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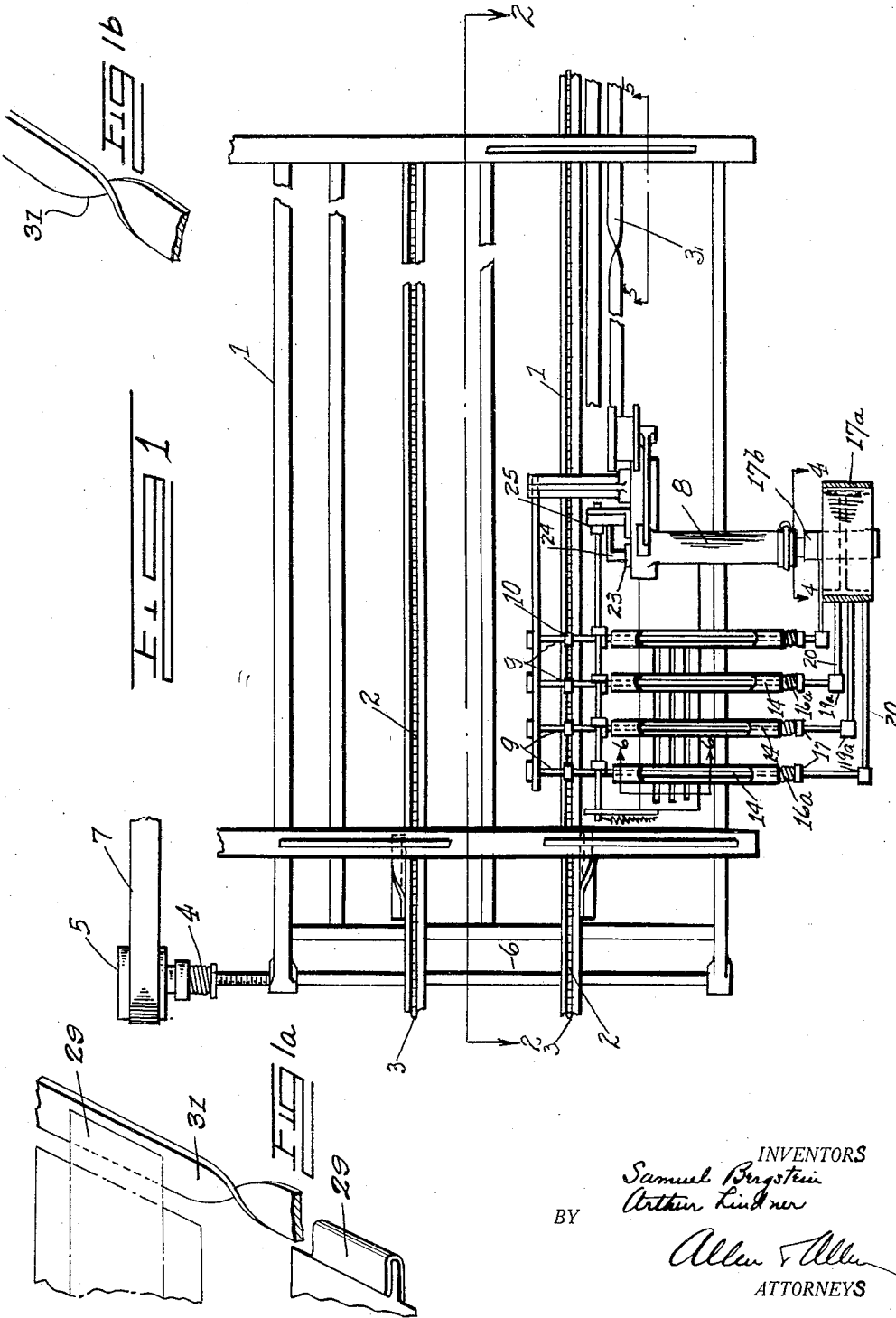
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WORK FEEDING MECHANISM FOR STITCHING MACHINES

