H. R. BLISS.

WIRE STITCHING MACHINE.

APPLICATION FILED SEPT. 24, 1921.

1,430,150.

Patented Sept. 26, 1922.

5 SHEETS—SHEET 1.

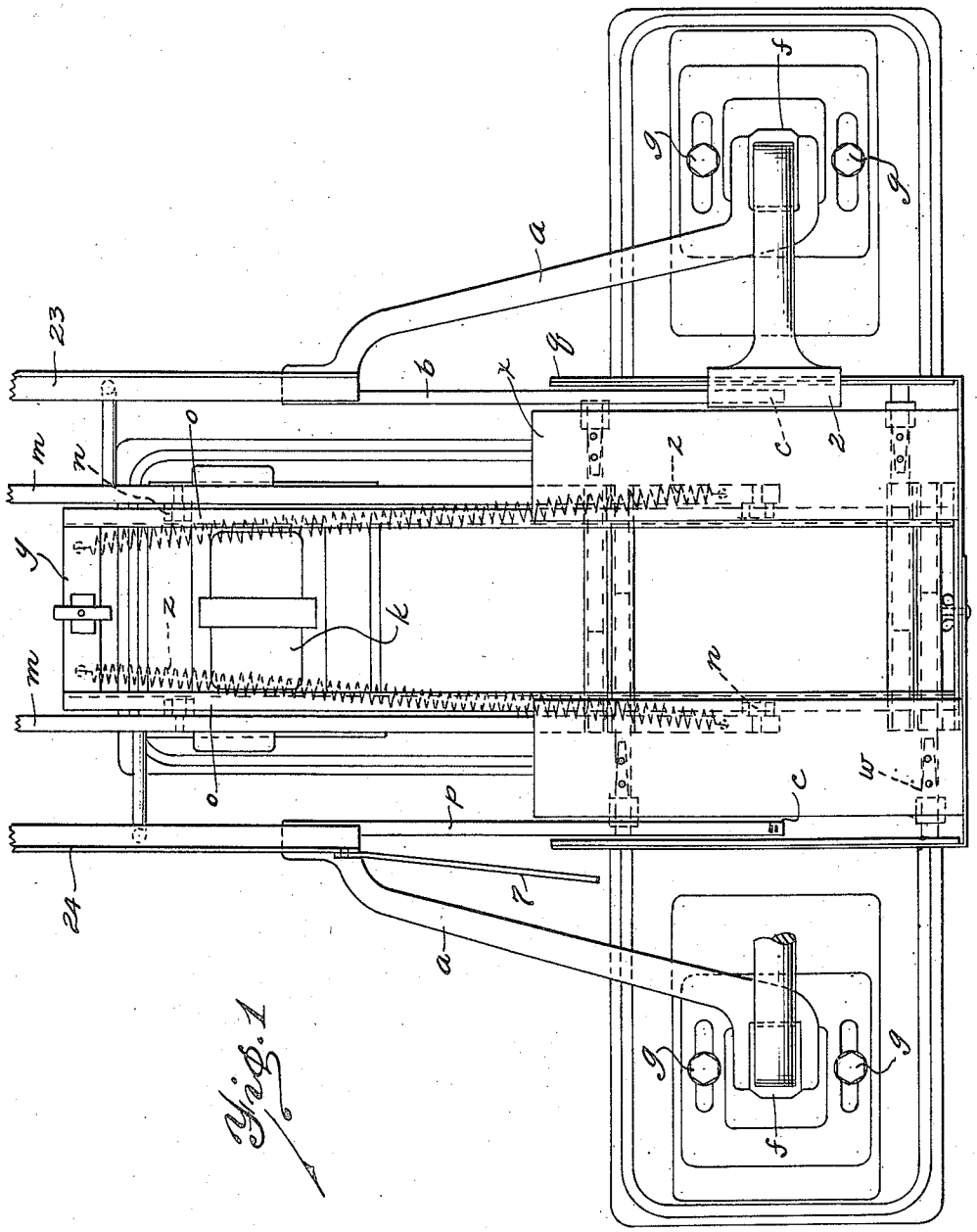


Fig. 1.

