

March 3, 1959

R. W. ANNESS

2,875,726

BLANK GLUING APPARATUS

Filed Jan. 25, 1956

3 Sheets-Sheet 1

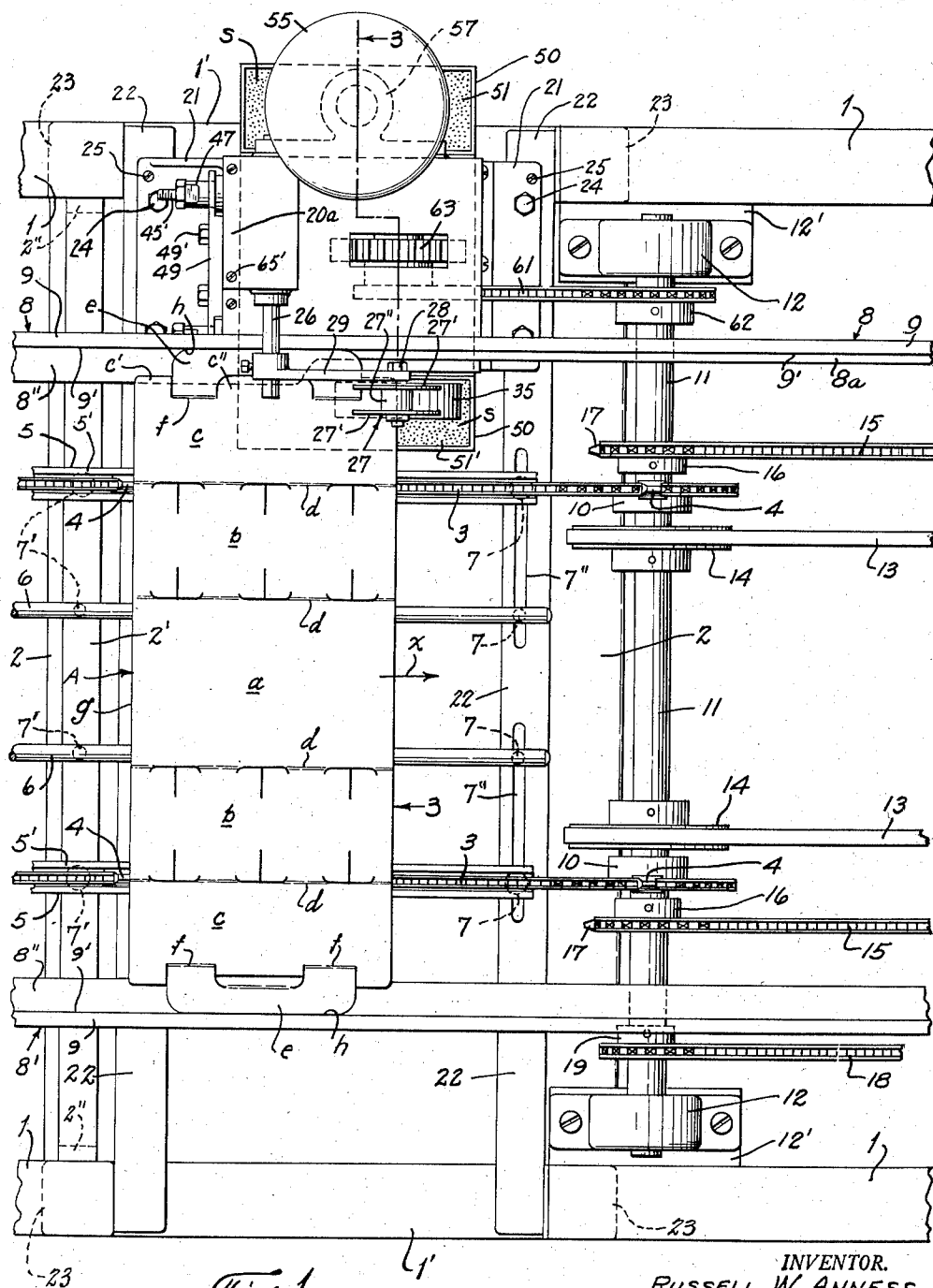


Fig. 1

INVENTOR.
RUSSELL W. ANNESS
BY
Ruben J. Carlson
ATTORNEY

March 3, 1959

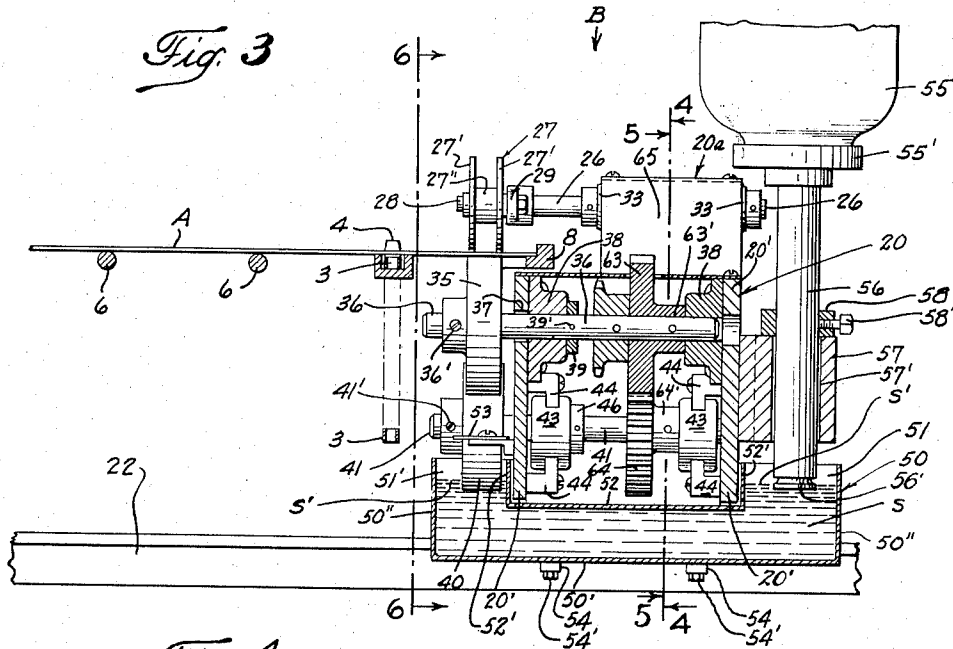
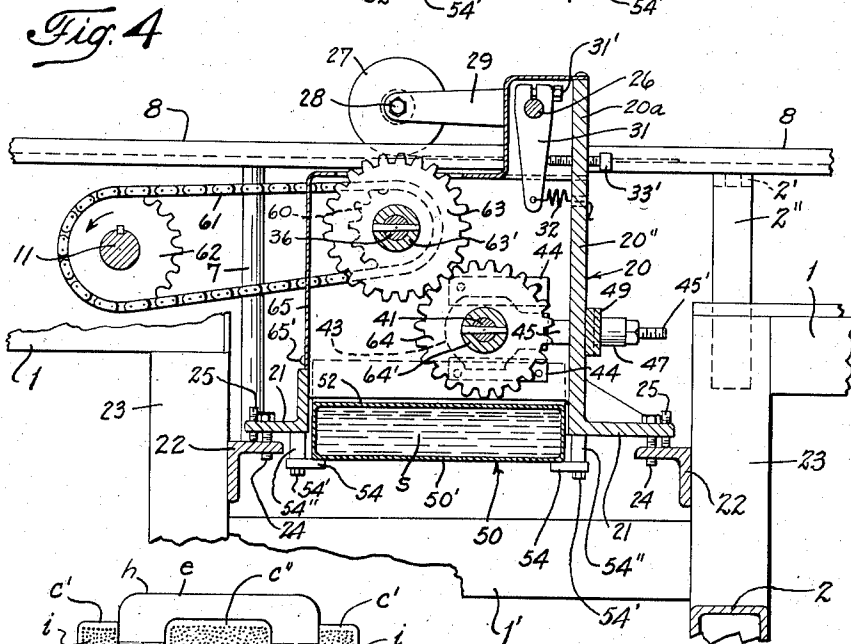
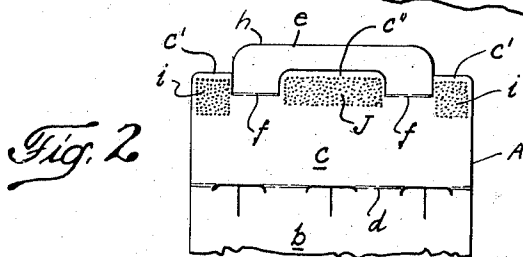
R. W. ANNESS