Filed Oct. 8, 1926

5 Sheets-Sheet 1



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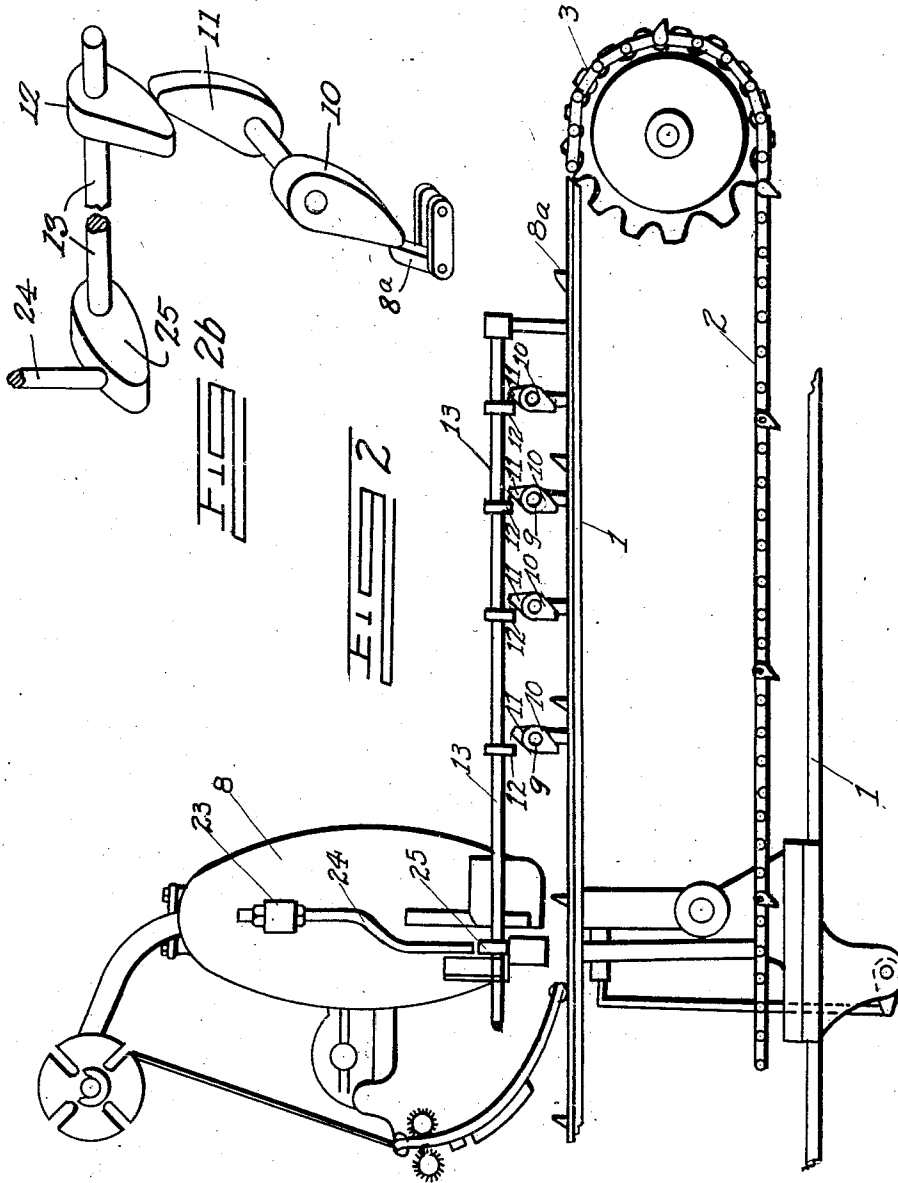
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WORK FEEDING MECHANISM FOR STITCHING MACHINES