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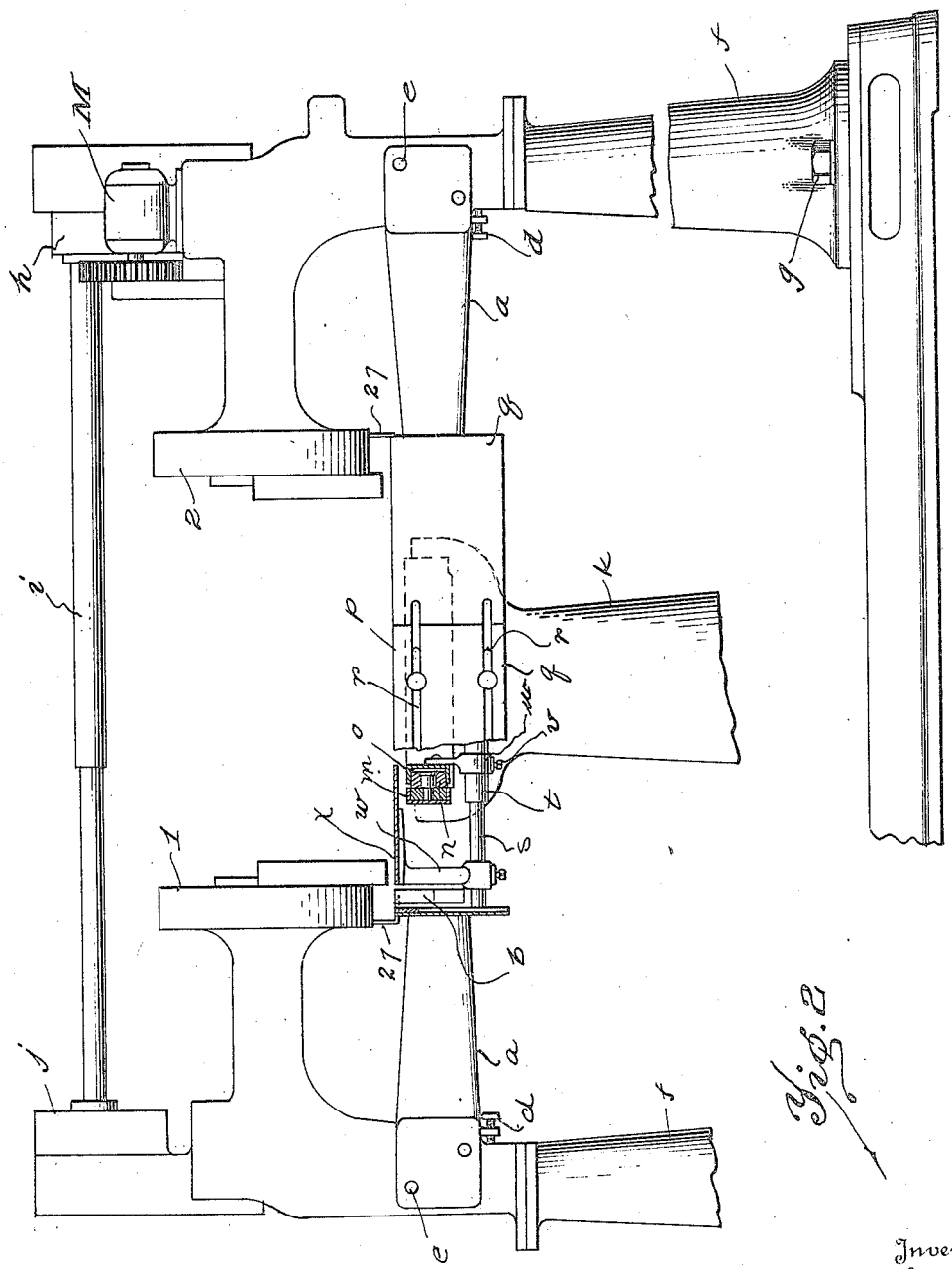


Fig. 2.

