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C. A. BURKHOLDER

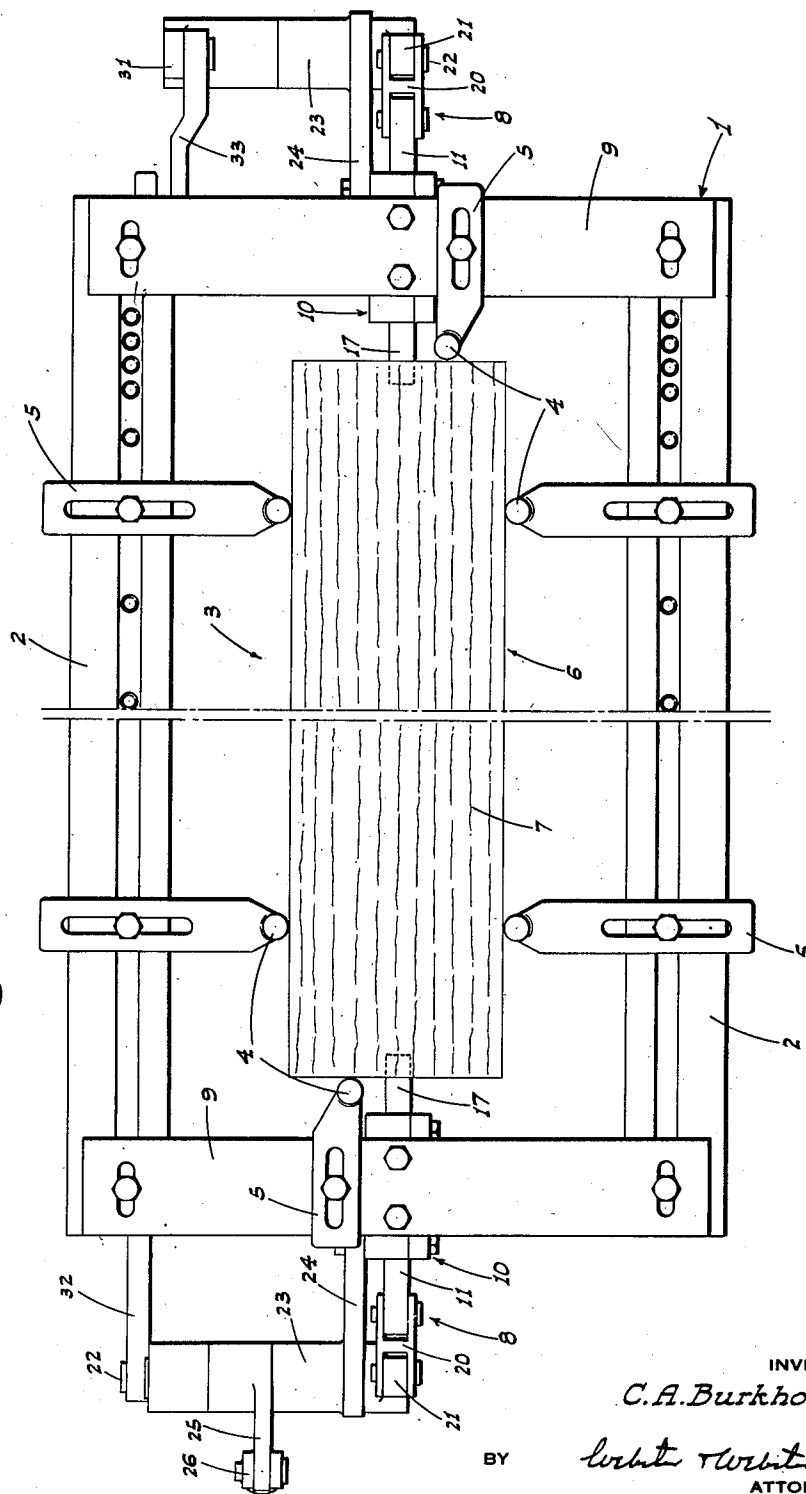
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FEEDING DEVICE FOR BOX-PART ASSEMBLING MACHINES

