1929 3 Sheets-Sheet 1

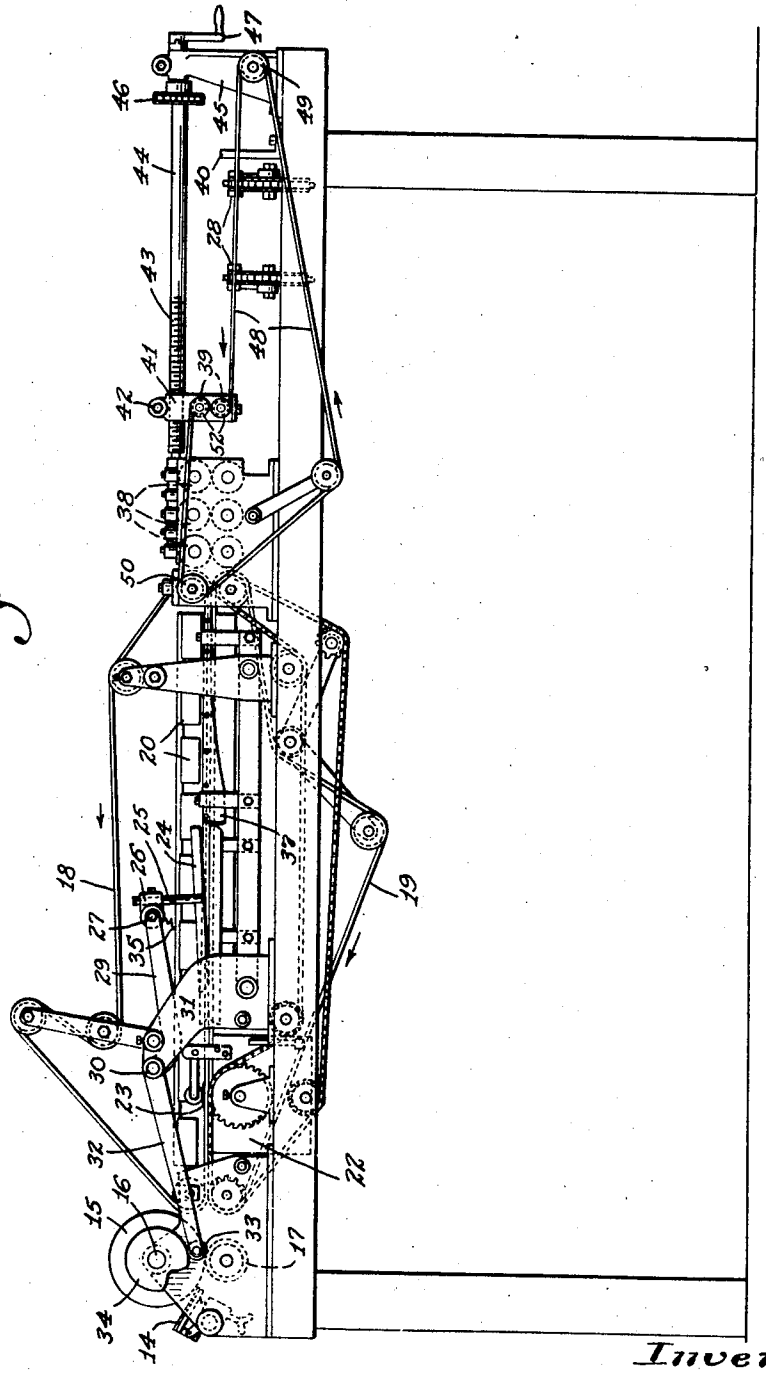


Fig. 1.