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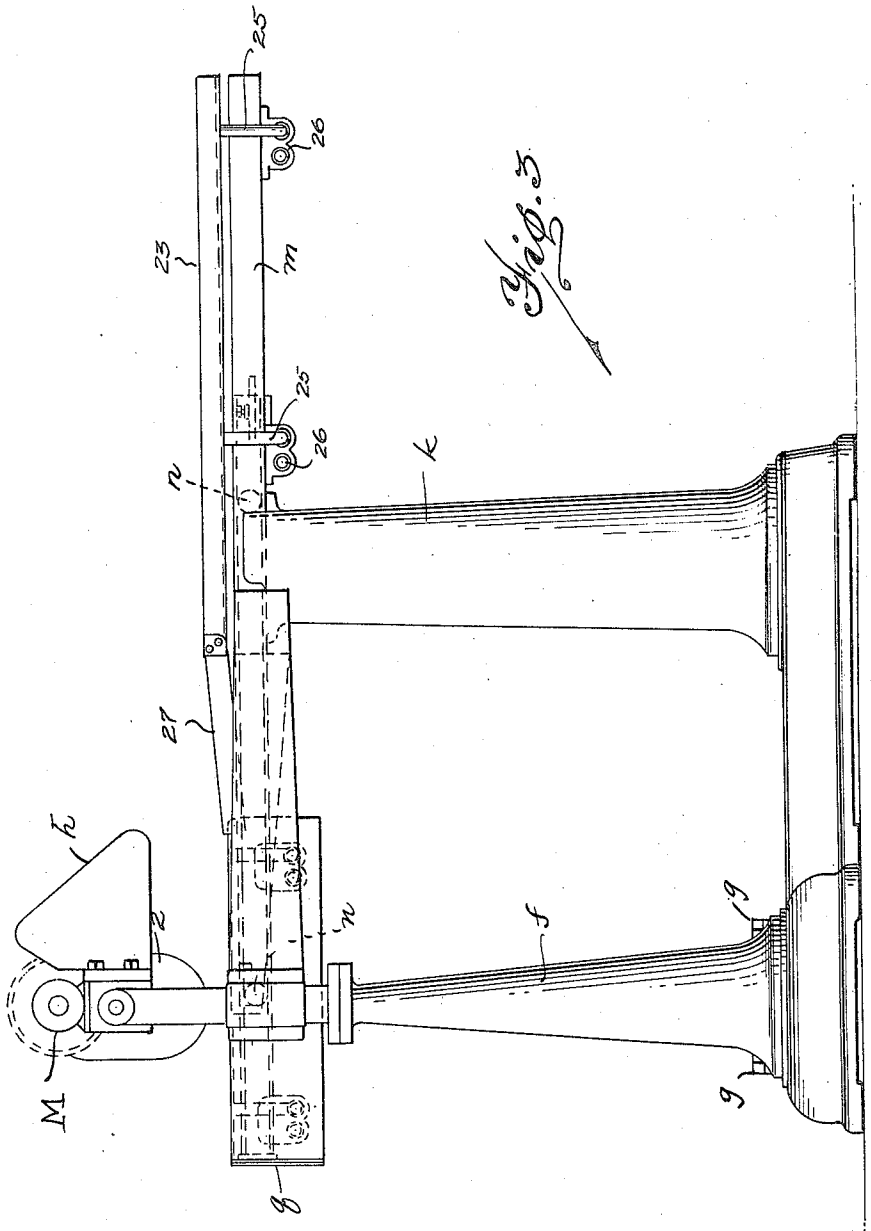


Fig. 5

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5 SHEETS—SHEET 4.