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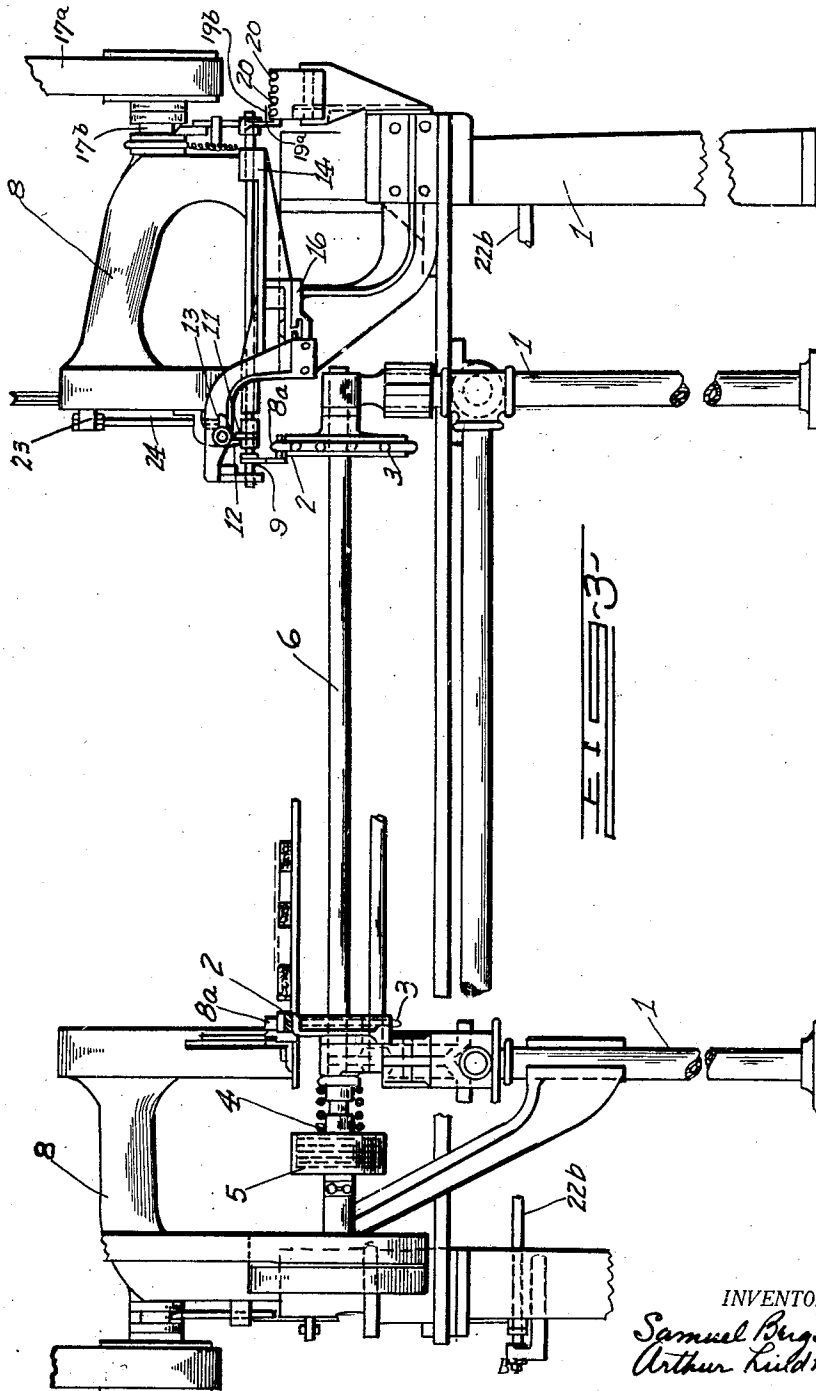
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WORK FEEDING MECHANISM FOR STITCHING MACHINES