2,875,726

BLANK GLUING APPARATUS

Filed Jan. 25, 1956

3 Sheets-Sheet 2



INVENTOR.
RUSSELL W. ANNESS
BY
Reuben J. Carlson
ATTORNEY.

March 3, 1959

R. W. ANNESS
BLANK GLUING APPARATUS

2,875,726

Filed Jan. 25, 1956

3 Sheets-Sheet 3

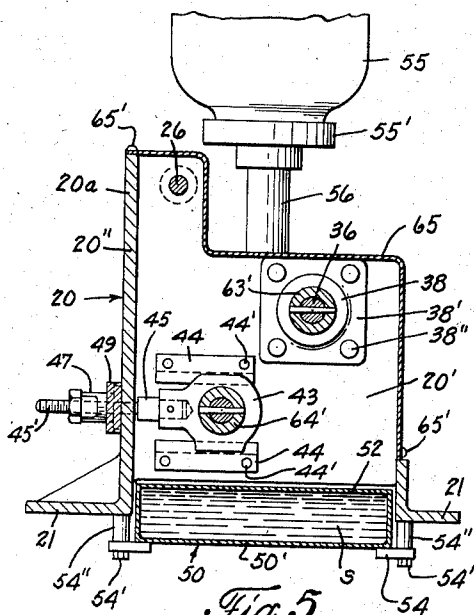


Fig. 5

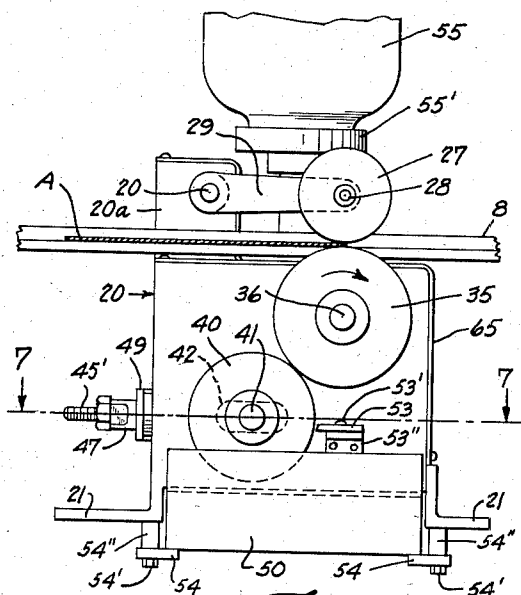


Fig. 6

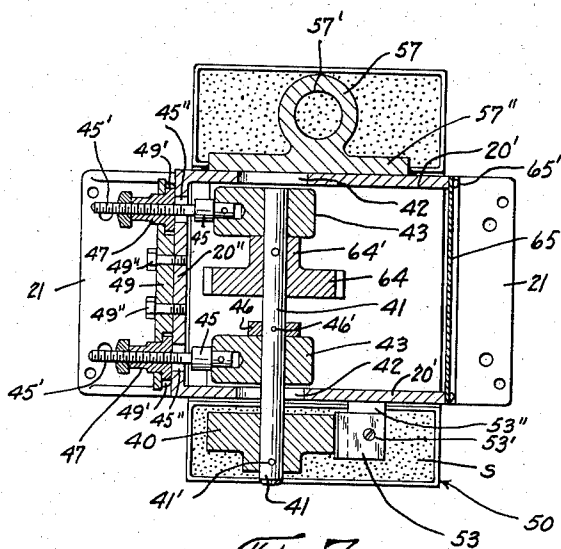


Fig. 7

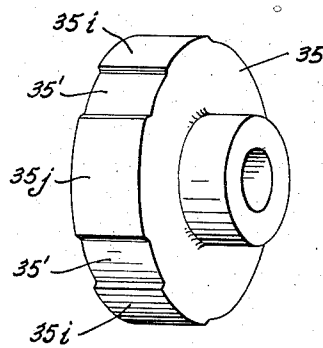


Fig. 8

INVENTOR.
RUSSELL W. ANNESS
BY
Reuben T. Carlson
ATTORNEY

1

2,875,726

BLANK GLUING APPARATUS

Russell W. Anness, Middletown, Ohio, assignor, by mesne assignments, to Diamond Gardner Corporation, a corporation of Delaware

Application January 25, 1956, Serial No. 561,332

10 Claims. (Cl. 118—212)

This invention relates to blank gluing apparatus and more particularly to apparatus for applying precisely located glue patches to continuously advancing blanks.

The application of glue or adhesive strips or patches to continuously advancing blanks presents numerous problems. In many blank assembly operations, glue strips or patches of irregular or unusual outline must be uniformly applied to precise areas of the successive blanks to insure proper adhesion and accurate dimensional assembly of the blanks into container, carton or package form. One of the difficulties often encountered is the inability of the gluing apparatus and associated blank aligning devices to effect application of the glue strips or patches in a uniform manner to the precise areas required. A further difficulty with blank gluing apparatus as heretofore provided stems from the fact that the glue contacting parts thereof cannot be readily cleaned when the blank run is completed, with the result that hardened glue becomes caked on the glue-contacting parts which interferes with proper glue application to the blanks. Blank gluing apparatus as heretofore provided is also complicated in design, composed of many parts which are exposed to glue splash and difficult of access for inspection, repair or cleaning; and when inspection, repair or cleaning is necessary, extended shutdowns of the entire production line are required.

In accordance with this invention, an improved blank gluing apparatus is provided which assures precise registry of the traveling blanks with the glue applying instrumentalities of the gluing mechanism, and which operates to apply precisely-shaped glue patches in a uniform manner to the precise areas of the continuously advancing blanks to be glued. As a further feature, the glue applying mechanism of this invention is assembled in a compact unit, adapted to be conveniently mounted on one side of the conveyor structure so that it can be readily removed for repair, and a similar substitute unit placed in operating position in a relatively few minutes with a minimum of production line shutdown.