Fig. 4

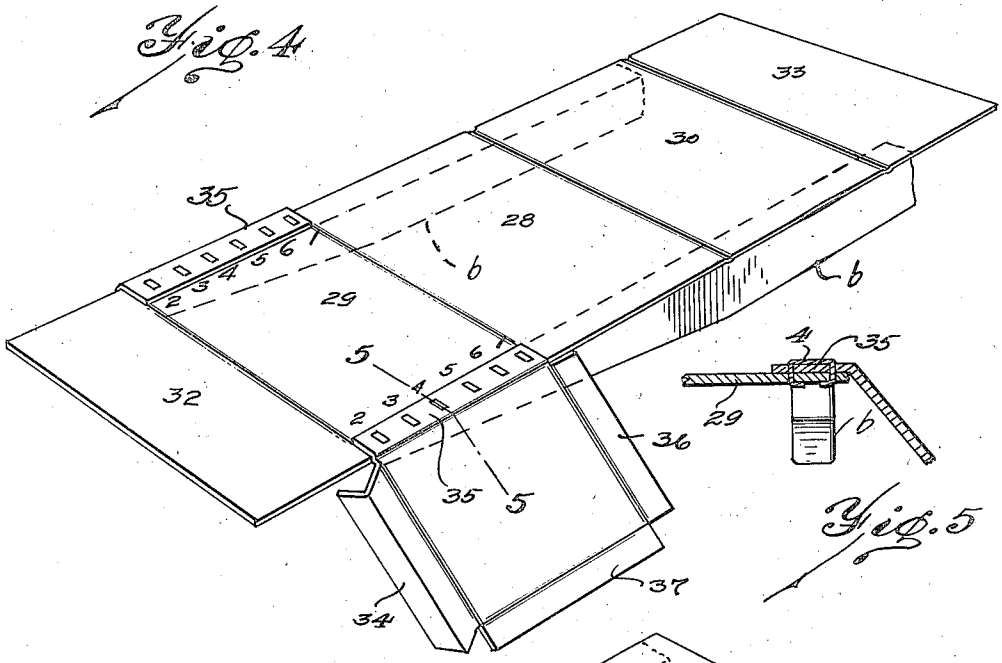


Fig. 5

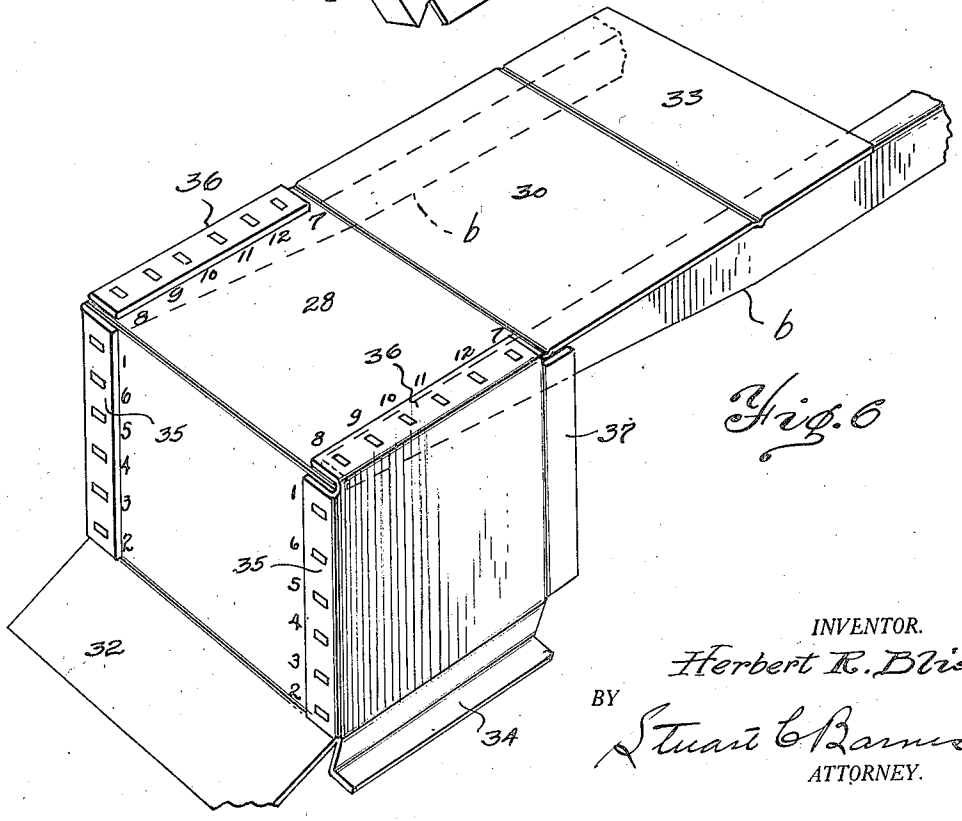


Fig. 6

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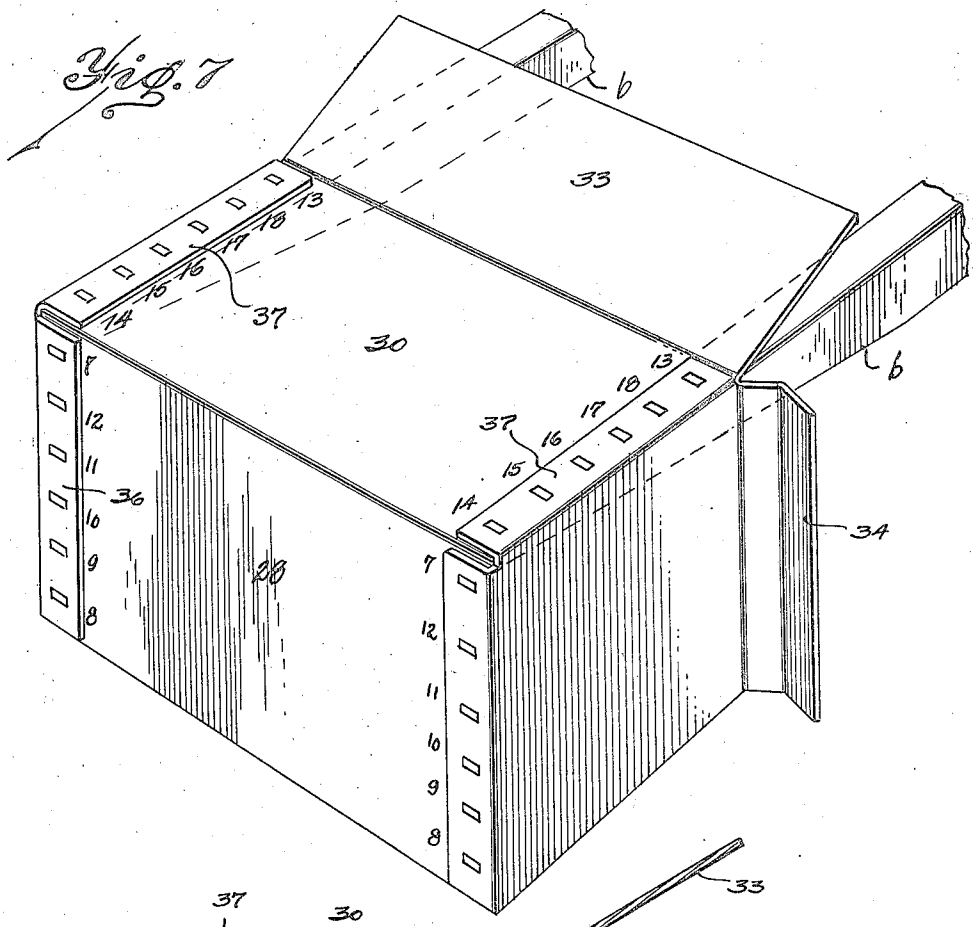
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5 SHEETS—SHEET 5.

Fig. 7



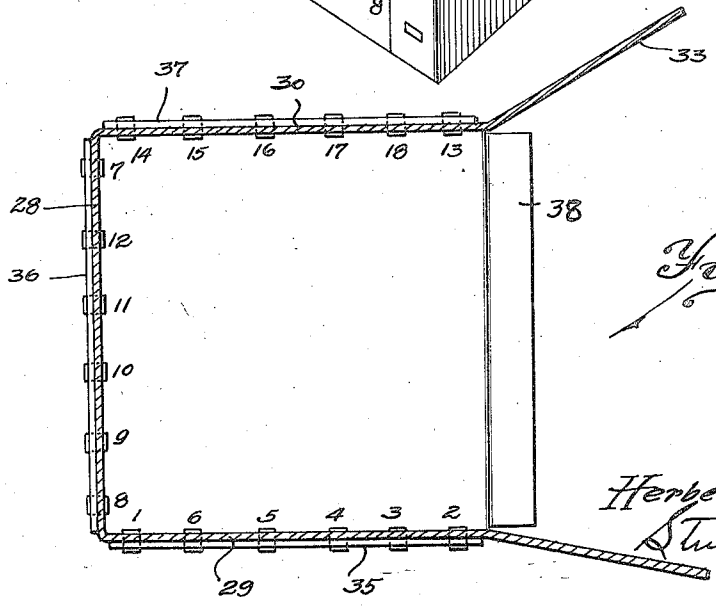


Fig. 8

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Patented Sept. 26, 1922. 1,430,150

UNITED STATES PATENT OFFICE.

HERBERT R. BLISS, OF NIAGARA FALLS, NEW YORK.

WIRE-STITCHING MACHINE.

Application filed September 24, 1921. Serial No. 502,966.

To all whom it may concern:

Be it known that I, HERBERT R. BLISS, a citizen of the United States, residing at Niagara Falls, in the county of Niagara and State of New York, have invented certain new and useful Improvements in Wire-Stitching Machines, of which the following is a specification.

This invention relates to wire stitching machines, and has for its object a wire stitching machine that is especially adapted for the making up of fiber shipping cases. It is the object of the present invention to provide a machine which can simultaneously handle both ends of the fiber shipping case.