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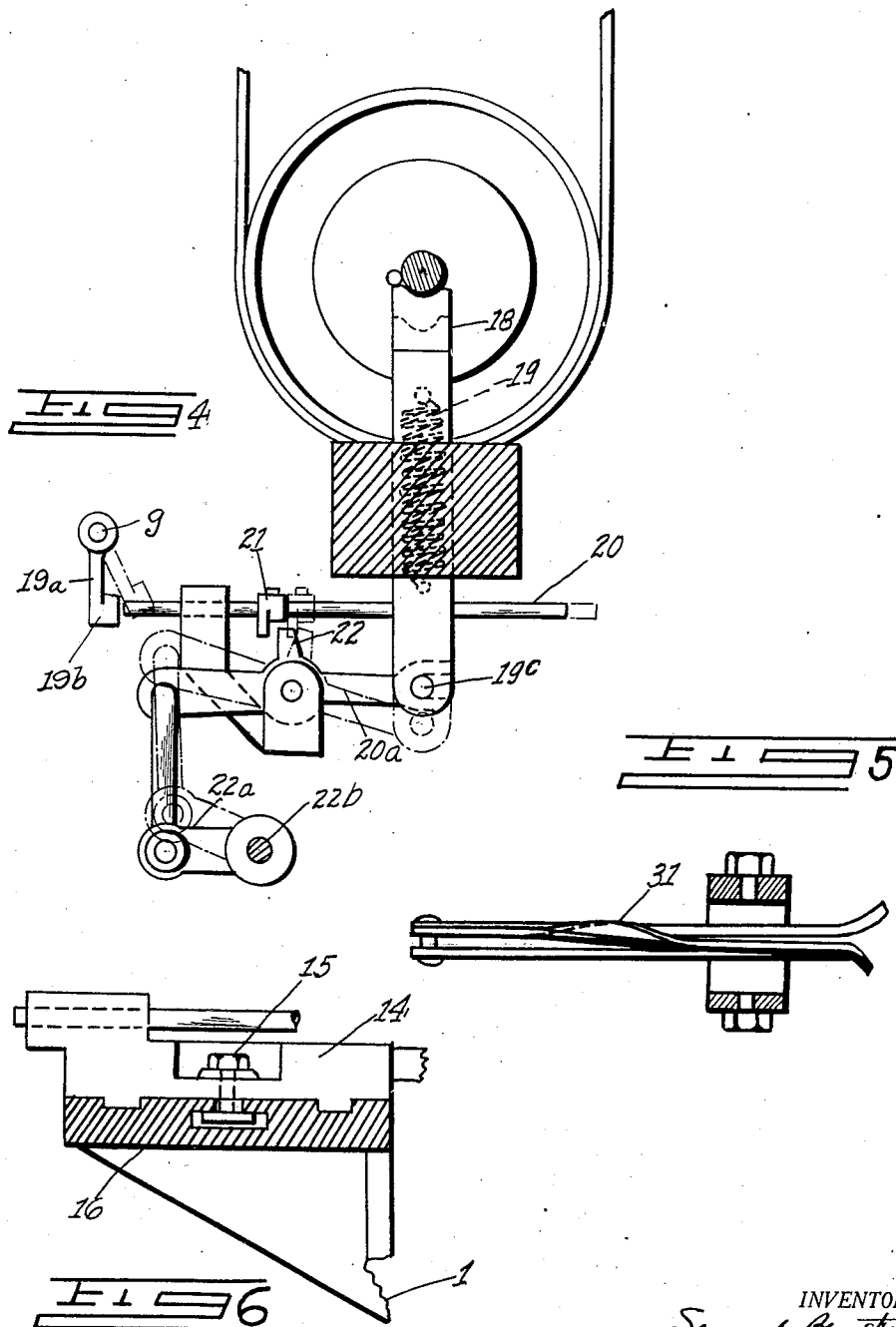
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WORK FEEDING MECHANISM FOR STITCHING MACHINES

