No. 813,908. PATENTED FEB. 27, 1906.

H. C. MILLER.

MACHINE FOR ASSEMBLING COLLAR BLANKS.

APPLICATION FILED JAN. 26, 1904.

4 SHEETS—SHEET 1.

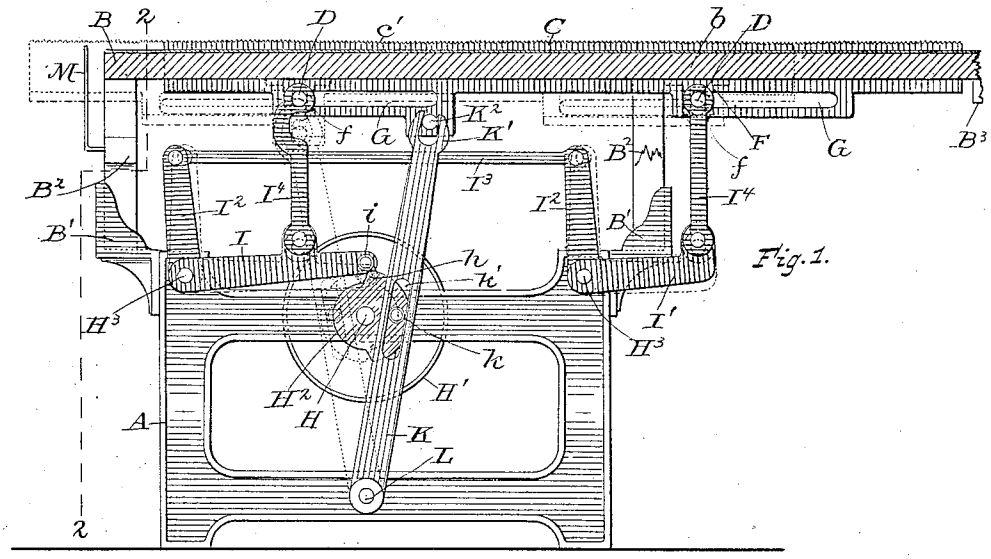

Fig. 1.

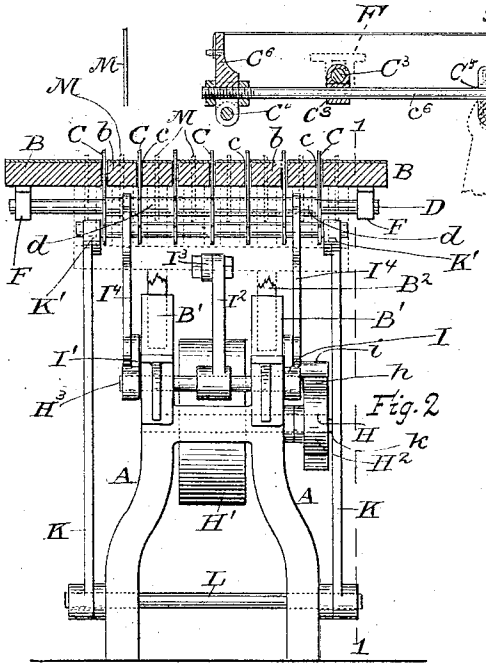

Fig. 2.

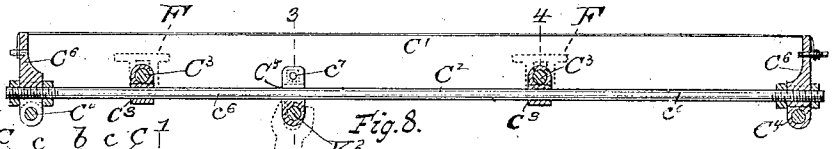

Fig. 8.

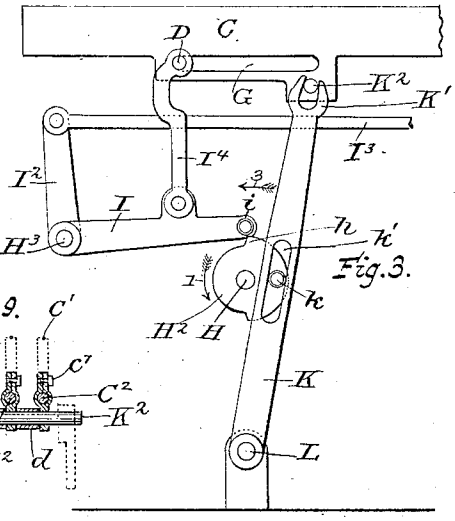

Fig. 3.

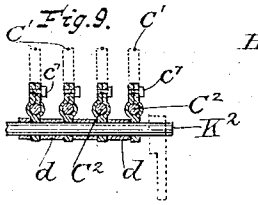

Fig. 9.

Witnesses,

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4 SHEETS—SHEET 2.