Heretofore the prevailing fiber shipping case has been that known as the slotted container. This is a shipping case that is constructed of a single blank forming the four side walls. Each side wall has a flap on each end. These flaps when overlapped form the bottom and the top of the case. This is, however, a rather wasteful design considering the material used. The inner flaps are very much larger than need be. To cut down their width would not help in the saving of any material because the amount cut off would simply be wasted out of the sheet from which the blank is cut.

I have shown in some of the figures a very much superior shipping case from the standpoint both of economy and strength. This shipping case has a body which is constructed of a rectangular blank forming the two sides, bottom and the cover flaps. The ends are formed from separate blanks with shallow flaps that can be turned over or turned in. These flaps are wire-stitched to the main blank that forms the body of the case. This not only effects a considerable saving in material, something like from 15 to 20%, depending upon the length of the case to its breadth, but it affords a shipping case that has double strength along all the corners due to the reinforcement afforded by the shallow turned-over flaps.

This type of shipping case would not realize the economy inherent in the blanks were it not for the machine that I have designed which permits both ends of the shipping case to be stitched to the body blank at the same time. If the ends had to be separately stitched the economy in material would be practically offset by the increased labor cost in building the container. Furthermore, by stitching both ends simultaneously it is possible to complete the work on the case with a single type of anvil. If one end was completely stitched before the other end is begun, then it will be necessary to use both a horizontal and vertical anvil to complete the second end.

The distinct features of this machine are the two stitching heads synchronously operated, a special form of adjustable table by which the blanks may be correctly fed to the stitching heads, and an arrangement whereby both the stitching heads and the table may be adjusted to accommodate the mechanism to the length of the box to be worked upon. These and other features will be more thoroughly explained hereinafter.

In the drawings,—

Fig. 1 is a plan view of the machine.

Fig. 2 is a front elevation, fragmentary in character.

Fig. 3 is a side elevation.

Fig. 4 is a perspective showing how the first stitching operation is performed on the machine.

Fig. 5 is a section on the line 5—5 of Fig. 4.

Fig. 6 is another perspective showing the second stitching operation on the machine.

Fig. 7 is a still further perspective showing the third stitching operation.

Fig. 8 is a cross section showing the completed shipping case.

In a co-pending application I have claimed the new method involved in the operation of this machine and which is independent of the machine.

Now referring to Fig. 2, it will be seen that two stitching heads 1 and 2 are set facing each other. These stitching heads are common construction and are now to be had upon the market. It will be unnecessary to detail the operating parts that go to make up the stitching head as these may vary within wide limits. Suffice it to say that a flat copper wire is fed to the mechanism that suitably cuts it in given lengths and that a suitable hammer or driver drives this piece of wire formed in the shape of a staple down through the plies of fiber board and that an anvil clinches it on the under side. These anvils are carried on arms *a*, *a*. The anvils are designated *b* and are provided with clinching blocks *c*. The formation of the arm and the anvil is one of the features of this invention. The anvil is a horizontal one and the anvil and arm form in plan view

a relatively deep V with the base of the V extending rearwardly of the machine. This forms a relatively deep open space adapted to accommodate the work and at the same time permit the anvil to be hung from the pedestal that carries the stitching head. These arms *a* are hung on pivots *e* and are adjustable within given limits by the set screws *d*.

The stitching heads and anvils are all carried on the single main pedestals *f*. These are adjustable along the base of the machine by loosening the bolts *g* which run through slots in the base and this permits the pedestals and hence both the stitching heads and the anvils to be simultaneously moved toward or away from each other, affording a suitable adjustment for boxes of different lengths.

The stitching mechanism is driven by the motor M which through the transmission *h* and the telescoping shaft *i* drives the transmission contained in the transmission case *j*. This latter transmission through suitable connections drives the stitching head 1. This forms a positive operating connection from one head to the other and assures the two drivers being synchronously actuated. This is very important, as we shall see.

k is a pedestal supported at the rear of the base of the machine upon which is carried a pair of channel bars *m*, *m* which form the stationary frame of the machine. These channel bars *m*, *m* support blocks that journal rollers *n*. On these rollers are adapted to ride the channel bars *o* which form the skeleton frame of the sliding table *p*. This sliding table *p* includes a pair of angle strips *q* at the front which are adjustable by reason of the wing nut and bolt and the slots *r*, so that the angle strips or form plates may be moved further away or nearer to each other for the purpose of accommodating the form to the length of the case that is to be stitched upon the machine. These form plates are connected to the channel bars *o* by the rods *s* that telescope into the tubes *t*. The tubes *t* are adjustable in the hangers *w* when the set screw *v* is loosened. Supported upon the rods *s* are the supporting plates *x*. These supporting plates may be adjustable toward and away from each other to suit the conditions met with in different lengths of cases.