As a further feature, the blank gluing apparatus of this invention incorporates glue supply instrumentalities which can be quickly removed and cleaned when the blank run has been completed, and quickly replaced when a new blank run is to be initiated. The glue applicator roller and the glue pickup roller are also readily accessible from one side of the conveyor structure for convenient wiping and cleaning in minimum time, and during the period of the blank run, may be kept in continuous motion to thereby prevent glue caking on the surfaces thereof and glue skin formation in the glue supply pan. The driving devices for the glue applicator roller and glue transfer rollers are completely enclosed, and fully protected from glue contact.

The blank gluing apparatus of this invention is simple in design, can be constructed from relatively few parts, can be readily assembled, disassembled and reassembled, is highly reliable and substantially foolproof in operation, and assures precise application of glue patches of

2

any shape or form to successive blanks traveling at high speed.

Other objects and advantages of this invention will become apparent as the disclosure proceeds.

Although the characteristic features of this invention will be particularly pointed out in the claims, the invention itself, and the manner in which it may be carried out, may be better understood by referring to the following description taken in connection with the accompanying drawings forming a part thereof, in which

Fig. 1 is a plan view of the blank gluing apparatus of this invention showing a typical blank in process of advance into contact with the glue applying devices thereof, the drive shaft for the blank advancing chains being omitted;

Fig. 2 is a fragmentary plan view of an end portion of a typical blank having a series of spaced glue patches of precise area applied thereto to more fully illustrate the precision gluing which the blank gluing apparatus of this invention can capably perform;

Fig. 3 is a fragmentary transverse section of the blank gluing apparatus of this invention as the same would appear as viewed along line 3—3 of Fig. 1, this view showing the front edge of a blank in position to advance into contact with the glue applying devices of the gluing mechanism;

Fig. 4 is a fragmentary vertical section taken longitudinally of the glue applying apparatus as the same would appear when viewed in the direction of the arrows 4—4 of Fig. 3, this view showing further details of the blank pressure wheel and the manner in which it is adjustably supported, the driving devices for the glue applicator roller and glue pickup roller, the glue pan, and the mounting devices therefor;

Fig. 5 is another vertical section taken longitudinally of the glue applying apparatus as the same would appear when viewed in the direction of the arrows 5—5 of Fig. 3, this view showing still further details of the glue applying mechanism of this invention;

Fig. 6 is a side view of the glue applying mechanism as the same would appear when viewed in the direction of the arrows 6—6 of Fig. 3, this view also showing a cross-section of the blank in process of being advanced into contact with the glue applying devices of the mechanism;

Fig. 7 is a horizontal section of the glue applying mechanism as the same would appear when viewed in the direction of the arrows 7—7 of Fig. 6; and

Fig. 8 is a perspective view of a typical glue applicator roller.

Similar reference characters refer to similar parts throughout the similar views of the drawings and specification.

To illustrate the adaptability of the blank gluing apparatus of this invention to precisely glue successively advancing blanks, there is shown in Fig. 1 a typical blank A in process of passage through the gluing devices thereof and receive a pair of end glue patches *i* and an intermediate glue patch *j* adjacent one end thereof as shown on Fig. 2. The blank shown in Figs. 1 and 2 is designed to provide a wrapper blank for a group of six flat ended cans and comprises a bottom panel *a*, a pair of side panels *b* and a pair of top panels sections *c*, hingedly joined by parallel extending transverse scores *d*. A projecting handle part *e* is hingedly connected to each of the top panel sections *c* by score segments *f*. The end adhesive patches *i* are to be applied only to the paired end extensions *c'* of one of the top panel sections *c* and the intermediate patch *j* only to the intermediate extension *c''* of the top panel section. The blank A thus requires precision application of the glue patches *i* and *j*

which the gluing apparatus of this invention is uniquely adapted to perform.

The blank gluing mechanism B is designed to be attached to and supported by a framework which also supports the blank conveyor at an elevation suited to the blank feeding apparatus and subsequent blank forming, blank shaping or blank wrapping apparatus. Successive blanks A are continuously advanced in contact with the glue applicator devices of the blank gluing mechanism B by means of a pair of conveyer chains 3 having longitudinally spaced and transversely aligned lugs 4 fixed thereto and designed to engage the rear edge *g* of the blank to thereby advance the same in gluing relation to the blank gluing mechanism B. The paired blank advancing chains 3 may travel within a pair of guide channels 5, each presenting a pair of top slide surfaces 5' on which the blank is slidably advanced by the transversely paired lugs 4 affixed to the conveyer chains 3. Where the blank A is of considerable length as shown in Fig. 1, the central portions of the advancing blanks may be additionally supported by a plurality of slide rods 6.

The projecting handle parts *e* of the advancing blanks are supported by a pair of side rails 8—8' having smooth slide surfaces 8'' along which the ends of the advancing blank may freely slide. The end edges *h* of the advancing blanks are guided by vertical guide faces 9' presented by a pair of longitudinally extending rib formations 9 which may be formed integral with the side rails 8—8'. It will be noted by referring to Fig. 1 that the side rail 8' has a slide surface 8'' of substantially uniform width throughout its length, while the slide surface 8'' of the side rail 8 is reduced in width at 8*a* beginning at a point adjacent the blank gluing mechanism B. The reduced width section of the slide surface 8*a* of the side rail 8 is designed to provide support for only the outer end portion of the adjacent handle part *e* so as not to interfere with the application of the glue patches *i* and *j* to the underside of the adjacent top panel *c*, nor disturb the glue patches when applied.

The paired conveyer chains 3 may be driven from any suitable drive shaft (not shown) so that the upper runs thereof travel in the direction of the arrow *x* as shown on Fig. 1. The discharge end of the conveyer chains 3 may be trained around a pair of idler sprockets 10 rotatably supported on a driven shaft 11 whose ends are mounted in bearing blocks 12 secured as by bracket plates 12' to the adjacent side frame members 1 of the framework.

The successive glued blanks A may be transferred by the engaging lugs 4 from the main conveyer chains 3 onto a pair of transfer belts 13 trained around a pair of sheaves 14 fixed to the driven shaft 11. The transfer belts 13 may be driven at a traveling speed different from the main blank advancing chains 3 to best accommodate subsequent operations to be performed on the glued blanks. The transfer belts 13 may be positioned between the main blank advancing chains 3 as shown in Fig. 1 to thereby support the intermediate section of the advancing glued blanks. A pair of secondary glued blank advancing chains 15, trained around a pair of sprockets 16 fixed to the driven shaft 11, may also be provided with transversely aligned lugs 17 to assure continued advance of the successive glued blanks on the transfer belts 13. Driven shaft 11 may be rotated as by a drive chain 18 trained around a sprocket 19 fixed to the driven shaft 11 adjacent one end thereof.

The supporting framework may comprise two pairs of discontinuous side frame members 1 as shown in Figs. 1 and 4. The adjacent ends of the two pairs of side frame members 1 are secured to the upper ends of two pairs of supporting legs 23 which are longitudinally spaced a sufficient distance to receive the glue applying mechanism B therebetween. Each pair of legs 23 are strengthened and braced by a lower transverse frame

member 2 whose ends are secured to the spaced legs in a position below the side frame members 1. The adjacent legs 23 of each pair are also connected by dropped side frame sections 1' positioned below the side frame members 1. The glue applying mechanism B is pocketed between the adjacent paired legs 23 and is supported by a pair of transversely extending rails 22 secured to the paired legs 23 in a position below the side frame members 1 but above the dropped side frame sections 1'.