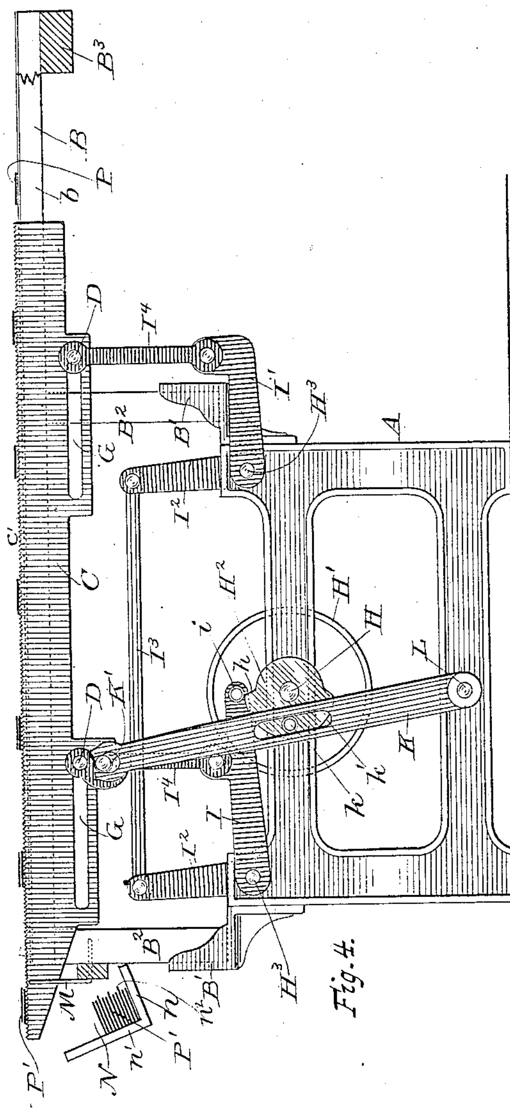

Fig. 4.

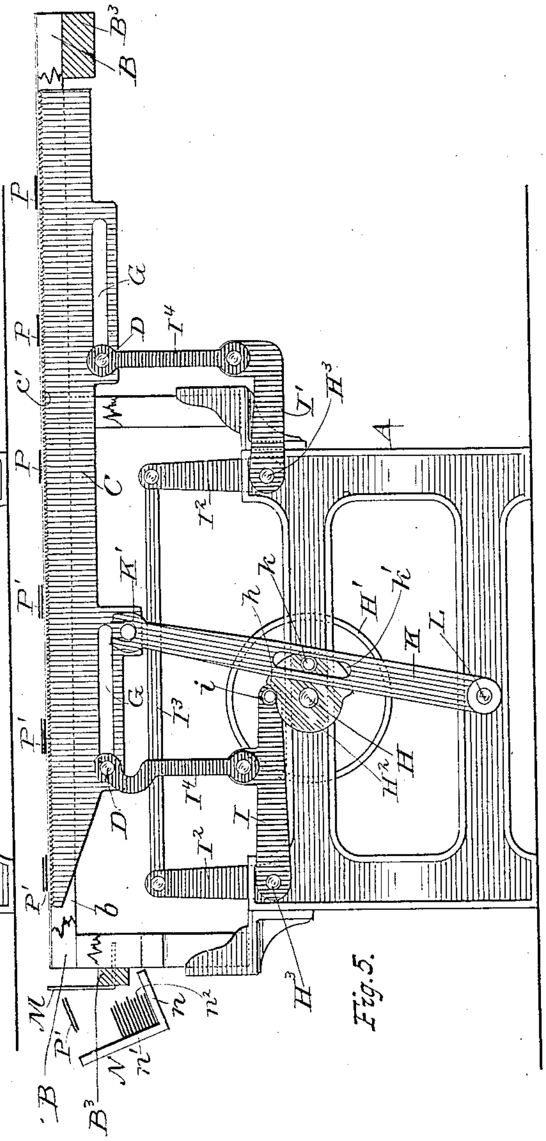

Fig. 5.

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4 SHEETS—SHEET 3.

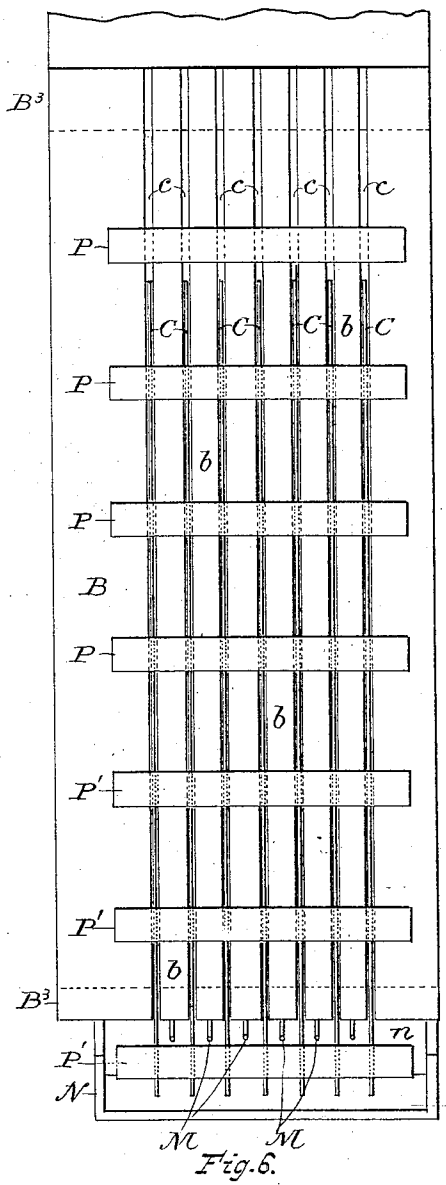

Fig. 6.

