Jan. 1, 1924 1,479,038

W. FUHR

CORNER STAYING MACHINE

Filed Aug. 18, 1922 2 Sheets-Sheet 1

Fig. 1.

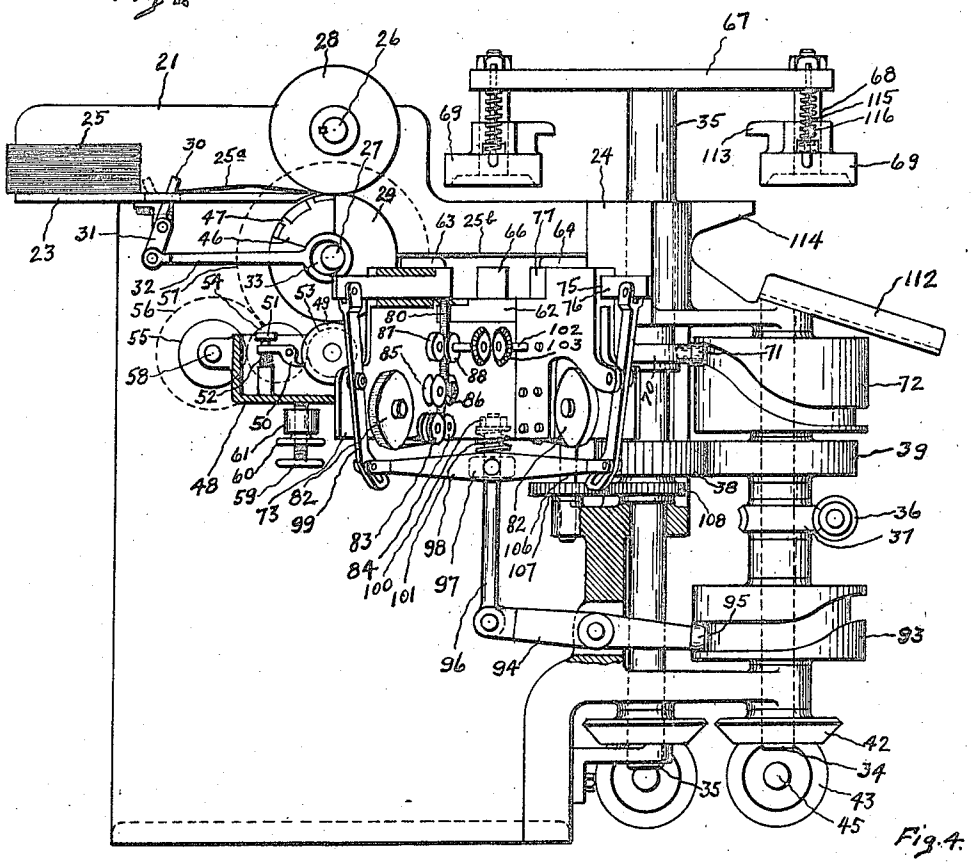


Fig. 4.

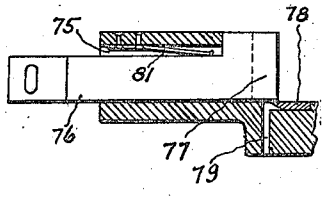
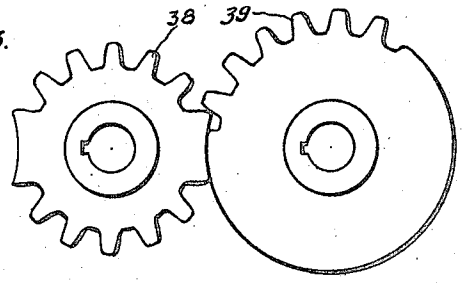


Fig. 3.



WITNESSES.

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Fig. 10.

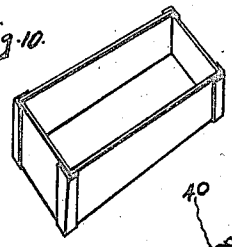


Fig. 9.

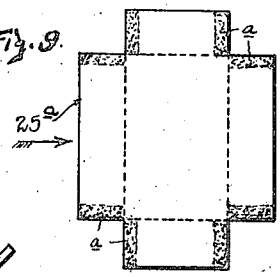


Fig. 2.