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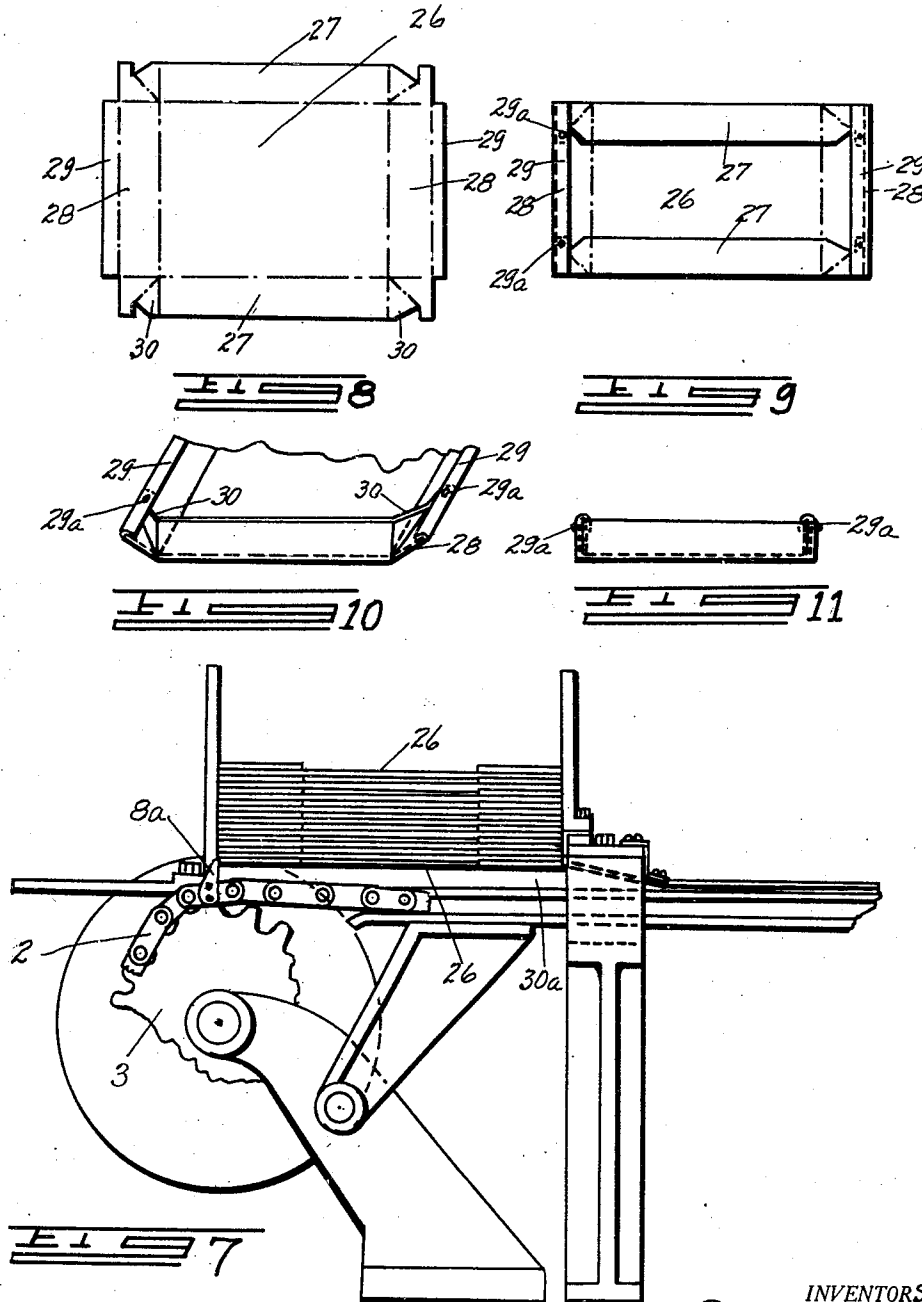
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WORK FEEDING MECHANISM FOR STITCHING MACHINES

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5 Sheets-Sheet 5



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UNITED STATES PATENT OFFICE.

SAMUEL BERGSTEIN, OF CINCINNATI, AND ARTHUR LINDNER, OF MIDDLETOWN, OHIO, ASSIGNORS TO THE INTERSTATE FOLDING BOX COMPANY, OF MIDDLETOWN, OHIO, A CORPORATION OF OHIO.

WORK-FEEDING MECHANISM FOR STITCHING MACHINES.

Application filed October 8, 1926. Serial No. 140,410.

Our invention relates to work feeding mechanism in general and particularly to work feeding mechanism associated with stitching machine units by which paper containers to be stitched may be automatically carried and supported in work stitching position.

There are many types of containers in which closures are made most satisfactorily by stitching with wire, and stitching machines have been quite generally used for this purpose. Most stitching work has been done by manually feeding the containers into stitching position, inserting a stitch or a series of stitches and then manually moving the cartons or boxes for positioning the subsequent stitches in other positions thereon.