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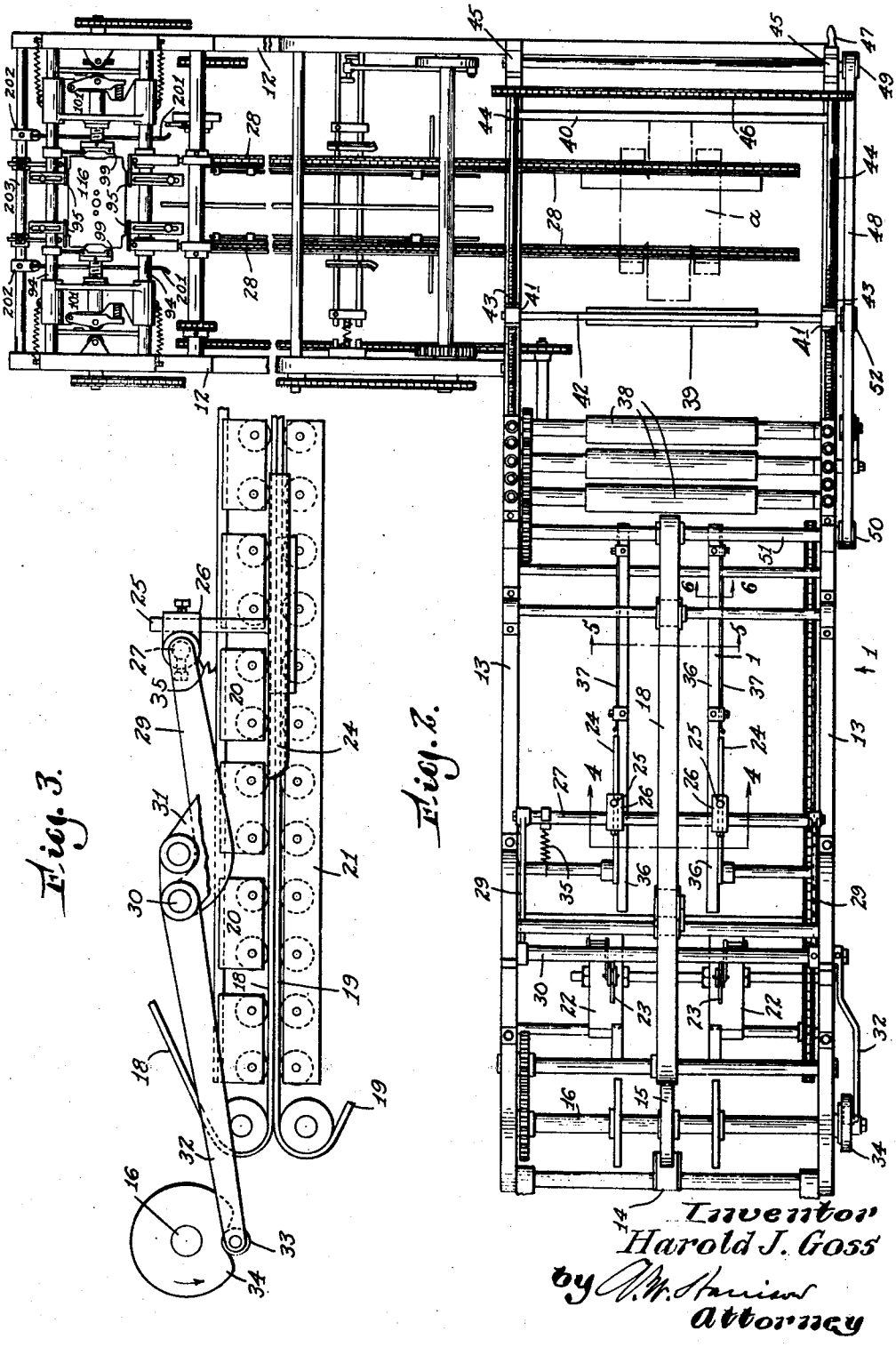


Fig. 2.

Fig. 3.

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BLANK PREPARING MECHANISM FOR BOX MAKING MACHINES

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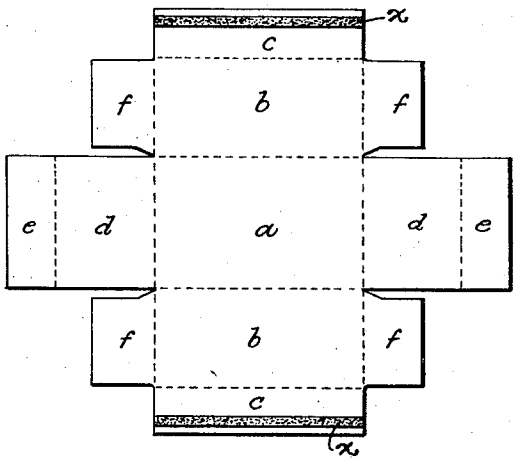


Fig. 7.