The paired chain guiding channels 5, the slide rods 6, and the side rails 8—8' may be supported immediately preceding the blank gluing mechanism B, as shown in Fig. 1, by an overhead spanner bar 2' positioned above the adjacent pair of side frame members 1. The spanner bar 2' presents a pair of riser legs 2'' at the ends thereof which are secured to the adjacent side frame members 1. The paired chain guiding channels 5 and slide rods 6 may be adjustably secured to the spanner bar 2' as by adjustable bolt elements 7'. The other adjacent ends of the chain guiding channels 5 and slide rods 6 may each be supported by a vertically tubular riser 7 which is supported from the adjacent transverse rail 22 therebelow as shown in Figs. 1 and 4. The tubular risers 7 are transversely adjustable in adjusting slots 7'' formed in the rail 22. The side rails 8—8' extend continuously as shown in Fig. 1 to thereby guide the end edges of the blank during its travel before, during and after the gluing operation.

The blank gluing mechanism B may be removably supported on the rails 22 of the conveyer framework by a U-shaped cage 20 which may be stamped from heavy metal plate and which may comprise a pair of side walls 20' connected by a rear wall 20'' as shown in Fig. 7. The cage 20 is mounted between the longitudinally spaced legs 23 of the framework with one of its side walls 20' extending substantially parallel to the side frame members 1. The cage 20 may be supported by a pair of laterally flared foot brackets 21 secured to the rear wall 20'' and the lower front edges of its side walls 20' as shown in Fig. 4. The foot brackets 21 are adjustably supported by the parallel rails 22 which extend transversely of the framework and may be detachably secured to the rails 22 as by bolts 24. Precise levelling and vertical adjustment of the cage 20 may be achieved by the provision of leveling screws 25 threaded into the foot brackets 21 and resting upon the adjacent rails 22.

The rear wall 20'' of the cage presents an upwardly projecting extension 20*a*, as shown in Figs. 3, 4, 5 and 6, which projects a distance above the adjacent side rail 8 of the framework. The end extension 20*a* is of less width than the rear wall 20'' from which it extends, as shown in Figs. 1 and 3, and has two end portions which extend forwardly and provide support for a rocker shaft 26 from which an overriding blank pressure wheel 27 is supported. The blank pressure wheel 27 is positioned directly above a glue applicator roller 35 designed to apply the glue patches *i* and *j* to the underside of the advancing blank.

The blank pressure wheel 27 preferably comprises a pair of spaced discs 27' of equal diameter joined by a hub portion 27''. The wheel forming discs 27' are spaced a distance substantially equal to the distance between the transverse margins of the glue patches *i* and *j* to be applied to the blank. The blank pressure wheel 27 is rotatably mounted on a stub pintle 28 fixed to the end of a rider arm 29 which extends longitudinally in the direction of advance of the blanks to be glued. The rider arm 29 is fixed to the projecting end of the rocker shaft 26 as shown in Figs. 1, 3 and 4. The rocker shaft 26 is rockably supported within a pair of bearing assemblies 33 which may be supported by brackets (not shown), fixed to the end extension 20*a* of the rear wall 20'' of the cage 20.

The blank pressure wheel 27 is maintained in resilient

riding contact with the upper surface of the successively advancing blanks by means of a lever 31 which is clamped to the rocker shaft 26 by clamp bolt 31' as shown on Fig. 4. A tension spring 32, secured to the lower end of the lever 31 and to the adjacent rear wall 20'' of the cage, maintains the blank pressure wheel 27 in resilient bearing contact against the top side of the traveling blank, and the degree of bearing pressure may be adjusted as desired by manipulating an adjusting screw 33' whose end has bearing contact with the lever 31.

A glue applicator roller 35, as shown in Figs. 1, 3, 5, 6 and 8, is positioned directly under the resiliently supported blank pressure wheel 27. The glue applicator roller 35 presents a pair of raised peripheral sections 35i, whose area conforms to the adhesive patches *i* to be applied to the underside of the end extensions *c'* of the blank, and an intermediate raised peripheral section 35j whose area conforms to the intermediate glue patch *j* to be applied to the intermediate extension *c''* of the blank. The intermediate raised peripheral section 35j and the paired peripheral sections 35i are separated by depressed peripheral sections 35' as shown in Fig. 8. The glue applicator roller 35 is positioned exteriorly of the U-shaped cage and is fixed as by set screw 36' to a shaft 36. Slots or holes 37 are formed in the side walls 20' of the cage 20 which facilitate insertion and removal of the shaft 36 therefrom.

The shaft 36 is rotatably supported in a pair of bearing blocks 38 each presenting a flange plate 38' which is secured as by bolts 38'' to the inside face of the adjacent side wall 20' of the cage 20 as shown in Figs. 3, 4, 5 and 6. The glue applicator roller 35 is maintained in true alignment with the blank pressure wheel 27 by a shift plate 39 which is secured to the shaft 36 by set screw 39' and which is adjusted to abut one of the bearing blocks 38.

Glue is applied to the raised peripheral sections 35i and 35j of the glue applicator roller 35 by a glue pickup roller 40 as shown in Figs. 3, 4, 5, 6 and 7. The glue pickup roller 40 has a smooth cylindrical surface and is fixed to the end of a supporting shaft 41 as by set screw 41'. The side walls 20' of the cage 20 are provided with a pair of horizontally extending slots 42 to facilitate insertion and removal of the shaft 41. The shaft 41 is rotatably supported by a pair of bearing yokes 43 positioned interiorly of the cage 20. Each bearing yoke 43 presents upper and lower slide grooves which ride on support rails 44 secured to the adjacent side walls 20' of the cage 20 as by securing screws 44'. It will thus be noted that the shaft 41 and the glue pickup roller 40 fixed thereto may be horizontally adjusted as may be necessary to insure proper glue transfer contact between the periphery of the glue pickup roller 40 and the raised glue applicator sections 35i and 35j of the glue applicator roller 35.

Horizontal adjustment of the shaft 41 and the glue pickup roller 40 supported thereby may be effected by the provision of a pair of yoke stems 45 which are secured to the respective bearing yokes 43 as shown in Figs. 4, 5, 6 and 7. Each yoke stem 45 presents a threaded section 45' which extends through a hole or slot 45'' in the rear wall 20'' of the cage 20. An adjusting knob 47 is threaded onto the threaded section 45'' of each yoke stem 45 and bears against the outside face of the cage rear wall 20''. The glue pickup roller 40 and its supporting shaft 41 may be shifted laterally by manipulating the adjusting knobs 47 to thereby maintain the desired glue transfer contact between the periphery of the glue pickup roller 40 and the raised glue applicator sections 35i and 35j of the glue applicator roller 35.

Each bearing yoke 43 and its threaded adjusting knob 47 is maintained in shaft supporting position by a supporting plate 49 having cavities 49' which receive and conform to the base portions of the threaded adjusting knobs 47. The supporting plate 49 is secured to the cage

rear wall 20'' as by securing screws 49''. The glue pickup roller 40 is maintained in aligned relation with the glue applicator roller 35 by means of a shift plate 46 which is fixed to the shaft 41 as by set screw 46' and which is adjusted into abutting relation to one of the bearing yokes 43. The glue pickup roller shaft 41 may thus be readily withdrawn from the bearing yokes 43 and the cage 20 by loosening the set screw 46'.