It is the object of our invention to provide in combination with an endless belt conveyor preferably of the link chain type for mechanism which will be readily adjustable for different sizes of containers which will enable the accurate positioning of a stitch or an interspaced series of stitches in a successive line of containers which are carried by the conveyor, one following the other. When the machine is once adjusted, a series of containers may be automatically fed to the conveyor and the mechanism will automatically stop the conveyor as each container comes into proper position for inserting a stitch. The machine which we have disclosed herein has been found to have a capacity for stitching containers at a rate which would replace the hand stitching of at least ten operators so that it represents a development in the art of considerable importance.

Referring to the drawings in which we have illustrated a preferred assembly in which one stitching machine is shown;

Figure 1 is a plan view of the assembly with parts not specifically relating to our invention, not shown for purposes of clearness.

Figure 1^a is a detail of the turn over plate mechanism. Figure 1^b is a detail of one of the turn over plates.

Figure 2 is a longitudinal vertical section taken along the lines 2—2 of Figure 1 showing the automatic stopping and releasing mechanism associated with the wire stitching machine in side elevation.

Figure 2^b shows the parts composing the tripping mechanism.

Figure 3 is an end elevation from the discharging end of the machine with portions of the mechanism not shown which do not relate essentially to the inventive features of our assembly.

Figure 4 is a vertical section along the lines 4—4 in Figure 1.

Figure 5 is a vertical section along the lines 5—5 in Figure 1 showing the turn over guide for bending a flap of a carton into position to be stitched.

Figure 6 is a lateral vertical section along the lines 6—6 in Figure 1.

Figure 7 is a detail side elevation of our preferred type of assembly for automatically delivering containers to the endless chain belts. This view is a modification not shown in any of the other figures.

Figure 8 is a plan view of the blank for which the machine, as shown, is set up.

Figure 9 is a plan view of the blank shown in Figure 8 with the longitudinal flaps bent up into partially assembled position.

Figure 10 is a perspective view of the blank showing the position of a container with the side edges partially interlocked after the retaining stitch has been inserted.

Figure 11 is an end elevation of the container after being stitched and set up.

Generally indicated at 1 is the supporting frame of the machine on which are a pair of endless chains 2 which are driven from sprockets 3, mounted on a shaft suitably journaled in the supporting frame. It is essential for the operation of our automatic stopping and starting mechanism that a driving member for driving the sprockets be provided which can be stopped without danger of injury to the driving mechanism. Such a friction clutch is indicated at 4 and through the medium of this clutch the rotary movement of the pulley 5 is applied to the shaft 6 on which the driving sprockets are mounted. The pulley 5 may be operated by means of a belt 7 driven from some convenient source of power as an electric motor. The particular type of clutch which we prefer to use is known in the trade as a fibre disc friction clutch, and as it forms no part of our invention further explanation of its operation is not thought to be necessary.

Mounted on the frame 1 in such position that its stitching portion is suitably aligned with reference to the chain conveyor we have shown one stitching machine 8 which may be of any desired type. In the drawings, in Figures 1 and 2, we have shown only one stitching machine for purposes of clearness, but it should be understood that we contemplate an assembly with at least two stitching machines set in opposite relation so that opposite edges of a container may be stitched coincidentally. Portions of a second stitcher are shown in Figure 3. Our automatic stopping and starting mechanism need not be provided in duplicate as the control for the starting and stopping may be governed from one set of parts as will be hereinafter explained.

The principle of operation which we prefer to adopt is as follows. We feed containers to be stitched singly onto the chain conveyor. The chain conveyor has lugs projecting therefrom which when met by a blocking engagement will check and stop the movement of the conveyor. As the driving clutch for the conveyor will stop without danger of injury from overheating we have but to stop the conveyor with the container on it in proper position with relation to the stitcher and connect the stopping mechanism with the starting mechanism of the stitcher and our primary purpose is accomplished. In order to control the extent of the stitching however, and as we only usually desire to insert one stitch in one position on the container we also provide mechanism operated by the stitcher which will, toward the end of one stroke or at the end of predetermined number of strokes, automatically release the blocking means which is holding the conveyor, and the driving clutch will immediately take hold and move the container to its next stitching position where the conveyor will again be blocked.