Fig. 8.

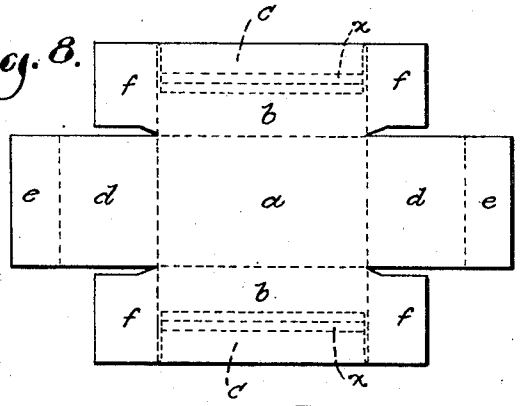


Fig. 5.

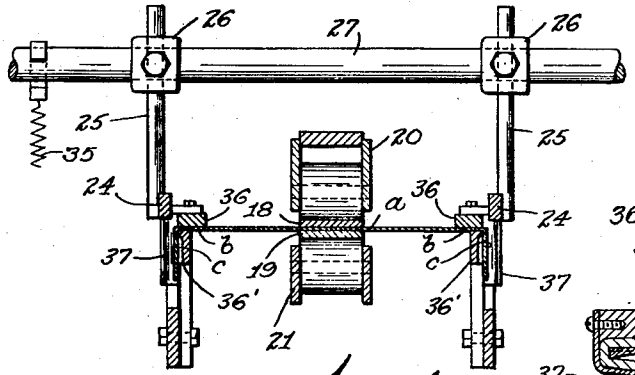


Fig. 4.

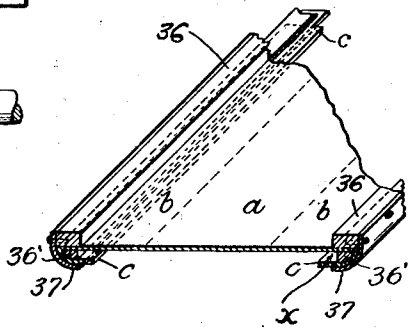




Fig. 6

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1,803,698

UNITED STATES PATENT OFFICE

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BLANK PREPARING MECHANISM FOR BOX MAKING MACHINES

Application filed August 19, 1929. Serial No. 386,756.

This invention relates to the manufacture of paperboard boxes, and has particular reference to machines for making rectangular boxes in set up form, said boxes having wall portions of double thickness.

There are in use at present many box-making machines, in different localities, which machines operate on blanks having marginal portions folded and adhesively secured in double-thick condition by machines other than those which effect the setting up. In other words, the marginal portions are first folded and glued by machines which do nothing more, and such partially conditioned blanks are later fed to the box setting-up machines. Such operation requires the use of two kinds of machines, independently fed, one to prepare the blanks with folded, double, wall portions, and another to convert the previously conditioned blanks to set-up form. Many of the box manufacturers do not make the blanks, but buy, from a more or less distant source, the cut blanks having the requisite marginal portions already doubled. Such previously conditioned blanks require more space for shipping or storing than flat blanks which are of single thickness throughout, and a much less number of them can be piled on the table of a feeding mechanism. Moreover, when such previously conditioned blanks are stored in piles and sometimes left piled for a considerable period, the mid-portions of the blanks, which are of single thickness, bend down or sag so that the blanks acquire a horizontally curved condition that interferes with proper automatic feeding to the setting-up machine.

The principal object of the present invention is to provide a single machine which combines the operation of both preparing the blanks and setting them up, whereby time is saved by having only one feeding operation instead of two, and whereby less space is required when blanks are stored or shipped, and whereby better feeding to the setting up mechanism is effected.

Another object is to provide a machine having improved mechanism for effecting accurate folding of the marginal portions of the blanks which are eventually to become double-thick wall portions of the set up boxes.