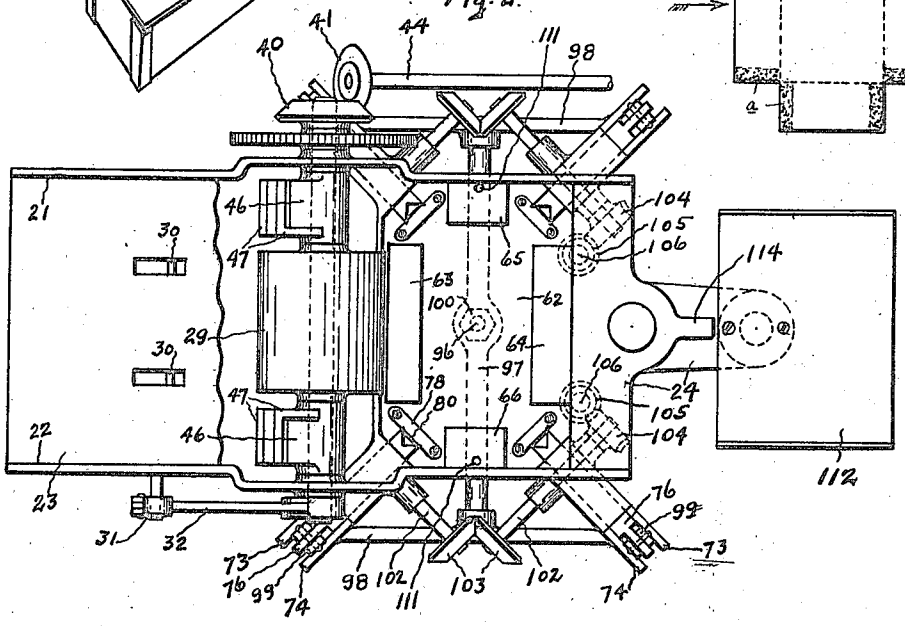


Fig. 5.

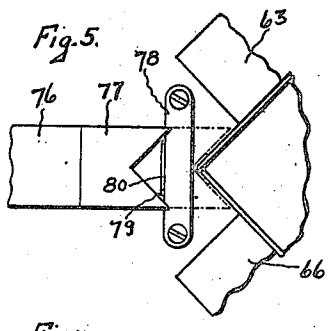


Fig. 6.

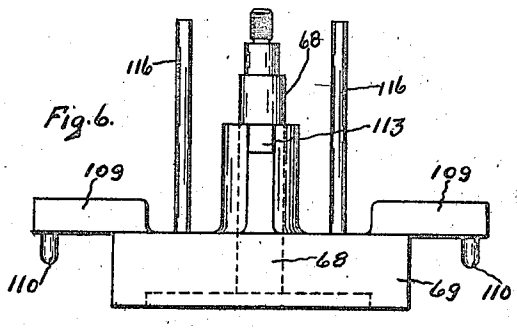


Fig. 7.

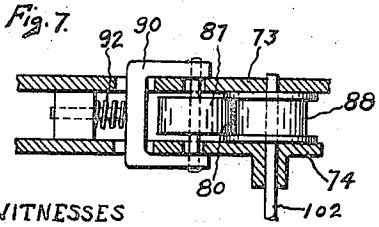
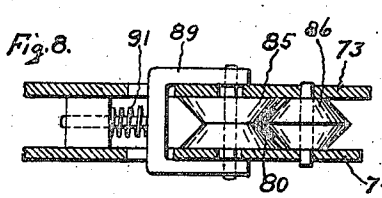


Fig. 8.



WITNESSES

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UNITED STATES PATENT OFFICE.

WILLIAM FUHR, OF CHICAGO, ILLINOIS.

CORNER-STAYING MACHINE.

Application filed August 18, 1922. Serial No. 582,620.

To all whom it may concern:

Be it known that I, WILLIAM FUHR, a citizen of the United States, and a resident of Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Corner-Staying Machines, of which the following is a specification.

This invention relates to a machine for folding blanks of paper, cardboard, or like material, into box form and applying the corner staying tape to all corners simultaneously.

The main object of this invention is to provide a machine which will take a cut and creased blank and deliver a box with all corners stayed, this with greater speed, greater efficiency, and with the elimination of all danger to the operator.

A further object of the invention is to eliminate the difficulty in handling the corner staying material by the use of dry tape and the application of the glue to the blank instead of the usual method of applying moistened gummed tape to the blank.

The novel features of the machine are the means for delivering the staying tape to the cutter, applying the tape to all corners simultaneously with equal pressure, holding the form-block motionless in position while the corner stays are applied, regulating the amount of pressure to be applied on the corner stays, means for applying the glue on the blanks for the corner stays, and means for discharging the finished box.