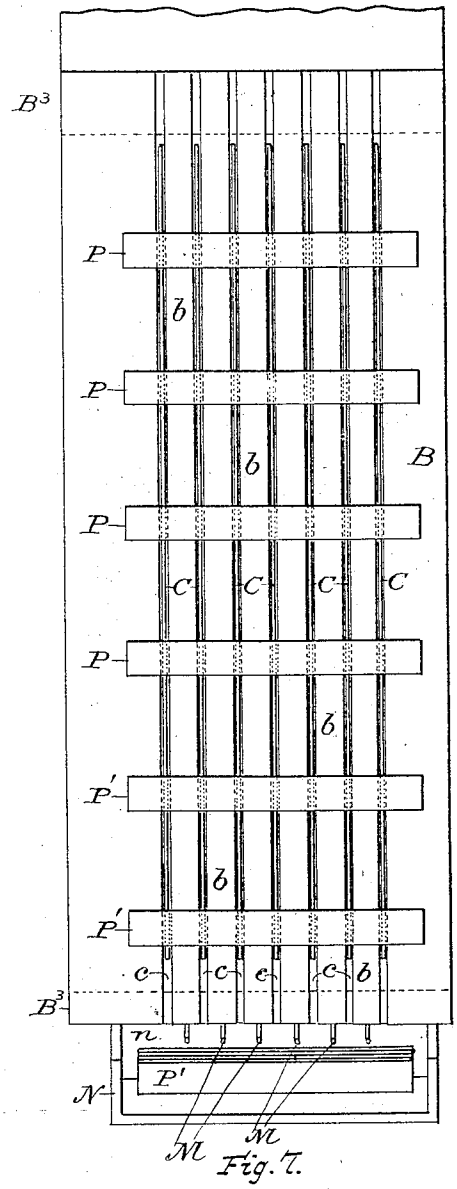

Fig. 7.

Witnesses

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No. 813,908. PATENTED FEB. 27, 1906.

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4 SHEETS—SHEET 4.

Fig. 10.

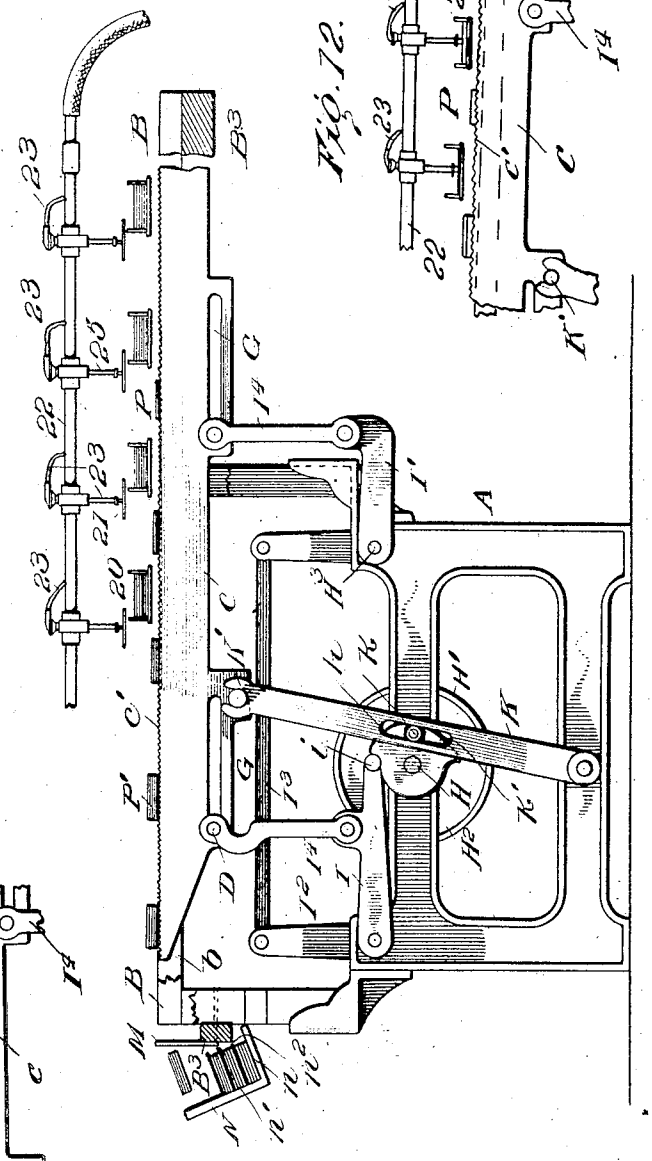


Fig. 12.