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5 Sheets-Sheet 1

Fig. 1



INVENTOR

C.A. Burkholder

BY

*Wright Wright*

ATTORNEYS

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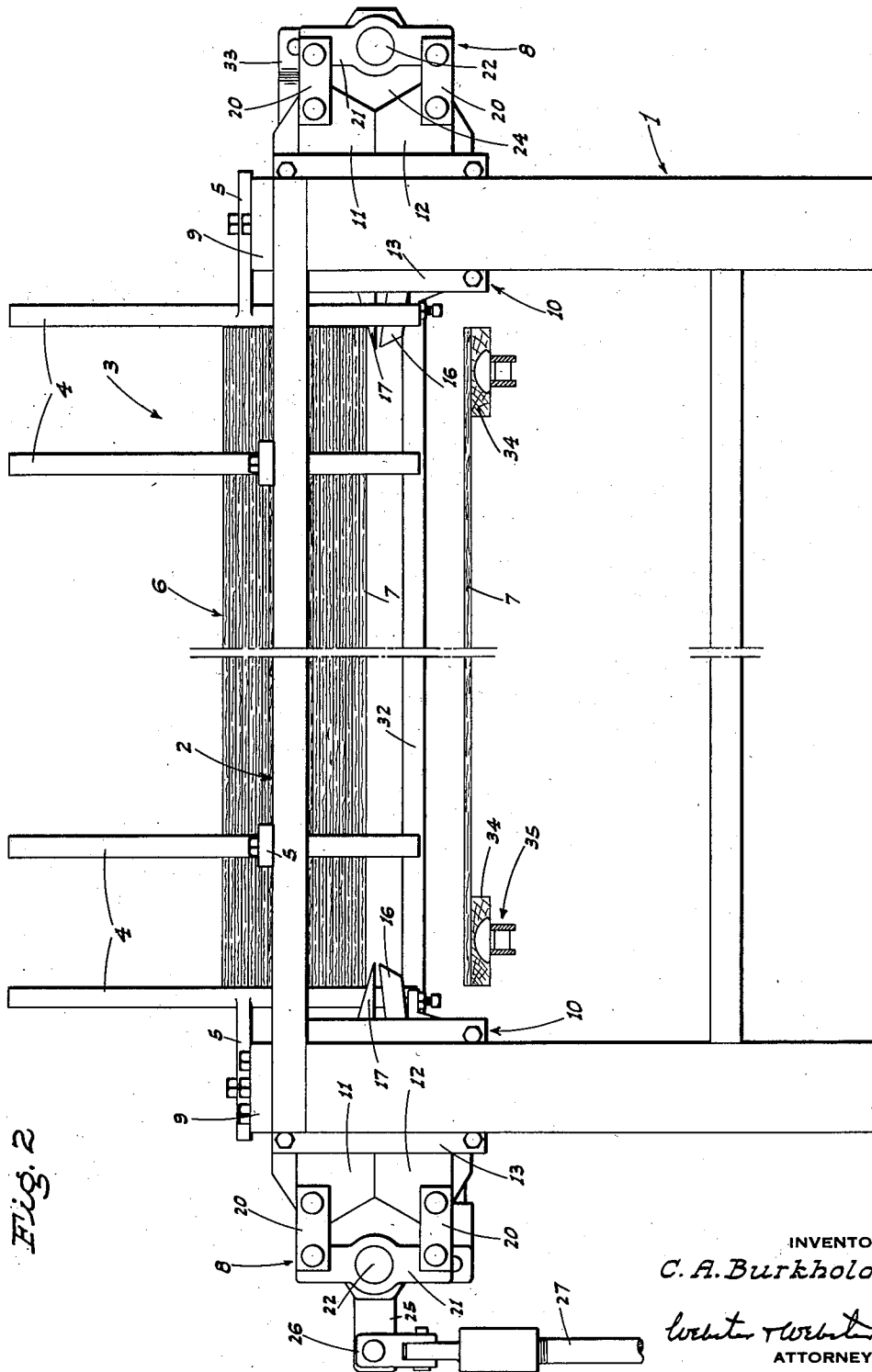
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FEEDING DEVICE FOR BOX-PART ASSEMBLING MACHINES