In the accompanying drawings—

Fig. 1 is a side elevational view of the machine with the rear wall removed,

Fig. 2 is a plan view of the machine with the bobbin, or form-block carrier, removed,

Fig. 3 is an enlarged plan view of the intermittent gears,

Fig. 4 is an enlarged sectional view of the stay-tape cutting and applying means,

Fig. 5 is a plan view of Fig. 4 with a corner of a box in position,

Fig. 6 is an enlarged elevational view of a form-block,

Fig. 7 is an enlarged plan view of the stay-tape feeding means,

Fig. 8 is an enlarged plan view of the means for folding the stay-tape V-shape,

Fig. 9 is a plan view of a cut, creased, and glued blank, and

Fig. 10 is a perspective view of a completed box.

Referring now more specifically to the drawings, the moving parts of the machine are supported by a rigid frame consisting of parallel upright walls 21 and 22, horizontal feed-table 23, and end-piece 24, Figs. 1 and 2.

Upon the forwardmost portion of the feed-table a stack of cut and creased blanks 25 are piled from which position they are fed one by one into the machine. Journalled in the walls 21 and 22 are transverse shafts 26 and 27 carrying, respectively, a rigidly mounted feed roll 28 and a loosely mounted rubber counter roll 29, said counter roll being driven by friction contact with the feed roll. A pair of oscillating fingers 30 are mounted underneath the feed table with their ends protruding through the same, Figs. 1 and 2. The blanks are delivered by hand from the stack 25 to the fingers 30 which force them into engaging contact with the feed rolls, which in turn deliver them to the folding die, hereinafter described. The blank being operated upon is designated as 25^a and 25^b, respectively, Fig. 1. The distance between the feed rolls and fingers 30, when the latter are advanced, is slightly less than the size of the blank which causes the blank to buckle up and bear against the said feed rolls, assuring an instantaneous engagement when the feed rolls are set in motion (Fig. 1) it being understood that the feed rolls are motionless during the folding and corner staying operations. These fingers 30 receive motion from the shaft 27 by means of a rock lever 31, connecting rod 32, and eccentric cam 33, Fig. 1.

Motion is transmitted to this blank feeding mechanism, as follows: Rotatably mounted in the end piece 24 is the drive shaft 34 and bobbin shaft 35, Fig. 1. The drive shaft is preferably motor driven by means of worm 36 and worm gear 37, and transmits rotary motion to the bobbin shaft intermittently (one-half revolution at a time) by means of the intermittent gears 38 and 39, Figs. 1 and 3. The shaft 27 supporting the counter roll 29 is geared to the drive shaft by means of the bevel gears 40, 41, 42 and 43 and shafts 44 and 45, receiving continuous rotary motion, while the shaft 26 carrying the feed roll 28 is connected to the bobbin shaft by similar gearing and receives intermittent motion.

A pair of segmental rolls 46 with glue pads 47 are rigidly mounted on the shaft 27, one on each side of the counter roll 29,

Figs. 1 and 2. Glue is delivered to the said pads through the medium of glue rolls 49 which dip into a pair of glue pots 48, pivotally mounted to the walls 21 and 22. The amount of glue is regulated by a doctor blade 50, screw 51 and spring 52. Motion is transmitted to the glue rolls from the shaft 27 by means of the gears 53, 54, 55, 56 and 57 and shaft 58. The glue pads rotate continuously and are so timed as to be in operative position when the feed rolls are set in motion. The adjustment between the glue pads and glue rolls is obtained by the screw 59, lock nut 60 and cross bar 61, swinging the glue pot and all parts associated therewith.

The blank 25^a passes through the feed rolls in the position and direction indicated by the arrow, Fig. 9. During the passage, the glue pads come in contact with the under side thereof, applying glue along the edges of the marginal side and end flaps, as indicated at *a*, *a*.