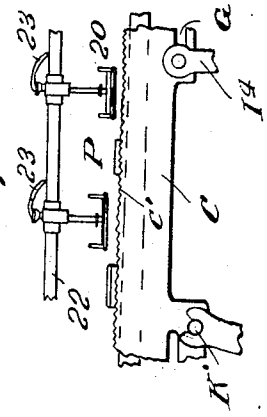
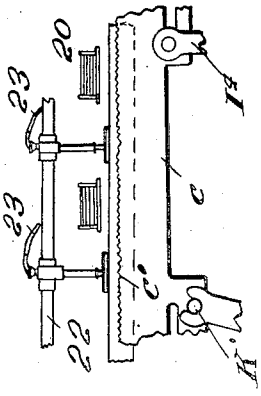


Fig. 11.



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UNITED STATES PATENT OFFICE.

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MACHINE FOR ASSEMBLING COLLAR-BLANKS.

No. 813,908. Specification of Letters Patent. Patented Feb. 27, 1906.

Application filed January 26, 1904. Serial No. 190,758.

To all whom it may concern:

Be it known that I, HENRY C. MILLER, a citizen of the United States, and a resident of Waterford, in the county of Saratoga and State of New York, have invented a new and useful Machine for Assembling Collar-Blanks, of which the following is a specification.

This invention relates to a machine for assembling and moving when assembled pieces of fabric, paper, or other sheet material in successive steps of predetermined length and delivering said pieces in preferred order prior to further operations in their assembled condition for their future completion; and it consists in the novel devices and parts and the novel arrangements and combinations of parts hereinafter described, and set forth in the claims.

The objects of this invention are to produce a quick upward vertical movement, a forward straight-line movement, a quick down vertical movement, and a straight-line return movement of a bed of horizontal bars or pieces, whereby pieces of material may be raised, then advanced in a preferred direction and to a preferred distance, and then be lowered to a lower plane, whereby duplicated pieces of sheet material may be automatically assembled in piles of two or more and moved to a place of deposit in a rapid manner.

Other objects and advantages of this invention will be readily understood from the following description when taken in connection with the accompanying drawings, in four sheets, forming a part of this specification, in which—

Figure 1 is an elevation with table in section, taken at line 1 in Fig. 2. Fig. 2 is an end view with part in section taken at line 2 in Fig. 1. Fig. 3 is a side view of this mechanism employed for actuating the moving parts of the table of the machine. Fig. 4 is a side elevation illustrating the movable parts of the top of the machine elevated and moved to their full limit to the left, and Fig. 5 is a side elevation with the movable parts of the top lowered and returned toward the right to normal situation. Fig. 6 is a plan. Fig. 7 is a plan with pieces to be assembled in place. Fig. 8 is a horizontal view of a modification of the horizontal moving bed of horizontal moving pieces for carrying pieces of material to be assembled, and Fig. 9 is a section taken in the transverse of the same. Fig. 10 is a view in elevation showing my improved machine arranged in coöperative relation to an ordinary pick-up mechanism. Fig. 11 is a detail view illustrating the position of the carrying-bed when receiving plies. Fig. 12 is a similar view showing the previously-deposited plies carried forward and the depositing means receiving other plies.

Similar characters of reference refer to similar parts throughout the several views.

In the drawings, A A represent the frame of the machine for receiving the movable parts of the actuating mechanism and for supporting the stationary bars *b b* of the table B and the movable parts arranged between the adjoining stationary bars, as shown in Fig. 3. The stationary bars *b* are preferably of wood, having their top surfaces covered with felt or other fabric and arranged a suitable distance apart for forming openings *c c*, in which are arranged the movable carrying-pieces C C. These stationary bars *b b* are supported from the frame A by brackets B′, standards B^2, and tie-rails B^3, Figs. 3, 5, and 6; or by any other means which will support said bars *b* of the table B independent and separate from a movable bed of carrying-pieces provided for receiving the pieces or articles to be moved and assembled.

The movable horizontal carrying-pieces C C are employed in numbers sufficient for producing a width sufficient to support the groups of assembled pieces at predetermined distance apart and allow them to be moved in succession to a distance each group of assembled pieces is to be advanced toward the place of their final deposit. These pieces C C are preferably made of thin steel with their upper edges *c′* serrated and on the same horizontal plane, while their bodies are preferably passed down through openings *c c* and below the stationary bars *b b* of the table, as shown in Figs. 2, 4, and 5, and may be held together from shifting in relation to each other and the stationary parts *b* of the table B. I at present prefer to hold said pieces C secure from such shifting by means of bars D D and thimbles *d d* on the same and between the adjoining carrying-pieces C C and support said bars D D from their respective ends from the downward-projected hangers F F, provided each with vertical slots *f* and secured to the lower sides of the outer side stationary bars *b b*, as shown in Figs. 1 and 2. These bars pass through per-