The channel bars *o* of the sliding table are at the extreme rear connected by the cross strip *y*. The springs *z* extend from this cross strip to near the forward ends of the stationary bars *m*. These are tension springs. Consequently when the table is pushed to the rear these tension springs tend to return the table forward for a purpose to be described. 23 and 24 are angle bars extending from near the rear of the arms *a* rearwardly and are supported on elbows 25 that are adjustable in the brackets 26 hung from the stationary bars *m*. These elbows, therefore, permit the angle bars or guides 23 and 24 to be separated more or less from each other to accommodate themselves to the width of the body blank. These angle bars in connection with the bars *m*, *m* form a skeleton frame or slide-way. This slide-way is for the purpose of permitting the pushing of the blanks to the machine operator. An assistant is employed at the rear of the machine to gather the blanks together. The body blank (shown in Fig. 4) comprises a simple rectangular strip of material scored to provide the bottom 28, the two side walls 29 and 30, and the cover flaps 32 and 33. The assistant takes this body blank and places it upon the guides formed by the angle bars 23 and 24 and bars *m*, *m*. On top of this body blank he sets the end blanks, one of which is shown in Fig. 4, attached to the side of the body blank. These are pushed forward along the stationary skeleton frame-work onto the sliding table where the machine operator grasps them.

The operator takes one end blank in each hand, turns over the flaps 35 and overlaps them onto the side wall 29. This operation is very much facilitated by the form plates being adjusted correctly to the length of the box. This permits the operator to simply slap the end blanks against the side form plates and fold over the shallow flaps 35 with a one hand operation. The clutch of the machine being thrown in by a foot pedal (not shown), the operator takes the stitches 1 at the end of the flaps removed from himself. Next he allows the clutch to be released and pushes the whole sliding table away from himself until the ends of the flaps next to himself are directly under the drivers of the stitching heads. He then takes the stitches 2. All that is necessary in taking the stitches 3, 4, 5 and 6 is to allow the tension spring *z* to return the table between the strokes of the drivers of the stitching heads. Every time the drivers contact with the blanks this stops the forward movement of the table until they are again released. All the operator has to do is simply restrain the table from coming forward too fast if he desires to take stitches at short intervals. This is a very much easier operation than it would be to push the table backward after each operation of the drivers. By placing the stitches 1 at the rear ends of the shallow flaps first, this serves to tie the blanks together so that they stay properly located with respect to one another in the succeeding operations.

It is possible to apply all the stitches by a continuous operation either from the rear of the flap forward or from the forward end of the flap rearward, but the operations would not be nearly as easy or practical. The synchronous operation of the transmis-

sion, which has been outlined in a general way, is essential for the proper operation of the blank, for, as already stated, the contact of the drivers of the stitching head with the blank is what stops and releases the table. Consequently if one side of the blank was caught or released before the other then there would be a tendency of the work to cock or turn awry on the table, making it practically impossible to operate the machine.

Fig. 6 shows how the second set of shallow flaps 36 is stitched to the bottom wall 28, and Fig. 7 shows how the third set of shallow flaps 37 is stitched to the other side wall 30. Preferably the stitches are taken in the same order as with the first example.

It will be understood that the machine is adapted for almost any shipping case built out of a pliable board. It will also be understood that other fasteners than wire stitches might conceivably be used, such as rivets and the like. Wherever, therefore, the terms "fiber shipping case" or "wire stitching" are used in the claims, it will be understood that they have a broader signification than the precise structure that is usually designated by these terms. "Simultaneously" and "synchronously" are used to mean substantially simultaneously and substantially synchronously.

What I claim is:

1. In a machine for the purpose specified, the combination of a pair of stitching heads, a pair of anvils supported below the stitching heads, the anvils and stitching heads being spaced apart to accommodate themselves to the length of a shipping case, means for synchronously operating the drivers of the stitching heads, a reciprocating table on which the work is carried, and means yieldingly tending to urge the sliding table forward.