The blank 25^b, Fig. 1, is shown in its position immediately after the passage through the feed rolls and ready for the folding and tape applying operation, which are carried out as follows: A folding die, consisting of a floor plate 62 and blocks 63, 64, 65 and 66 is rigidly mounted between the walls 21 and 22 and end piece 24, Figs. 1 and 2. A bobbin consisting of the shaft 35, previously mentioned, cross bar 67 carrying a hanger 68 at each end, and form blocks 69 conforming to the inside dimensions of the box. As hereinbefore mentioned, the bobbin receives intermittent motion (one-half revolution at a time) from the drive shaft 34, bringing one and then the other form block in line with the folding die, but some distance above it, Fig. 1. It also receives vertical sliding motion from the same drive shaft by means of the collar 70 and roller 71 arranged on the bobbin shaft and drum cam 72 arranged on the drive shaft. This vertical sliding motion of the bobbin brings the form blocks in and out of engagement with the folding die. The folding is accomplished by the form block carrying the center portion of the blank to the floor plate 62 while the blocks 63, 64, 65 and 66 force the four sides to turn up. The folded blank and form block is held down within the folding die until after the corner staying operation, which will now be described.

Rigidly fixed at each of the four corners of the folding die, at the proper angle, is a housing consisting of parallel walls 73 and 74 and slideway 75, Figs. 1 and 2. A ram 76 with head 77 faced at 90° is slidably mounted within the said slideway. A knife 78 is arranged in the floor plate 62 of the folding die, directly in front of which a slot 79 is arranged through which the staying tape 80 is carried, Figs. 2, 4 and 5. Fig. 5 shows the travel of the ram in broken lines, and it will be noted that its return does not clear the knife while it does clear the slot 79 permitting the tape to be carried through. A spring finger 81, Fig. 4, holds the ram against the knife at all times, it being understood that the said ram co-operates with the knife in cutting the tape. The roll of tape 82 is loosely mounted within the housing, Fig. 1, the tape traveling between guide rolls 83 and 84, V-faced rolls 85, and 86, which fold the tape in the shape of a V, (Fig. 8) and feed rolls 87 and 88 which, besides feeding the tape, flatten the same out again and guide its travel. The reason for folding the tape V-shape is to cause it to assume that shape again (to some extent) after it is cut so that it may center itself within the face of the ram as it is carried to the corner of the box. The guide rolls 83 and 84, V-roll 86 and feed roll 88 are journalled in the walls 73 and 74, while the V-roll 85 and feed roll 87 are mounted on sliding forks 89 and 90 respectively, backed by springs 91 and 92, Figs. 7 and 8.

Motion is transmitted to the rams 76 from the drive shaft 34 by means of drum cam 93, lever 94 having a roller 95, rod 96, cross bar 97, levers 98 and levers 99, Figs. 1 and 2. The levers 98, cross bar 97 and rod 96 form a universal joint which equalizes the pressure on the four rams. The rod 96 is provided with a nut 100 which acts on a spring 101 and regulates the amount of pressure exerted by the rams when applying the staying tape to the corner of the box. The feed roll 88 for the staying tape is actuated by the bobbin shaft 35 by means of stems 102, bevel gears 103, worm gears 104 and 105, shafts 106, spur gears 107 and 108, Figs. 1 and 2. This tape feeding roll 88 being connected to the bobbin shaft receives intermittent motion and is so timed as to feed the tape when the rams have reached the return position.

During the operation of these corner staying rams the form block must be held motionless in its position, which is accomplished by the arms 109 and dowel pins 110 arranged on the said form block and reamed holes 111 arranged in blocks 65 and 66 of the folding die, Figs. 2 and 6.

After the corner staying operation the bobbin raises the form block clear of the folding die, makes one-half revolution bringing the finished box over a chute 112, or any suitable receptacle, and the empty form block over the folding die, then lowering again and folding another blank and discharging the finished box simultaneously.

The finished box is discharged in the following manner: The form block is provided with a tooth 113. A rigid arm 114 is arranged on the end piece 24 in line with the

said tooth. During the downward movement of the bobbin the arm 114 engages the tooth 113 bringing the form block to a stop while the hanger 68 continues its downward travel, against the action of springs 115 arranged over pins 116, Figs. 1 and 6.

Having described a preferred form of the machine and its mode of operation, I claim as my invention:—

1. A corner staying machine comprising blank forming members, means for feeding blanks to said forming members, means for applying glue to the corners of the blank in the movement thereof toward said forming members, and means for applying tape over said corners while said blank is on said forming member.

2. A corner staying machine comprising blank forming members, means for feeding blanks to said forming members, means coacting with said feeding means for applying glue to the corner edges of said blanks, and means for applying non-adhesive tape to the glued portions of said blanks subsequent to the forming operation.