forations made in the bodies of the blades C C and are held from shifting by the thimbles *d d* at opposite sides, so that all the carrying-pieces C may be simultaneously raised and lowered and moved longitudinally in either direction. In the lower portion of these carrying-pieces C are provided longitudinal slots G G, Figs. 1, 3, 4, and 5. These slots G receive the bars D D, and the pieces C C, which said slots hold, are actuated by a reciprocating longitudinal motion as well as a vertical reciprocating motion. The mechanism for imparting to the connected series of carrying-pieces C C a reciprocating vertical movement and for imparting to the same reciprocating longitudinal movements may be of any suitable construction which may be adapted to move the said connected pieces C C quickly upward to a short distance, then longitudinally in a horizontal line of direction—say as to the left—then at the end of this longitudinal direction of movement be moved vertically downward, and at the finish of this latter movement be moved longitudinally in direction opposite to that first had, as, say to the right.

Supported in bearings provided in the frame A is shaft H, adapted to be revolved by wheel H′, mounted on the latter and actuated from any source of power. Mounted on the same shaft H is cam H^2, having its operative portion *h* in the form of a half-circle. This cam is for actuating lever mechanisms for raising and lowering the bed of pieces C C.

Pivoted on stationary parts of frame A is lever I, having its free end extended over the shaft H, on which is fixed the cam H^2, the free end of which lever is provided with a friction-roller *i* for contact with the periphery of the cam. The said lever I and similar levers I′ I′ I′ are also provided and pivoted in pairs on frame A by rock-shafts H^3 H^3 and are so fixed on the latter as to move the same when the throw portion *h* of the cam H^2 operates, through roller *i*, to raise the free end of lever I. Rigidly fixed on the hub end of levers I and I′ I′ I′ are vertical arm I^2 I^2, which are connected by their upper ends to similar arms I^2 I^2 by connecting-rods I^3 I^3. Between the hub ends of levers I I′ and free ends of the same are pivoted vertical arms I^4 I^4, which are arranged at opposite sides in pairs and have their upper ends pivoted on bars D, which are supported from vertical slotted brackets F. By means of the cam H^2, levers I and I′ I′ I′, vertical arms I^2 I^2, connecting-rods I^3 I^3, and pivoted vertical arms I^4 I^4, pivoted on shafts D D, as above described, the said arms I^4 I^4 will be operated so as to have a vertical reciprocating movement, and thereby quickly move the bed of carrying-pieces C C first upward, followed by a short interval of stoppage after the throw portion *h* of the cam has run out from under roller *i*, when the arms I^4 I^4 will be carried vertically down by the weight of the bed of carrying-pieces C.

K K are vertical levers pivoted by their lower ends to stationary parts of frame A, which levers are adapted to have their upper ends moved from position shown by full lines in Fig. 2 to that indicated by dotted lines in the same figure. These levers K K are moved from position shown in Fig. 4 to that shown in Fig. 5 by wrist-pin *k*, carried by cam H^2, revolved by shaft H and working in slot *k*′, provided in one of said levers K. The upper ends of levers K K are each provided at its upper end with fork K′, which receives the outer ends of the transverse bar K^2, which is preferably passed through all the blades C, as shown in Fig. 2. The lower ends of these levers K K are pivoted to frame A by shaft L, to which said levers are rigidly secured, so as to be simultaneously moved with a reciprocating movement when the wheel or cam on which the wrist-pin is fixed is revolved.

At the discharge end of this machine are provided a series of vertical stationary fingers M of size which will admit of their free passage upward between the carrying-pieces C, which are extended out past the outer ends of the stationary parts *b* of the table B, as shown in Figs. 1 and 2. These fingers are secured from moving by connection with the standards B^2 or other stationary pieces to give them such support. Supported by a table is receptacle N, in which the bottom *n* is preferably inclined, as shown, and the side *n*′ will be at right angles with the same, so as to adapt the assembled pieces to fall properly in place in the said receptacle N.

The manner in which the several operating parts of this machine are operated is as follows: All the parts of the machine are in normal position for beginning operations, as shown in Figs. 1 and 2. Pieces P, to be assembled and moved, may be of fabric, paper, leather, or other thin sheet material and be of any form, but each the same as the other, so that each assembled piece may have its respective edges register with those of the other pieces when assembled, as in pile P′. When shaft H is revolved continuously by drive-wheel H′, the cam H^2 will be revolved in direction of arrow 1, Fig. 3, and carry its throw portion *h* and the wrist-pin *k* in the same direction. In the course of each revolution the throw portion *h* of said cam will raise the free end of lever I and through shafts H^3 and the respective similar levers I′, vertical arms I^2 I^2, and connecting-rods I^3 I^3 will simultaneously operate levers I and I′ and raise the outer ends of the same, and thereby move arms I^4 upward and keep said levers raised until the throw portion *h* of the cam has passed out from under the roller *i*′, provided on lever I. When arms I^4 are raised, all the carrying-pieces C will be raised to the full