With the above stated objects in view, and others hereinafter explained, the invention consists in the construction and combination of parts substantially as hereinafter described and claimed.

Of the accompanying drawings:

Figure 1 is an elevation looking in the direction of the arrow 1 below Figure 2.

Figure 2 is a plan view of the machine.

Figure 3 is a detail view, similar to a portion of Figure 1, on a larger scale, but omitting some parts in the interest of clearness.

Figure 4 represents a section on line 4—4 of Figure 2, on a larger scale.

Figure 5 is a detail perspective and part section on line 5—5 of Figure 2.

Figure 6 represents a section on line 6—6 of Figure 2 on a larger scale.

Figure 7 is an under plan view of a flat blank and illustrates where glue is applied.

Figure 8 is a plan view of a blank in the condition in which it passes from the primary to the secondary mechanism of the present combined machine.

Similar reference characters designate similar parts or features in all of the views.

For a type of machine now in use as hereinbefore referred to, I have chosen that which is illustrated and described in my Letters Patent No. 1,765,420, issued June 24, 1930, which machine operates on, to fold to set-up condition, blanks which include previously doubled marginal portions. In present Figure 2 I have illustrated sufficient of the parts of the machine of said patent, to enable the present invention to be understood. Although said parts constitute what will be referred to herein as the secondary mechanism, they will be first briefly described, the reference numerals employed for said parts being the same as in said patent.

Mounted in the frame 12 are tie rods 94 on which are mounted opposie slides 101 carrying end pressers 99. A plunger 116 moves vertically between the pressers 99. Side wall plates 95 move toward and from the sides of the plunger. Blanks riding on and fed by chains 28 pass onto guides 201 projecting

from brackets 202 mounted on a tie rod 203, and are folded to set-up form by the cooperation of the plunger and presser mechanism as explained in said patent. As the particular structure of this box-setting-up machine has no bearing on the present invention and is not claimed herein, further description thereof would be superfluity herein. So far as I am aware, the present invention is new regardless of the particular type of setting up mechanism, and also regardless of the particular shape of the blanks used to make double wall boxes. For instance, the shape of blank illustrated herein is somewhat different from the shape of blank illustrated in the patent referred to.

The frame 13 of the primary mechanism is illustrated as at a right angle to the frame 12 of the above briefly described secondary mechanism, but I do not limit myself to such relative positioning of the combined mechanisms.

In Figures 1 and 2 a small portion of the usual feed table for a pile of blanks is indicated at 14. As such feed tables are well-known, complete illustration thereof is unnecessary. From such table the blanks are removed singly, by a feed wheel 15 carried by shaft 16 and cooperating with a lower roll 17 in delivering the blanks between upper and lower belts 18, 19, which are driven in the direction of the arrows Figure 1, and are mounted on suitable pulleys and rolls illustrated in said figure. Said belts carry the blanks past other parts of the machine presently described. The coacting runs of the belts are maintained in operating proximity by pressure rolls mounted in upper and lower carriages 20, 21, Fig. 3. The structure of the machine as so far described is of such a well-known type that detailed illustration and description thereof is unnecessary herein. Also well-known are the glue tanks 22 and glue disks 23.

Blanks of such form as illustrated by Figure 7 are fed singly from a pile on the table 14 and the belts carry them over the glue disks 23, the latter applying stripes of glue x to the under surfaces of the two flaps c c of the blanks.

The next operation of the primary mechanism is to break the flaps c c down accurately on the score or crease lines which define said flaps from the side wall portions b b of the blanks. Heretofore, in box-making machines, the breaking down, or up, of marginal portions of box blanks, has been effected by twist belts or twisted metal strips which are necessarily of considerable length to perform their functions and which do not always effect sharp, straight, breaks. In the present machine I effect more definitely pronounced breaks, and in a space of less length than heretofore, by means of a pair of vertically moving breakers 24, each being carried by a pin 25 (Figs. 1, 2 and 3) adjustably mounted in a bracket 26, the two brackets being carried by, and laterally adjustable on, a transverse rod 27 which is carried by two arms 29 of a rock shaft 30 supported in frame brackets 31. At one end of the rock shaft 30 there is secured an arm 32 carrying a roll 33 which is maintained in surface engagement with a cam 34 of shaft 16 by means of a suitable spring 35 connecting the rod 27 with a suitable fixed part of the machine. As the cam is carried by the same shaft that carries the feed wheel, and said feed wheel being of the usual type that effects the feed of one blank during each rotation, the breakers are necessarily actuated in synchronism with the passage of blanks under them. The adjustable mountings of the members just described, provide for operating on blanks of different sizes and quality of material.