3. A corner staying machine comprising blank forming members, means for feeding blanks successively to said forming members, means coacting with said feeding means for applying glue to predetermined portions of the blanks during the feeding operation, and comprising glue pads and means for supplying glue to said pads, and means for feeding tape to said forming mechanism and applying it to the glued corners of the blanks in folded form.

4. A corner staying machine comprising fixed and movable forming dies adapted to form a blank into box form, means for feeding blanks successively to said forming dies, means for applying adhesive to the corner edges of blanks in the passage of the same to said forming dies, tape feeding and applying mechanism mounted adjacent the corners of said folding die, and comprising V-shaped rolls for initially creasing said tape.

5. A corner staying machine comprising fixed and movable forming dies adapted to form a blank into box form, blank feeding mechanism, adhesive applying mechanism coacting with said feeding mechanism to apply the adhesive to the corner edges of the blanks prior to their delivery to the forming dies, and means for feeding non-adhesive tape to said dies and applying the same to the corners of the folded blanks.

6. A corner staying machine comprising fixed and movable blank forming members, means for feeding blanks successively to said forming members, glue applying members in the path of said blanks, and comprising rolls provided with glue pads adapted to register with predetermined portions of the blanks, and means for feeding and applying tape to the corners of said blanks in folded form.

7. A corner staying machine comprising forming members, blank feeding mechanism, adhesive applying mechanism coacting with said feeding mechanism, and comprising rotative glue rolls provided with pads conforming in shape to the portions of the blanks to be glued, and means for cutting and applying strips of non-adhesive tape to all corners of the blanks in folded form within said forming members.

8. A corner staying machine comprising a fixed forming die, a vertically movable forming block, blank feeding mechanism, glue applying rolls coacting with said feeding mechanism for applying glue to the corner edges of said blanks during their advancement to said forming die, said rolls being provided with pads conforming to the corner margins of the blanks, and means for feeding non-adhesive tape to the corners of said blanks in folded form.

9. A corner staying machine comprising a stationary forming die, an intermittently rotative bobbin shaft, a plurality of forming blocks mounted on said bobbin shaft and adapted to successively engage said forming die, means for feeding blanks successively to said forming die, means for applying strips of tape to the corners of said blanks in folded form, and means for automatically removing the finished blanks from said forming blocks.

10. A corner staying machine comprising a stationary forming die, an intermittently rotative bobbin shaft, a plurality of forming blocks mounted on said bobbin shaft, and adapted to successively engage said forming die, means for feeding blanks successively to said forming die, glue applying members associated with said blank feeding means, means for feeding tape adjacent the corners of said forming die, and means for applying strips of said tape to the corners of said blanks simultaneously.

11. A corner staying machine comprising a stationary forming die, a bobbin shaft provided with radial arms forming blocks mounted on said arms, means for imparting intermitting rotative and endwise movement to said shaft, whereby said blocks are brought successively into die engaging position, means for feeding blanks successively into said die, means for applying strips simultaneously to the corners of said blanks in folded form, said blocks acting to remove the stayed blank from said die into discharging position, and having a relatively movable member adapted to be tripped to automatically discharge the blanks therefrom.

12. A corner staying machine comprising a fixed forming die, a bobbin shaft, provided with radial arms, means for imparting intermittent rotative and endwise movement to

said bobbin shaft, forming blocks mounted on said arm and adapted to successively engage the forming die, and removing a formed blank therefrom, and means for discharging the blank from one of said blocks during the travel of another block into die engaging position.

13. A corner staying machine comprising a fixed forming die, a bobbin shaft provided with radial arms, forming blocks mounted at the ends of said arms, and adapted to be successively brought into registering relation with said forming die in the rotation of said shaft, means for imparting endwise movement to said shaft whereby each block successively forms and removes a blank from said die into discharging position, a fixed member mounted in the path of said blocks in discharging position, said blocks being provided with a coacting member whereby the blank is automatically discharged from the blocks during the die engaging stroke of said shaft.

14. In a machine of the character described, the combination of a fixed die, a bobbin shaft provided with radial arms forming blocks mounted on said arms, means for imparting intermittent rotative and endwise movement to said shaft, whereby said blocks are brought successively into engagement with said die, said blocks comprising a relatively movable member adapted to force a blank from said block, and a fixed member mounted in the path of endwise movement of said blocks in blank discharging position for automatically actuating said relatively movable member thereof to discharge the blanks therefrom.

In witness whereof, I hereunto subscribe my name this 14th day of August, A. D., 1922.

WILLIAM FUHR.