The adhesive or glue *s* may be contained within a glue jug or other receptacle 55 which supplies the glue to one end of a glue pan 50, the other end of the pan being so positioned that the glue pickup roller 40 contacts the glue therein. The glue pan 50, as shown in Figs. 1, 3, 4, 5, 6 and 7, may be generally rectangular in form and presents a bottom wall 50' and enclosing side and end walls 50''. The outer end of the glue pan 50 presents a raised glue input neck 51 and the other end presents a raised glue outlet neck 51' which are defined by a depressed top wall section 52 and upwardly projecting end wall sections 52' of the pan. The glue supply to the glue pan 50 is so controlled as to maintain the glue level *s'* in the raised input and outlet necks 51 and 51' of the pan at a level above the glue surface in the midsection of the pan as shown in Fig. 3.

The lower periphery of the glue pickup roller 40 is submerged below the surface level *s'* of the glue in the raised glue outlet neck 51' of the pan 50. Excess glue is scraped off from the periphery of the glue pickup roller 40 during rotation thereof by a scraper blade 53 which may be fixed as by securing screw 53' to a bracket plate 53'' secured to the adjacent side wall section 20' of the cage 20. The glue pan 50 is removably suspended from the foot brackets 21 and is thus readily accessible from the adjacent side of the apparatus as is shown in Fig. 1. The glue pan is removably supported by a pair of knuckle lugs 54 positioned on each side of the pan as shown in Figs. 3, 4, 5 and 6. Each knuckle lug 54 is supported by an adjustable bolt 54' threaded into the adjacent foot bracket 21 of the cage 20, with the knuckle lug 54 maintained in spaced relation from the lower face of the foot bracket 21 by a spacing collar 54'', as shown in Figs. 3, 4, 5, and 6. The glue pan 50 may be easily removed from its supported position by swinging the knuckle lugs 54 outwardly, thereby permitting the pan to be lowered as necessary before removing the same for cleaning purposes.

The discharge end of the glue jug 55, as shown in Figs. 1, 3, 5 and 6, is secured to a glue spout 56 as by a threaded cover assembly 55'. The glue flows by gravity from the inverted glue jug 55 through the glue spout 56 and discharges into the raised input neck 51 of the glue pan 50. A suitable flow regulator valve may be mounted on the lower end of the glue spout 56 by means of which the flow of glue from the jug 55 may be cut off or the flow thereof regulated as desired. The glue spout 56 as well as the glue jug 55 is supported in inverted position by means of a supporting yoke 57 having an elongated bore 57' therein through which the glue spout 56 extends. The supporting yoke 57 is provided with a flanged section 57'' which is secured to the adjacent side wall 20' of the cage 20. The glue spout 56 and associated glue jug 55 is maintained in vertically adjusted position by means of a grip collar 58 which embraces the glue spout 56 and is designed to seat on the upper end of the supporting yoke 57. A set screw 58' threaded into the grip collar 58 and designed to be manipulated into gripping engagement with the outer surface of the glue spout 56 may be used to adjustably secure the grip collar 58 to the feed spout 56 and thus permit supported adjustment thereof. It will be appreciated that in normal operation the lower end of the feed spout 56 is immersed below the surface level *s* of the glue in the input neck 51 of the glue pan 50. By adjusting the level of the discharge end of the glue spout 56, the surface level *s'* of

the glue in the input and outlet necks 51 and 51' of the pan 50 may be regulated as desired.

The glue applicator roller 35 is continuously rotated by means of a sprocket 60 fixed to the glue applicator shaft 36 as shown in Figs. 3, 4 and 5. The sprocket 60 carries a drive chain 61 which is trained around a sprocket 62 fixed to the driven shaft 11 which drives the transfer belts 14 above described. The glue pickup shaft 41 is rotated from the glue applicator shaft 36 by means of a gear 63 whose hub portion 63' is fixed to the glue applicator shaft 36 as shown in Figs. 3 and 4. The gear 63 meshes with a gear 64 whose hub portion 64' is fixed to the glue pickup shaft 41. Rotation of the transfer belt supporting shaft 11 thus operates to rotate the glue applicator roller 35 and the glue pickup roller 40 in unison.

The cage 20 which contains and supports the driving devices for the glue applicator roller 35 and glue pickup roller 40, as well as the parts for effecting pressure adjustment of the pressure wheel shaft 26, may be enclosed within a removable housing 65 suitably attached to the cage 20 as by removable screws 65'. These driving devices are thus fully protected from the entry of loose pieces of paper stock, dust and foreign matter, and glue splash. When necessary to inspect or repair the driving devices contained within the cage 20, the cage and the entire glue applying mechanism B supported thereby can be readily removed from the conveyor supporting framework and the housing 65 quickly removed.

It will be appreciated that the peripheral shape and form of the glue applicator roller 35 must conform to the precise shape and form of the glue strips or glue patches to be applied to the blank. The glue applicator roller 35 is readily removable by loosening the set screw 36' which secures it to its shaft 36, and replaced by a substitute glue applicator roller whose peripheral contact surfaces conform to the shape and dimensions of the glue strip or glue patches to be applied to the blanks. The glue pickup roller 40 is also readily removable from its shaft 41 by loosening the set screw 41' and then replaced by a substitute glue pickup roller of proper form and dimension. Similarly, the blank pressure wheel 27 may also be readily removed from its stub pintle 28 and replaced by a substitute glue pressure wheel whose form and dimensions conform to the requirements of the glue applicator roller 35.

It will also be appreciated that the shaft 36 which supports the glue applicator roller 35, and the shaft 41 which supports the glue pickup roller 40, can both be readily withdrawn from the supporting cage 20 and replaced by substitute shafts of sufficient length to position the glue applicator roller 35 and the glue pickup roller 40 respectively attached thereto in the precise position required for glue application to the blanks. The glue pan 50 may also be lengthened as desired to place its glue outlet neck 51' in position under the glue pickup roller 40. The rocker shaft 26 may also be readily removed and replaced by a substitute rocker shaft of the required length to support the blank pressure wheel 27 in the desired position.

It will also be appreciated that the blank gluing mechanism B may be located in any position with respect to the blank conveyor framework to conform to requirements. The blank gluing mechanism B, may also be arranged to apply the glue strips or glue patches to the upper surfaces of the successively advancing blanks by adding an intermediate glue transfer roller.

Operation

In applying the glue patches *i* and *j*, the elongated blanks A are successively deposited in uniform spaced relation on the blank advancing chains 3 with the transversely aligned lugs 4 thereof in pushing relation to the rear edge *g* of the adjacent blank. The blanks slide along the slide surfaces 5' of the guide channels 5, the slide surfaces of the slide rods 6, and the slide surfaces 8''

and 8a of the side rails 8-8', with the end edges *h* of the blanks guided by the vertical guide faces 9' of the guide ribs 9 of side rails 8-8' as shown in Fig. 1. During their uninterrupted advance, one end of the successive blanks is driven under the blank pressure wheel 27, as shown in Figs. 1, 3 and 4, which serves to press the adjacent end of the blank against the raised glue applying sections 35i and 35j of the driven glue applicator roller 30. The blank pressure wheel 27 is so adjusted by the adjusting screw 33' that it will not depress the blank into the depressed sections 35' of the glue applicator roller 35, but will insure positive application of the glue patches *i* and *j* to the underface of the blank end portion. Precise registry of the glue patches *i* and *j* with respect to the blank is assured by the accuracy of the blank alignment as fixed and maintained by the cooperating blank advancing lugs 4 and the vertical guide faces 9' of the longitudinally extending guide ribs 9.