distance of the upward throw of said arms I^4 (which in this machine, as shown, is about one-half of one inch) and hold the said blade up with its serrated upper edge c' above the plane of upper surface of pieces b of the table B. All the time the throw portion h of the cam is operating against the said roller of lever I. When the throw portion h of the cam has passed from beneath said roller, the lever I and all corresponding levers I', together with the respective arms I^2, connecting-rods I^3, and vertical arms I^4, will be returned to normal idle position and so remain until the throw portion h of the cam has been again carried to beneath said roller of lever I. This reciprocating movement of levers I and I' will, through said arms I^4 I^4 and the bars D D, working in slots G, and the guiding-hangers F F, first raise all the blades C, as in Fig. 1, and then return them to normal position, as in Fig. 5. When the throw portion h of the cam H in its course of revolution is just about passing beneath the roller i of lever I, the wrist-pin k, carried by said cam, will be at the point of middle of length of slot k' of lever K, and said lever will be in inclined position toward the left, as shown in Figs. 1, 4, and 5, as also the corresponding lever K at the opposite side of the machine and rigidly secured to the same shaft H, and when the revolution of said cam is continued the wrist-pin k, working in slot k', will move said lever K and corresponding opposite side lever K to position of dotted lines in Fig. 1 and cause the forked ends K' of both said levers, receiving the outer ends of bar K^2, to be moved toward the left, as indicated by arrows 3, Fig. 3, when all the blades C will be simultaneously moved in a right line to the left. At the same time the throw portion h of the cam will be idle. When the forked levers K K have reached their limit of left-hand throw, the forward movement of the bed of carrying-pieces C will be stopped and the throw portion h of the cam, as indicated by dotted lines in Fig. 1, will be carried under the roller i of the lever I, when said lever and its corresponding levers I' will be operated and through the arms J carried by the said levers and through bars I^3 simultaneously lower all the pieces C from their upper plane to the lower plane, (indicated by dotted lines in Fig. 1,) when the throw portion h of the cam will be again started to begin to pass beneath the roller i on lever I. The revolution of the said cam being continued in direction of arrow 1, Fig. 3, the wrist-pin k (indicated by dotted lines in Fig. 1) will be operated to move lever K in reverse direction and from position indicated by dotted lines to that of full lines, Fig. 3, when pieces C will be returned in a right line to their first situation, as shown in Fig. 1. These several movements of the bed of pieces C first upward, next forward to the left, then downward, and, lastly, rearward toward the right, will all be made at each revolution of the cam H, and when the revolutions of the said cam are continued these movements of the bed of the carrying-pieces C, in the order described, will be effected. When the throw h of the cam H^2, wrist-pin k, levers I I', and lever K are in situation shown in Fig. 4, the serrations of upper edges c' c' will be above the plane of upper surface of the pieces b b of the stationary table B, and said bed of blades will be in situation at point of beginning of return movement from left to right, as shown in the same figure.

By reference to Fig. 10 it will be seen that the mechanism hereinbefore described and hereinafter termed a "feed" mechanism is arranged for coöperation with a form of pick-up mechanism. In order to show the assembled operation, I have illustrated a conventional form of pick-up designed to be supported and operated alongside of and slightly above the feeder. This mechanism comprises a series of hoppers 20, designed to receive individual plies of material to be assembled by the feeder. A pipe 22, leading to any suitable inlet and exhaust mechanism, is provided with a series of branch pipes 23, one for each hopper. Supports 25, connected with the branch pipe 23, receive mechanism controlled by air to operate the pick-up devices 21 to lift the material from the hoppers and deposit the same upon the bed or table B of the machine. In the mechanism shown the operation of the pick-up will serve to deposit four single plies of material upon the table at one operation. The movement of the carrying-pieces of the feeder is such as to advance each ply deposited a distance equal to the distance between the plies as deposited by the pick-up. Assuming the parts arranged as described, the operation of the pick-up will serve to deposit four individual plies of material upon the table of the machine. As the pick-up is receding to secure an additional ply the carrying-pieces are operated to move the deposited plies forward or toward the left a distance equal to that between the plies when deposited. This advances all plies a determinate distance toward the left or discharge end of the feeder. The pick-up operates to again deposit individual plies; but as the plies first deposited have been advanced it will be understood that the pick-up will deposit upon the plies already deposited, with the exception of the pick-up to the extreme right, which will deposit its ply upon an unoccupied space, as the ply previously deposited at this point has been advanced toward the discharge end of the machine. A continuation of this operation will deposit a ply for each movement of the feeder, so that in the instance illustrated when the feeder is ready to discharge each assembled pile will contain four plies. It is at once apparent that if the machine is particularly designed for assembling plies for collars or cuffs the

hoppers may be supplied with the exact size and nature of material required, so that when assembled in the receptacle at the end of the feeder the material will be arranged in proper order and relation for stitching. The various piles may be separated in the final receptacle by cardboard strips n' n^2, as illustrated in Fig. 4, if desired.