2. In a machine for the purpose specified, the combination of a pair of spaced apart stitching heads, a pair of similarly spaced anvils supported under the stitching heads, a sliding table adapted to carry the work under the stitching heads, and one or more springs tending to keep the sliding table at the forward end of its travel.

3. In a machine for the stitching the ends on shipping cases, the combination of a pair of spaced apart stitching heads, a pair of spaced apart anvils supported under the stitching heads, means for synchronously operating the drivers of the stitching heads, means whereby the anvils and the stitching heads may be adjusted away from or toward each other to accommodate themselves to shipping cases of varying lengths, and a sliding table provided with parts which may be adjusted to accommodate the width of the table to the length of the shipping case, said sliding table serving to carry shipping case blanks under the stitching heads and over the anvils.

4. In a machine for the purpose specified, the combination of a pair of spaced apart stitching heads, a pair of spaced apart anvils supported under the stitching heads, means whereby the anvils of the stitching heads may be adjusted toward or away from each other to accommodate themselves to the varying lengths of shipping cases, means for operating the stitching heads, and a sliding table for carrying the blanks under the stitching heads and over the anvils including a pair of form plates that may be adjustable toward or away from each other to accommodate themselves to the length of the shipping case.

5. In a machine for the purpose specified, the combination of a pair of spaced apart stitching heads, a pair of spaced apart anvils supported under the stitching heads, means for adjusting the anvils and stitching heads toward or away from each other, and a sliding table comprising at the front and sides a pair of angle strips or form plates adjustable toward or away from each other and on top having supporting surfaces, said sliding table arranged to take the work under the stitching heads and over the anvils.

6. In a machine for the purpose specified, the combination of a pair of spaced apart stitching heads, a pair of anvils supported under the stitching heads, means for adjusting the stitching heads and anvils toward each other to accommodate themselves to the varying lengths of shipping cases, and a sliding table for carrying the work under the stitching heads and over the anvils comprising a pair of form plates adjustable toward or away from each other and forming the front and side of the table, and a pair of horizontal supporting plates adjustable toward or away from each other, said supporting plates and the sides of the form plates being spaced apart to straddle the anvils.

7. In a machine for the purpose specified, the combination of a pair of spaced apart stitching heads, a pair of anvils supported under the stitching heads, means for adjusting the stitching heads and anvils toward each other to accommodate themselves to shipping cases of varying lengths, a pedestal at the rear of the machine, a stationary guide skeleton frame supported on said pedestal on which the blanks may be slid forward, and a sliding table for carrying blanks under the stitching heads and over the anvils and forming a continuation of the stationary guide frame-work.

8. In a machine for the purpose specified, the combination of a pair of spaced apart stitching heads, a pair of spaced apart anvils supported under the stitching heads,

a guide-way at the rear of the stitching heads, and a reciprocating table at the forward end of the guide-way arranged to carry the blanks under the stitching heads and over the anvils.

9. In a machine for the stitching the ends on shipping cases, the combination of a pair of anvils spaced apart slightly less than the length of the shipping case to be stitched, said anvils projecting forwardly and supported only at their rear ends leaving an unobstructed space under and at the outside of said anvils to permit the shipping case body blank and end blanks when folded and in course of assembly to be slipped over both anvils, a reciprocating table for supporting the blanks in the course of assembly and arranged to reciprocate between the anvils for carrying the case in the course of assembly over the anvils, and means for simultaneously driving and clinching fasteners on both anvils whereby both end blanks are simultaneously stitched to the body blank.

10. In a machine for the stitching the ends on shipping cases, the combination of a pair of anvils which are adjustable toward and away from each other so that the same may be spaced apart slightly less than the length of the shipping case to be stitched, said anvils projecting forwardly and supported only at their rear ends leaving an unobstructed space under and at the outside of said anvils to permit the shipping case body blank and end blanks when folded up and in course of assembly to be slipped over both anvils, a reciprocating table whose width may be adjusted to accord with the length of the shipping case to be stitched, said table reciprocating between the two anvils for carrying the blanks over the anvils, and a pair of synchronously-operated stitching heads which may be adjustable toward and away from each other to accord with the adjustment of the anvils whereby both end blanks may be simultaneously stitched to the body blank.

In testimony whereof I affix my signature.

HERBERT R. BLISS.