By appropriate adjustment of the adjusting screw 33', the blank pressure wheel 27 may be precisely adjusted so that it cannot drop into contact with the glue applicator sections 35i and 35j of the glue applicator roller 35 when no blank is positioned therebetween. The glued blank continues to advance beyond the glue applicator mechanism B and is transferred by the aligned blank advancing lugs 4 of the blank advancing chains 3 onto the blank transfer belts 13 and thenceforth advanced at the speed required by subsequent blank folding or treating operations.

The glue applicator roller 35 and glue pickup roller 40 are continuously driven by the transfer belt driving shaft 11, thereby assuring at all times a wet coating of glue on the surfaces thereof and further assuring continuous agitation of the glue in the glue pan 50 so that the glue cannot harden and collect as a glue skin in the pan or on the glue contact surfaces of the glue applicator roller 35 and glue pickup roller 40.

The glue applicator mechanism B of this invention is so designed as to permit convenient and quick cleanup after the blank run has been completed. In the cleanup operation, the flow control or regulator valve 56' at the end of the glue spout 56, readily accessible from one side of the apparatus, is closed and the glue spout 56 and glue jug 55 lifted as a unit from supported position on the supporting yoke 57. The spout 56 is detached and washed and the glue pan 50 is conveniently removed from one side of the machine by swinging the knuckle lugs 54 outwardly to permit lowering removal of the glue pan 50 from the cage 20. The glue contents of the glue pan 50 can then return to the jug 55 and the pan washed. The peripheries of the glue applicator roller 35 and the glue pickup roller 40 may then be quickly wiped with a cloth, which may be facilitated when rotated. It will be noted that the glue applicator roller 35 and glue pickup roller 40 are both positioned outside of the cage adjacent one side of machine where they are conveniently accessible.

To place the blank gluing apparatus in operation, the feed spout 56, with the glue jug 55 attached thereto, is inserted into the supporting yoke 57 and the grip collar 58 is adjustably secured to the spout 56 in a position to maintain the lower discharge end of the glue spout 56 at the desired glue feeding level. The regulator valve 56' at the end of the glue spout is then opened and glue permitted to flow into the glue pan 50 until the glue level *s'* of the glue therein has surrounded and air sealed the discharge end of the spout 56, and the glue level *s'* is correspondingly maintained. The blank advancing chains 3 are then placed in operation, the transfer belt shaft 11 placed in operation, and successive blanks fed to the blank advancing chains 3.

The entire glue applying mechanism B of this invention can be conveniently removed as a unit for disassembly and reassembly as repair requirements indicate, by detaching the drive chain 61 and removing the secur-

ing bolts 24 which secure the cage 20 to the transverse supporting rails 22. The entire cage 20 and the driving mechanism supported thereby may then be tiltably withdrawn from the transverse supporting rails 22 and the entire unit removed. The enclosing housing 65 may then be removed from the cage and the entire driving mechanism and all the driving devices contained in the cage are then readily accessible for inspection or repair.

From the above disclosure, it will be apparent that a highly efficient blank gluing apparatus has been provided which insures precise application of difficult glue strips and glue patches of any size and dimension to predetermined areas only of successively advancing blanks. The gluing apparatus of this invention may be associated with any type or form of blank conveyer equipped with transversely aligned blank advancing lugs and blank guiding ribs as above disclosed. The glue applying mechanism may be mounted in any desired position to reach specific areas where the glue patches are to be applied. For example, when glue patches are to be applied to the more central areas of the advancing blanks, the rocker shaft 26 which supports the blank pressure wheel 27, and the shafts 36 and 41 which respectively support the glue applicator roller 35 and glue pickup roller 40, may be replaced by shafts of a length to project substantially beyond the adjacent side wall 20' of the cage 20 to reach the central area of the blank. The cage 20 and the driving devices which it contains may be positioned on either side of the framework but preferably adjacent a side thereof to permit convenient glue cleanup and adjustment of the parts thereof. A highly efficient and reliable blank gluing apparatus can be constructed in accordance with the teachings of this disclosure, designed to insure precise application of glue strips and patches to any location on the traveling blank, and which insures high speed application of the glue patches to blanks traveling continuously at high speed.

While certain novel features of this invention have been disclosed herein and are pointed out in the claims, it will be understood that various omissions, substitutions and changes may be made by those skilled in the art without departing from the spirit of this invention.

What is claimed is:

1. Blank gluing apparatus including in combination, a supporting framework, a plurality of spaced members extending longitudinally of the framework and presenting coplanar blank supporting surfaces on which a series of blanks may be slidably supported, a driven conveyor having transversely aligning lugs positioned between the slide surfaces of said members and designed to engage the rear edge of successive blanks and advance the blanks longitudinally along said members, means presenting a pair of vertical guide surfaces designed to have sliding contact with the opposite ends of the advancing blanks and positioned to cooperate with said advancing lugs to maintain the blanks advanced thereby in accurately spaced and longitudinally aligned relation, supporting means mounted on said framework and extending transversely with respect to said blank supporting members and projecting laterally beyond the adjacent vertical guide surface, and a blank gluing mechanism removable as an integrated unit from said supporting framework which includes, a cage structure removably mounted on said supporting means and positioned at one side of the path of travel of the blanks and adjacent one of said vertical blank guiding surfaces, a pair of transversely extending shafts mounted on said cage structure, said shafts presenting end extensions projecting from said cage structure and straddling the adjacent vertical guide surface with the free ends thereof positioned above and below the path of travel of said blanks, a glue applicator roller fixed to the free end of one of said shaft extensions and presenting a raised peripheral glue applying section positioned between the adjacent vertical guiding surface and the adjacent blank supporting member, means supported by said

cage structure for rotatably supporting said glue applicator shaft, and a blank pressure wheel rotatably supported from the free end of said other shaft extension in aligned relation to said glue applicator roller and designed to maintain that portion of the blank advancing therebetween in glue transfer contact with the raised section of said glue applicator roller, said pressure wheel having a pair of circular pressure discs each presenting a relatively thin pressure applying periphery whose outer faces are positioned closely adjacent to but within the plane of the side faces of the raised peripheral section of the glue applicator roller.

2. Blank gluing apparatus including in combination, a supporting framework, a pair of spaced channel members extending longitudinally of the framework whose flanges present coplanar blank supporting surfaces on which a series of blanks may be slidably supported, a pair of continuously driven conveyors traveling in said channel members and together presenting transversely aligning lugs designed to engage the rear edge of successive blanks and advance the blanks longitudinally along the slide surfaces of said channel members, means presenting a pair of vertical guide surfaces designed to have sliding contact with the opposite ends of the advancing blanks and positioned to cooperate with said advancing lugs to maintain the blanks advanced thereby in accurately spaced and longitudinally aligned relation, supporting means mounted on said framework and extending transversely with respect to said blank supporting members and projecting laterally beyond the adjacent vertical guide surface, and a blank gluing mechanism removable as an integrated unit from said supporting framework which includes a cage structure mounted on said supporting means and positioned at one side of the path of travel of the blanks and exterior to the adjacent vertical blank guiding surface, a pair of transversely extending shafts mounted on said cage structure, said shafts presenting end extensions projecting from said cage structure and straddling the adjacent vertical guide surface with the free ends thereof positioned above and below the path of travel of said blanks, a glue applicator roller fixed to the free end of one of said shaft extensions and presenting a raised peripheral glue applying section positioned between the adjacent vertical guiding surface and the adjacent blank supporting channel member, means mounted on said cage structure for rotatably supporting said glue applicator shaft, and a blank pressure wheel rotatably supported from the free end of said other shaft extension and positioned in aligned relation to said glue applicator roller and designed to maintain that portion of the blank advancing therebetween in glue transfer contact with the raised section of said glue applicator roller.