While I have shown and described a pick-up arranged for depositing four plies, it is to be understood that the invention is to be in no wise limited thereto, as it is readily apparent that the pick-up may be arranged for assembling any number of plies desired or may be adapted to pick up a plurality of plies from each hopper. All such structures, with obvious variations, I consider within the scope of the present invention, the gist of which consists in a machine for assembling in piles a plurality of plies of material by regularly advancing deposited plies in a position to receive further deposits from the depositing mechanism.

In Figs. 8 and 9 is shown a modification of construction of a carrying device for a carrying-bed which may be employed. This modification of construction comprises wire pieces, rods, transverse bars, and clamping-pieces, and with other features which adapt the carrying-bed embodying these features to operate and be itself operated as the carrying-bed shown in Figs. 1, 2, and 3. In this modification C' C' are wires of size about corresponding with No. 16 wire, which are arranged horizontally and about the same distance apart as blades C in Figs. 1, 2, and 3, and placed in the carrying-bed shown in said figures and with a length about the same as the said blades. C^2 C^2 are rods preferably made of cold-rolled steel and about three-eighths of an inch diameter, or more or less, as may be preferred. These rods are connected so as to be rigidly held from shifting in relation to each other in any direction by transverse bars C^3. The transverse bars C^3 preferably comprise a series of nice-fitting sockets c^3, through which said rods C^2 are passed and secured, and are provided with end portions for insertion in the slotted downward projected hangers F. (Shown in dotted outline in Fig. 8.) Portions c^6 of rods C^2 serve as horizontal ways for guiding the rods C^2 when moved in the perforations or sockets c^3 of transverse bars C^3. The clamping-sleeves c^7 are formed with sockets C^5, which receive the transverse bar provided to receive the forks K' of forked levers K, (shown in Figs. 1 and 2,) which are operated by wrist-pin k. The end bars C^4 are preferably secured to the outer ends of rods C^2 by clamping-sleeves or split sleeves, which are made, preferably, integral with said end bars C^4 and with upward-extended brackets C^6, to which the ends of wires C' are secured. With this modification fingers M are preferably made with the form of construction shown. From the figures showing this sectional form of construction of carrying devices is omitted the table and other parts of the machine for preventing confusion. This modification may be used with all the operating parts shown in the other views to be employed in this machine.

Having described my invention, what I claim, and desire to secure by Letters Patent, is—

1. In combination with means for individually depositing plies of material, of means for elevating and feeding while elevated said deposited plies in regular advance to assemble a plurality thereof in a pile.

2. In combination with means for depositing plies of material, of a feeder for elevating and regularly advancing while elevated said plies between the depositing operations.

3. In combination with means for regularly depositing plies of material, of means for elevating and advancing while elevated said plies distance equal to the distance between the deposited plies in normal position.

4. In combination with means for depositing a plurality of plies of material, of means for elevating and advancing while elevated said plies beneath the depositing means to receive an additional deposit therefrom.

5. In combination with means for depositing successive plies of material, of a feeder comprising a carrying-piece to elevate said plies and advance them while elevated to a position beneath the next successive depositing means.

6. In combination with a plurality of depositing means, of a table arranged lengthwise said depositing means, and a carrying-piece operative through the table and arranged to elevate said deposited plies above the table and move them longitudinally of the table while elevated a distance equal to the distance between the adjacent depositing means.

7. In combination with means for depositing plies of material, of a table to receive said plies, a carrying-piece movable through the table and means to elevate the carrying-piece and the deposited plies of material above the table and advance while elevated said carrying-piece and the deposited plies in regular order, whereby to assemble a plurality of said plies in a pile.

8. In combination with successively-arranged depositing means operative to simultaneously deposit a plurality of plies, of a table to receive said deposited plies, and means carried by the table to elevate above the table and to advance while elevated and lower each of said plies beneath the next successive depositing means.

9. In combination with successively-arranged depositing means operative to simultaneously deposit a plurality of plies, of a ta-

ble to receive said deposited plies, and means carried by the table to simultaneously elevate above the table and advance while elevated and lower all of said plies a distance equal to the distance between the successive depositing mechanisms.

10. In combination with a plurality of pick-up mechanisms, of a table to receive material from said pick-up mechanisms, and means carried by the table to elevate above the table and advance while elevated and lower said material in regular order beneath the pick-ups, said means operating to advance the material between the depositing operations of the pick-up.

11. A feeder comprising a table, a carrying-piece movable through the table, and means to elevate the operative surface of said carrying-piece wholly above and out of contact with the table, move it longitudinally thereof while elevated, depress it below the table and return it to original position, and means to deposit plies of material on the carrying-piece.

12. A feeder comprising a slotted table, a carrying-piece movable in said slot, and means to move the operative surface of said carrying-piece wholly above and out of contact with the table and longitudinally thereof while elevated and then below and to original position, and means to deposit plies of material on the carrying-piece.

13. A feeder comprising a slotted table, carrying-pieces movable in the slots of the table, and mechanism to move the operative surface of said carrying-pieces wholly above and out of contact with the table and longitudinally thereof while in said elevated position, and means to deposit plies of material on the carrying-piece.