The conveyor is provided with lugs 8^a which may be disposed about the chains in any desired interspaced arrangement depending on the size of the containers to be stitched. Disposed in the path of the lugs we have provided a plurality of shafts 9 each one of which has cam shaped fingers 10 and 11 on its ends in vertical alignment with the lugs 8^a of the chain. When a lug on the chain engages a finger 10 the shaft 9 rotates and causes the other finger 11 to come in contact with the cam 12 which is the means for stopping the longitudinal movement of the chain conveyor. The chain conveyor will not be free to move forward until the trip rod 24 comes in contact with the release cam 25 which rotates the shaft 13 and the cam 12 mounted thereon. Rotation of the shaft 13 moves the cam 12 out of engagement with the finger 11 which in turn leaves the finger 10 free to rotate so that the

lug 8^a can move forward with the chain and bring another carton into stitching position. When the cams 12 are moved in a clockwise direction as viewed from the delivery end of the machine, the shafts 9 will be free to turn in a counter-clockwise direction as shown in Figure 2. This will release the engagement of the particular lug which is blocking the movement of the conveyor and the conveyor will again move on. It should be understood that the blocking operation of the shafts 9 never occurs conjointly as no two fingers 10 are ever engaged at the same interval by the same lug. Each of the plurality of shafts is mounted in an adjustable bearing block 14. The blocks have adjustment bolts 15 which engage T slots in a base plate 16 mounted on the machine frame. The preferred structure is clearly shown in Figure 6, and referring to Figure 1, it will be apparent that the shafts 9 may be set with any desired interspacing between them. The bearing blocks 14 have coiled torsion springs 16^a secured thereto which springs engage flanges 17 on the respective shafts 9 and thus tend to resiliently hold the fingers 10 in chain blocking position.

The stitcher which we have illustrated is driven by a belt 17^a which engages the stitcher drive shaft 17^b (Figure 3). For controlling the stitcher operation we have provided a trip clutch of well known design which is released for operation by means of a trip bar 18 normally held in inhibiting position by a spring 19. With the downward movement of the member 18, as shown in Figure 4, the clutch takes hold and the stitching machine is driven. Each one of the shafts 9 has a crank 19^a on the end opposite the cam finger 10 and bosses 19^b on these cranks engage links 20 on which links are mounted adjustable lugs 21. These lugs trip the stitching release mechanism and bring it to the position indicated by the dotted lines in Figure 4. The member 18 has a stud 19^c extending therefrom which is engaged by a yoked end of a rocker arm 20^c. The rocker arm has a projecting finger 22, which, with movement of a lug 21 and prior to the blocking of the cam 11, rocks the rocker in a clockwise direction and so lowers the trip bar 18 which will release the trip finger and start the stitching machine. By extending the rocker arm 20^a and linking a crank arm 22^a thereto a control shaft 22^b may be extended across the frame of the machine to control the operation of another stitching machine.

The head of the stitching machine indicated at 23 carries with it an arm 24 which near the lowermost portion of the stroke of the head or during its downward travel bears against a cam 25 mounted on the longitudinally extending shaft 13. Thus a cycle of operation consists in a lug 8^a on the chain

striking a cam 10. A shaft 9 will be rocked a partial revolution in a counter-clockwise direction as shown in Figure 2 until the respective cam 11 on the shaft 9 bears against its respective cam 12 on the shaft 13. Prior to the blocking of the shaft 9 its rotation will rock the crank 19^a and its respective link 20, which will cause the clutch rocker 20^a to be moved and the stitching machine started in operation. Before it has completed its stitching stroke however, the arm 24 has engaged the cam 25 on the shaft 13 and released the cams 11 and the fingers 10 from engagement with the lug of the chain. The lug of the chain being released, the conveyor moves to the next position where a cam finger 10 on another shaft 9 is set for blocking the further movement of the conveyor. It will be apparent that with the plurality of shafts 9 which are provided and with the wide range of adjustability which the bearing blocks 14 of the shafts 9 have, that single stitches may be inserted in a container carried by the conveyor in a wide range of predetermined positions.