3. Blank gluing apparatus including in combination, a supporting framework, a pair of spaced channel members extending longitudinally of the framework whose flanges present coplanar blank supporting surfaces on which a series of blanks may be slidably supported, a pair of continuously driven conveyors traveling in said channel members and together presenting transversely aligning lugs designed to engage the rear edge of successive blanks and advance the blanks longitudinally along the slide surfaces of said channel members, means presenting a pair of vertical guide surfaces designed to have sliding contact with the opposite ends of the advancing blanks and positioned to cooperate with said advancing lugs to maintain the blanks advanced thereby in accurately spaced and longitudinally aligned relation, a supporting means mounted on said framework and extending transversely with respect to said blank supporting members and projecting laterally beyond the adjacent vertical guide surface, and a blank gluing mechanism removable as an integrated unit from said supporting framework which includes, a cage structure mounted on said supporting means and positioned at one side of the path of

11

travel of the blanks and exterior to the adjacent vertical blank guiding surface, a pair of transversely extending shafts mounted on said cage structure, said shafts presenting end extensions projecting from said cage structure and straddling the adjacent vertical guide surface with the free ends thereof positioned above and below the path of travel of said blanks, a glue applicator roller fixed to the free end of one of said shaft extensions and presenting a raised peripheral glue applying section positioned between the adjacent vertical guiding surface and the adjacent blank supporting channel member, means mounted on said cage structure for rotatably supporting said glue applicator shaft, and a blank pressure wheel rotatably supported from the free end of said other shaft extension and positioned in aligned relation to said glue applicator roller and designed to maintain that portion of the blank advancing therebetween in glue transfer contact with the raised section of said glue applicator roller, and a separately driven secondary conveyor positioned adjacent the discharge end of said first conveyor and operative to receive and advance the glued blanks discharged thereon by said first conveyor.

4. Blank gluing apparatus including in combination, a supporting framework, a plurality of spaced members extending longitudinally of the framework and presenting coplanar blank supporting surfaces on which a series of blanks may be slidably supported, a pair of continuously driven conveyors presenting transversely aligned lugs positioned between the slide surfaces of said members and designed to engage the rear edge of successive blanks and advance the blanks longitudinally along said members, means presenting a pair of vertical guide surfaces designed to have sliding contact with the opposite ends of the advancing blanks and positioned to cooperate with said advancing lugs to maintain the blanks advanced thereby in accurately spaced and longitudinally aligned relation, supporting rails mounted on said framework and extending transversely with respect to said blank supporting members and projecting laterally beyond the adjacent vertical guide surface, and a blank gluing mechanism removable as an integrated unit from said supporting framework which includes, a cage structure removably mounted on said supporting rails and positioned at one side of the path of travel of the blanks and at the exterior side of one of said vertical blank guiding surfaces, a glue applicator supporting shaft and a pressure roller supporting shaft extending transversely to the direction of blank advance and mounted on said cage structure, said shafts presenting end extensions projecting from said cage structure and straddling the adjacent vertical guide surface with the free ends thereof positioned above and below the path of travel of said blanks, a glue applicator roller fixed to the free end of said applicator shaft extension and presenting a raised peripheral glue applying section positioned between the adjacent vertical guiding surface and the adjacent blank supporting member, bearing members contained within and fixed to said cage structure for rotatably supporting said glue applicator shaft, means for driving said glue applicator shaft, a blank pressure roller rotatably supported from the free end of said pressure roller shaft extension in aligned relation to said glue applicator roller and designed to maintain that portion of the blank advancing therebetween in glue transfer contact with the raised section of said glue applicator roller, foot brackets attached to the exterior of said cage structure, means for detachably and adjustably securing said foot brackets to said transverse rails, and a glue pan positioned below said glue applicator roller and removably suspended from said cage structure.

5. Blank gluing apparatus including in combination, a supporting framework, a plurality of spaced members extending longitudinally of the framework and presenting coplanar blank supporting surfaces on which a series of blanks may be slidably supported, a pair of continu-

12

ously driven conveyors presenting transversely aligned lugs positioned between the slide surfaces of said members and designed to engage the rear edge of successive blanks and advance the blanks longitudinally along said members, means presenting a pair of vertical guide surfaces designed to have sliding contact with the opposite ends of the advancing blanks and positioned to cooperate with said advancing lugs to maintain the blanks advanced thereby in accurately spaced and longitudinally aligned relation, supporting rails mounted on said framework and extending transversely with respect to said blank supporting members and projecting laterally beyond the adjacent vertical guide surface, and a blank gluing mechanism removable as an integrated unit from said supporting framework which includes, a cage structure removably mounted on said supporting rails and positioned at one side of the path of travel of the blanks and at the exterior side of one of said vertical blank guiding surfaces, a glue applicator supporting shaft and a pressure roller supporting shaft extending transversely to the direction of blank advance and mounted on said cage structure, said shafts presenting end extensions projecting from said cage structure and straddling the adjacent vertical guide surface with the free ends thereof positioned above and below the path of travel of said blanks, a glue applicator roller fixed to the free end of said applicator shaft extension and presenting a raised peripheral glue applying section positioned between the adjacent vertical guiding surface and the adjacent blank supporting member, bearing members contained within and fixed to said cage structure for rotatably supporting said glue applicator shaft, a blank pressure roller rotatably supported from the free end of said pressure roller shaft extension in aligned relation to said glue applicator roller and designed to maintain that portion of the blank advancing therebetween in glue transfer contact with the raised section of said glue applicator roller, a glue transfer roller positioned exteriorly of said cage structure and in contact alignment with said glue applicator roller, said glue transfer roller being removably secured to the free end of the shaft extension of a transfer roller shaft which extends into said cage structure through one of its side walls, second bearing members within said cage structure rotatably supporting said transfer roller shaft, a driving connection between said glue applicator shaft and transfer roller shaft and contained in said cage structure, means for driving one of said shafts, foot brackets attached to the exterior of said cage structure, and means for detachably and adjustably securing said foot brackets to said transverse rails.

6. In combination with a continuously driven blank conveyor supported by a framework having spaced means for slidably supporting and guiding the blanks in uniformly spaced and longitudinally aligned relation during continuous advance thereof, of a completely integrated glue applying unit designed to be attachably and detachably mounted as a unit on the supporting framework in operative gluing position with respect to the blanks as advanced by said conveyor, said glue applying unit including a cage structure presenting a pair of side walls and a rear wall, a glue applicator roller positioned outside of said cage structure and detachably secured to the end extension of a supporting shaft which extends into said cage structure through one of its side walls, bearing members rotatably supporting said shaft and contained within and fixed to said cage structure, a glue transfer roller positioned exteriorly of said cage structure and in contact alignment with said glue applicator roller, said glue transfer roller being removably secured to the end extension of a second shaft extending into said cage structure through one of its side walls, second bearing members within said cage structure rotatably supporting said second shaft, said second bearing members being adjustably supported from the side walls of the cage, means exterior of the cage for adjusting said second bearing members to

13

thereby adjustably maintain the periphery of said transfer roller in glue transfer contact with said glue applicator roller, a driving connection between said first and second shafts and contained in said cage structure, means for driving one of said shafts, foot brackets attached to the exterior of said cage structure, means for detachably and adjustably securing said foot brackets to the supporting framework of the conveyor, and a glue pan positioned below said glue transfer roller and removably suspended from said cage structure.