14. A feeder comprising a table formed with a plurality of slots, a carrying-piece arranged in each slot, a lever for moving the carrying-pieces longitudinally of the table, and means for elevating and depressing the carrying-pieces, said elevating means maintaining the operative surface of the carrying-piece wholly above and out of contact with the table during the feeding operation, and means to deposit plies of material on the carrying-piece.

15. A feeder comprising a table formed with a plurality of slots, a carrying-piece arranged in each slot, a lever for moving the pieces longitudinally of the table, levers for elevating and depressing the carrying-pieces prior to their longitudinal movement, and means for operating said levers, said elevating means maintaining the operative surface of the carrying-piece wholly above and out of contact with the table during the feeding operation, and means to deposit plies of material on the carrying-piece.

16. A feeder comprising a table formed with a plurality of slots, a carrying-piece arranged in each slot, a lever for moving the pieces longitudinally of the table, levers for elevating and depressing the carrying-pieces prior to their longitudinal movement, and a cam for operating said lever, said elevating means maintaining the operative surface of the carrying-piece wholly above and out of contact with the table during the feeding operation, and means to deposit plies of material on the carrying-piece.

17. The combination with a table comprising a series of parallel bars, of a series of carrying-pieces supported between said bars, the parallel bars forming vertical guides for the carrying-pieces, horizontal guides connected with the carrying-pieces, mechanism for elevating said pieces to move the upper edges thereof above the plane of the surfaces of the bars of the table, and returning the same to below the said surfaces, and mechanism for moving said blades forward and the reverse.

18. The combination with a table comprising a series of parallel bars arranged a short distance apart, a series of movable carrying-pieces, said bars serving to guide the whole series of said pieces in their movement, mechanism for imparting a reciprocating movement to said pieces in a vertical direction, and mechanism for imparting a reciprocating movement to said pieces in a horizontal direction, with each respective vertical movement alternating with each horizontal movement and means to deposit plies of material on the series of parallel pieces.

19. The combination with a frame, a stationary table comprising a series of bars separated from each other and supported by said frame, a movable bed comprising a series of parallel carrying-pieces provided each with an operative surface on the same plane as the others, a revolving shaft, mechanism actuated by said shaft to impart to the operative surface of all the blades a vertical upward movement wholly above and out of contact with the table, a forward horizontal movement while above the table, a downwardly-vertical movement, and a rearward horizontal movement below the surface of the table, and mechanism for guiding the pieces in their horizontal movement, and means to deposit plies of material on the movable bed.

20. The combination with a frame, a table comprising a series of stationary parallel bars and a bed of carrying-pieces, of a series of vertical stationary fingers projected above the surface of the table, a receptacle forward of said fingers, and mechanism for imparting to the series of said pieces a reciprocating longitudinal movement and a vertical reciprocating movement.

21. The combination with a frame, a stationary table provided with a series of parallel openings, a series of parallel carrying-pieces movable longitudinally in the parallel

openings, a revoluble shaft supported by the frame, a cam mounted on the shaft, a wrist-pin carried by the cam, a lever forked at its upper end and loosely engaging a pin projecting from the carrying-pieces, the lever being formed with a slot to receive the wrist-pin, mechanism actuated by the cam, arms connected and actuated by said mechanism, devices for guiding the bed of carrying-pieces in their vertical movement, and devices for guiding the pieces in their horizontal movements.

22. The combination with a stationary table provided with parallel openings, carrying-pieces mounted in said openings, a cam, a lever mechanism connected with the carrying-pieces and operated by the cam, a wrist-pin carried by said cam, a forked lever which is adapted to have a reciprocating movement with its forked upper end connected with said carrying-pieces and its lower end fixed to a rock-shaft, a longitudinal slot provided in the body of the forked lever to receive the wrist-pin, the rock-shaft being pivoted on the frame of the machine, and a drive-wheel for the parts.

23. The combination with a stationary table comprising a series of parallel sections with openings formed between the sections, a four-way moving bed comprising carrying-pieces guided in their respective movement in the openings of the table, mechanism for imparting to said bed a vertical reciprocating movement, mechanism for imparting to the bed a longitudinal reciprocating movement, with each vertical movement of the same alternating with each longitudinal movement, a series of stationary vertical fingers adjacent the discharge end of the bed, and between the carrying-pieces, the upper ends of the fingers projecting above the upper plane of said bed, and a receptacle at the discharge end of the movable bed for receiving pieces of material assembled on the same.

24. The combination with a frame, a carrying-bed operating on the frame, mechanism for intermittingly moving the carrying-bed to advance previously-deposited plies of material, means for reversing the movement of the bed, and means in the path of the bed for receiving the plies therefrom when the movement is reversed, and means against which the plies contact and are removed from the bed when the movement of the latter is reversed, to the means which receives the plies.

25. The combination with a frame, a carrying-bed operating on the frame, ply-removing means, mechanism for intermittently moving the carrying-bed to advance previously-deposited plies of material in front of the ply-removing means, means for reversing the movement of the bed, the reversal of the movement of said bed causing the ply-removing means to discharge the pile of plies from the bed.

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Witnesses:
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