The cam 34 and spring 35 cause the breakers to swing vertically. The timing is such that as each blank carried by the belts is approaching the longitudinal position of the breakers, the latter are raised as illustrated in Figure 1, and just as each blank arrives with its flaps c c under the breakers and while the outer portions of the wall sections b b are supported by the adjustable fixed strips 36' along which they ride, the recess of the cam 34 arrives over the roll 33 of the arm 32 so that the spring 35 imparts a quick, almost chopping, movement to the breakers to the lower position illustrated by Figure 3. This action occurs while each blank is being carried along by the belts 18, 19, and the downwardly broken flaps are guided by the breakers, before they rise, so as to enter inside of the fixed strips 37 (Figs. 2, 5 and 6) which are so shaped as to turn the flaps c c far enough under the sections b b so that the blank, with its under-folded flaps c c, will travel along between the upper and lower series of pressure rolls 38 which press the folded parts together to cause the glue stripes x x to hold the blank in the condition illustrated by Figure 8.

The rolls 38 also cause the blanks to reach the nip of a pair of rolls 39 which deliver each conditioned blank onto the chains 28 with its far edge against a stop strip 40. The chains 28 which are provided with lugs as described in the patent referred to, then carry the blanks successively to the secondary mechanism already described and which completes the folding to set up condition.

To ensure correct deposit of the blanks against the stop 40, and on that portion of the chains 28 which constitutes a transfer table, it is desirable that the distance between the rolls 39 and stop 40 shall but slightly exceed the length of the blanks being operated upon, so that the advancing front edge of the blank will reach the stop just as its rear edge is free from said rolls 39. To enable the result to be attained whether the blanks oper-

ated upon are of a long stock or a short stock, the rolls are adjustable toward and from the stop, the latter being in practice, adjustably mounted as heretofore in similar mechanisms.

The adjustability of the rolls 39 is effected by mounting them in bearings carried by a pair of blocks 41 connected together by a rod 42 and having internally threaded portions engaging the threaded portions 43 of shafts 44 mounted at their inner ends in the bearing blocks for the rolls 38 and at their outer ends in frame uprights 45. The two shafts have sprockets connected by a chain 46, and one of the shafts has a crank 47 by means of which the two shafts may be rotated and cause their threaded portions to effect a shifting of the blocks 41 which support the rolls 39 toward or from the stop 40.

To drive the rolls whether they are adjusted near to or far from the stop, a belt 48 is mounted at one end on a pulley 49 and at the other end on a pulley 50 carried by a driven shaft 51 (Fig. 2) which carries the pulley for one end of the upper carrier belt 18. An intermediate portion of the upper run of the belt 48 engages pulleys 52 of the shafts of the rolls 39 (Fig. 1) to drive said rolls in the proper direction.

Referring again to the operation of the breakers 24, it is to be noted that Figure 4 illustrates them as in the position which they occupy after having broken the flaps *c c* down and returned to their upper position. At this time, and as the blanks continue to travel along, the wall sections *b b* of the blanks are guided between lower fixed strips 36′ and upper fixed strips 36 (Figs. 4 and 5).

The end wall sections *d d* of the blanks, the flaps *e e* thereof, and the flaps *f f* of the sections *b b* illustrated in Figures 7 and 8, are all operated upon by the setting-up members of the secondary mechanism as explained in the patent referred to, and therefore description thereof herein is unnecessary.

It will now be understood that the machine as a whole comprises a single-feed apparatus which converts flat blanks into set-up boxes having double-thick wall portions, as it combines means for primarily folding and adhesively securing marginal portions of flat blanks, with secondary means for acting on the primarily-folded blanks to convert them to set up box form, and including transfer mechanism for ensuring travel of the blanks from one to the other, said transfer mechanism including the stop 40 and the lug-carrying chains 28.