The machine which we have shown is particularly designed for inserting a single stitch in each of two positions in a folded over flap of an open top container. The blank from which the open top container is made is shown at 26. There are longitudinal flaps 27 integrally secured to end flaps 28. The end flaps have extensions 29 which are folded in and stitched, as indicated at 29^a, after the longitudinal flaps have been folded in. The container is then bent with the flaps extending at right angles to the main body of the container and the connecting flaps 30 which connect the side and end flaps are tucked in between the end flaps and the stitched extensions 29 so that the container will be permanently in position for use. Of course with this type of container two parts of similar structure are made which interlock by means of the engagement of the flaps.

For handling the type of container referred to we have provided a supply compartment, as shown in Figure 7, consisting of blocks 30^a on which the ends of the containers rest one above another. Before inserting the stack of containers in the supply compartment, the longitudinal flaps are folded inwardly flatwise with the bodies of the containers. The lugs 8^a engage the edge of the bottom container only and carry the container along on the chain from left to right as indicated in Figure 1. The outer extension flaps 29, during their movement on the conveyor, engage a turn over plate 31 as shown in Figure 5, which folds over the extension 29 flatwise with the body of the container in which position the stitches are inserted. Two of the shafts 9 are so set that as the doubled over extensions of the

container move under the stitching portion of the stitching machine, the conveyor is stopped, then allowed to move and then stopped again, and a stitch is inserted in the desired position, in each of the two positions in the container which it is desired to reinforce.

It will be apparent that there are many different applications of the principle involved in our invention for stitching different types of containers than the specific type shown for purposes of illustration. Adjustments for inserting more than two stitches on each side of a container are provided in the plurality of shafts 9. We have shown only four shafts 9 but it should be understood that any desired number may be provided. It will also be within the scope of our invention to stitch different types of containers, cartons and paper receptacles by a similar process.

Having thus described our invention, what we claim as new and desire to secure by Letters Patent, is:—

1. In combination with a wire stitching machine, a continuously movable conveyor operated by impositive means for conveying articles to be stitched, means for controlling the movement of the conveyor by positively blocking the same while an article is being stitched, means for controlling the operation of the stitching machine to cause an operation thereof, and means connecting said last mentioned means with the means for controlling the movement of the conveyor.

2. In combination with a wire stitching machine, a conveyor for conveying articles to be stitched operated by impositive means, means for blocking the movement of the conveyor while an article is being stitched, means for controlling the operation of the stitching machine to cause an operation thereof, and means for connecting said conveyor blocking means and said means controlling the operation of the stitching machine.

3. In combination with a wire stitching machine, a conveyor for conveying articles to be stitched operated by impositive means, means for blocking the movement of the conveyor while an article is being stitched, means for controlling the operation of the stitching machine to cause an operation thereof, and means for connecting said conveyor blocking means and said means controlling the operation of the stitching machine, said impositive means comprising a friction clutch.

4. In combination with a wire stitching machine, a conveyor for conveying articles to be stitched operated by impositive means, means for intermittently blocking the movement of the conveyor while an article is being stitched in more than one position thereon, and means for controlling a se-

quence of operations of the stitching machine at intervals corresponding to the intermittent blocking operations, and means for connecting said intermittent blocking means and said stitching machine controlling means.

5. In combination with a wire stitching machine, a conveyor for conveying articles to be stitched operated by impositive means, means for intermittently blocking the movement of the conveyor while an article is being stitched in more than one position thereon, and means for controlling a sequence of operations of the stitching machine at intervals corresponding to the intermittent blocking operations, and means for connecting said intermittent blocking means and said stitching machine controlling means, said last mentioned means being adjustable for varying the intervals of opera-

tion of said stitching machine and said conveyor blocking means.

6. In combination with a wire stitching machine, a movable conveyor for conveying articles to be stitched having impositive driving means, means for intermittently blocking said conveyor while a series of stitches is inserted in spaced positions on one of said articles, means for controlling a sequence of operations of the stitching machine, and means operatively connected with said stitching machine for releasing said conveyor blocking means, said conveyor having a series of spaced lugs thereon, and said means for controlling the sequence of operations of said stitching machine comprising a series of movable members having portions disposed in the path of said lugs.

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