7. In combination with a continuously driven blank conveyor supported by a framework having spaced means for slidably supporting and guiding the blanks in uniformly spaced and longitudinally aligned relation during continuous advance thereof, of a completely integrated glue applying unit designed to be attachably and detachably mounted as a unit on the supporting framework in operative gluing position with respect to the blanks as advanced by said conveyor, said glue applying unit including a cage structure presenting a pair of side walls and a rear wall, a glue applicator roller positioned outside of said cage structure and detachably secured to the end extension of a supporting shaft which extends into said cage structure through one of its side walls, bearing members rotatably supporting said shaft and contained within and fixed to said cage structure, a glue transfer roller positioned exteriorly of said cage structure and in contact alignment with said glue applicator roller, said glue transfer roller being removably secured to the end extension of a second shaft extending into said cage structure through one of its side walls, second bearing members within said cage structure rotatably supporting said second shaft, said second bearing members being adjustably supported from the side walls of the cage, means exterior of the cage for adjusting said second bearing members to thereby adjustably maintain the periphery of said transfer roller in glue transfer contact with said glue applicator roller, a driving connection between said first and second shafts and contained in said cage structure, a blank pressure wheel positioned outside of said cage structure and in aligned relation to said glue applicator roller, a rocker arm rotatably supporting said blank pressure wheel, a rocker shaft having an end extension fixed to said rocker arm and rotatably supported by said cage structure, means for rotating said applicator roller shaft, foot brackets attached to the exterior of said cage structure, means for detachably and adjustably securing said foot brackets to said conveyor framework, and a glue pan positioned below said glue applicator roller and removably suspended from said cage structure.

8. In combination with a continuously driven blank conveyor supported by a framework having spaced means for slidably supporting and guiding the blanks in uniformly spaced and longitudinally aligned relation during continuous advance thereof, of a completely integrated glue applying unit designed to be attachably and detachably mounted as a unit on the supporting framework in operative gluing position with respect to the blanks as advanced by said conveyor, said glue applying unit including a cage structure presenting a pair of side walls and a rear wall, a glue applicator roller positioned outside of said cage structure and detachably secured to the end extension of a supporting shaft which extends into said cage structure through one of its side walls, bearing members rotatably supporting said shaft and contained within and fixed to said cage structure, a glue transfer roller positioned exteriorly of said cage structure and in contact alignment with said glue applicator roller, said glue transfer roller being removably secured to the end extension of a second shaft extending into said cage structure through one of its side walls, second bearing members within said cage structure rotatably supporting said second shaft, said second bearing members being adjustably supported from the side walls of the cage, means exterior of the cage for adjusting said second bearing members to

14

thereby adjustably maintain the periphery of said transfer roller in glue transfer contact with said glue applicator roller, a driving connection between said first and second shafts and contained in said cage structure, a glue pan removably suspended from said cage structure, said glue pan presenting a raised inlet neck at one end thereof and a raised outlet neck at the other end thereof, a removable glue supply spout adjustably supported by said cage structure and having the discharge end thereof extending into the raised inlet neck of said glue pan, said glue transfer roller having a peripheral portion thereof extending into said raised outlet neck for transferring glue from said raised outlet neck to said glue applicator roller.

9. A glue applying mechanism constructed as a self-contained and fully integrated glue applying unit including a cage structure presenting a pair of side walls and a rear wall, a glue applicator roller positioned outside of said cage structure and detachably secured to the end extension of a supporting shaft projecting into said cage structure through one of its side walls, bearing members rotatably supporting said shaft and contained within and fixed to said cage structure, a blank pressure wheel positioned outside of said cage structure and in aligned relation to said glue applicator roller, a rocker arm rotatably supporting said blank pressure wheel, a rocker shaft having an end extension fixed to said rocker arm and rockably supported by said cage structure, a glue transfer roller positioned exteriorly of said cage structure and in contact alignment with said glue applicator roller, said glue transfer roller being removably secured to the end extension of a second shaft projecting into said cage structure through one of its side walls, second bearing members within said cage structure rotatably supporting said second shaft, said second bearing members being adjustably supported from the side walls of the cage structure, means exterior of the cage structure for adjusting said second bearing members to thereby maintain the periphery of said transfer roller in glue transfer contact with said glue applicator roller, a driving connection between said first and second rotating shafts contained in said cage structure, and means for rotating said shafts.

10. A glue applying mechanism constructed as a self-contained and fully integrated glue applying unit including, a cage structure presenting a pair of side walls and a rear wall, a glue applicator roller positioned outside of said cage structure and detachably secured to the end extension of a supporting shaft projecting into said cage structure through one of its side walls, bearing members rotatably supporting said shaft and contained within and fixed to said cage structure, a blank pressure wheel positioned outside of said cage structure and in aligned relation to said glue applicator roller, a rocker arm rotatably supporting said blank pressure wheel, a rocker shaft having an end extension fixed to said rocker arm and rockably supported by said cage structure, a glue transfer roller positioned exteriorly of said cage structure and in contact alignment with said glue applicator roller, said glue transfer roller being removably secured to the end extension of a second shaft projecting into said cage structure through one of its side walls, second bearing members contained within said cage structure and rotatably supporting said second shaft, said second bearing members being adjustably supported from the side walls of the cage structure, means exterior of the cage rear wall for adjusting said bearing members to thereby maintain the periphery of said transfer roller in glue transfer contact with said glue applicator roller, a driving connection between said first and second rotatable shafts contained in said cage structure, means for rotating said first and second shafts, a glue pan removably suspended from said cage structure, said glue pan presenting a raised inlet neck at one end thereof and a raised outlet neck at the other end thereof, and a glue supply spout adjustably supported by said cage structure and having the discharge end thereof extending into the raised inlet neck of said glue

15

pan, said raised outlet neck being positioned to receive a peripheral section of said glue transfer roller.

References Cited in the file of this patent

UNITED STATES PATENTS

509,213	Friedlander	Nov. 21, 1893	1,939,359
596,564	Allen	Jan. 4, 1898	1,996,067
1,127,538	Staude	Feb. 9, 1915	2,000,325
1,672,842	Wagner et al.	June 5, 1928	2,186,977
1,757,180	Erickson	May 6, 1930	2,195,670
1,804,365	Price	May 5, 1931	2,288,720

5

10

16

Nelson	Dec. 12, 1933
Hadaway	Apr. 2, 1935
Ford et al.	May 7, 1935
Knowlton	Jan. 16, 1940
Ferngren	Apr. 2, 1940
Knowlton	July 7, 1942
Thomas	Mar. 20, 1951
Conti	Oct. 16, 1951
Miller	June 17, 1952
Zinn	Sept. 8, 1953
Burke et al.	Apr. 6, 1954