Having now described my invention, I claim:—

1. The combination with mechanism for making set-up boxes from blanks, of mechanism for preparing flat blanks for the setting-up mechanism, said preparing mechanism including continuously movable blank carriers and means for doubling and securing marginal portions of the blanks while travelling and delivering them to the setting-up mechanism.

2. The combination with mechanism for making set-up boxes from blanks, of mechanism for preparing flat blanks for the setting-up mechanism, said preparing mechanism including means for causing the blanks to travel without interruption and means for folding and adhesively securing marginal portions of flat blanks while travelling and delivering them to the setting-up mechanism.

3. A machine of the character described, comprising primary and secondary mechanisms at an angle to each other, the primary mechanism having means for causing the blanks to travel without interruption, and means for doubling and securing marginal portions of flat blanks while traveiling and delivering them so conditioned to the secondary mechanism, the said secondary mechanism having means for converting said conditioned blanks into set-up boxes.

4. A machine of the character described, comprising primary and secondary mechanisms at an angle to each other, the primary mechanism having means for causing blanks to travel without interruption, and means for folding and adhesively securing marginal portions of the blanks while travelling and delivering them so folded to the secondary mechanism, the said secondary mechanism having means for converting said folded blanks into set-up boxes.

5. A single-feed apparatus for converting flat blanks into set-up boxes having double-thick wall portions, comprising means for causing the blanks to travel continuously and uninterruptedly from the feeder, means for primarily folding and adhesively securing marginal portions of the flat blanks while travelling, and means for acting on the primarily-folded blanks to convert them to box form.

6. In mechanism for preparing blanks to be folded, means for causing the blanks to travel, breakers normally above the plane of travel of the blanks, and means for yieldingly depressing the breakers intermittently.

7. In a machine of the character described, a shaft having a blank-feeding wheel and a cam, carrying-belts for the fed blanks, a rock shaft having an arm extending in one direction and engaging said cam and having a pair of arms extending in the opposite direction, and breakers carried by said pair of arms.

8. A box-making machine comprising primary and secondary mechanisms at an angle to each other and having intervening transfer mechanism including means for supplying blanks to the secondary mechanism, a stop in position to arrest blanks in position

to be carried to said secondary mechanism, rolls for delivering blanks against said stop, and means for adjusting said rolls toward and from said stop.

9. A box-making machine comprising primary mechanism for doubling marginal portions of blanks and secondary mechanism for converting such blanks into set-up boxes, said mechanisms being at an angle to each other, chains for carrying the blanks to the secondary mechanism, rolls for delivering the blanks from the primary mechanism onto said chains, a stop to arrest blanks in position on said chains, and means for adjusting the said delivering rolls relatively to said stop.

10. The combination with mechanism for making set up boxes from blanks, of mechanism for preparing flat blanks for the setting up mechanism, said preparing mechanism including means for causing the blanks to travel without interruption, and means for doubling and securing a marginal portion of each blank while travelling and delivering it to the setting up mechanism.

11. The combination with mechanism for making set up boxes from blanks which mechanism includes means for doubling a marginal portion of each blank, of mechanism for preparing flat blanks for the setting up mechanism, said preparing mechanism including means for causing the blanks to travel without interruption, and means for doubling and securing a marginal portion of each blank while travelling and delivering it to the setting up mechanism.

12. The combination with mechanism for making set up boxes which mechanism includes means for doubling a marginal portion of each blank, of mechanism for preparing flat blanks for the setting up mechanism, said preparing mechanism including means for causing the blanks to travel without interruption, and means for doubling and securing two other marginal portions of each blank while travelling and delivering it to the setting up mechanism.

13. The combination with mechanism for making set up boxes which mechanism includes means for doubling two marginal portions of each blank, of mechanism for preparing flat blanks for the setting up mechanism, said preparing mechanism including means for causing the blanks to travel without interruption, and means for doubling and securing two other marginal portions of each blank while travelling and delivering it to the setting up mechanism.

In testimony whereof I have affixed my signature.

HAROLD J. GOSS.