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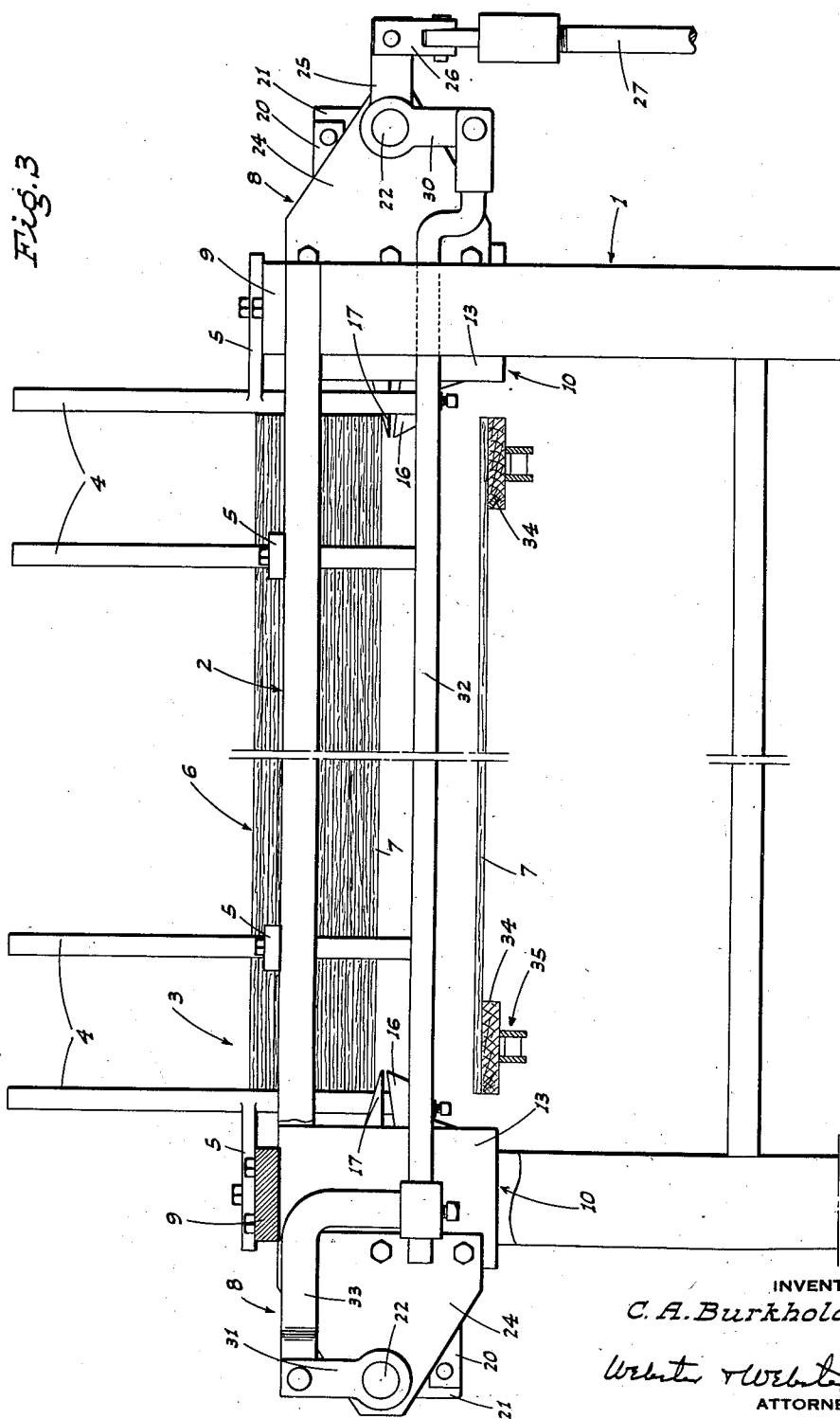
C. A. BURKHOLDER

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FEEDING DEVICE FOR BOX-PART ASSEMBLING MACHINES

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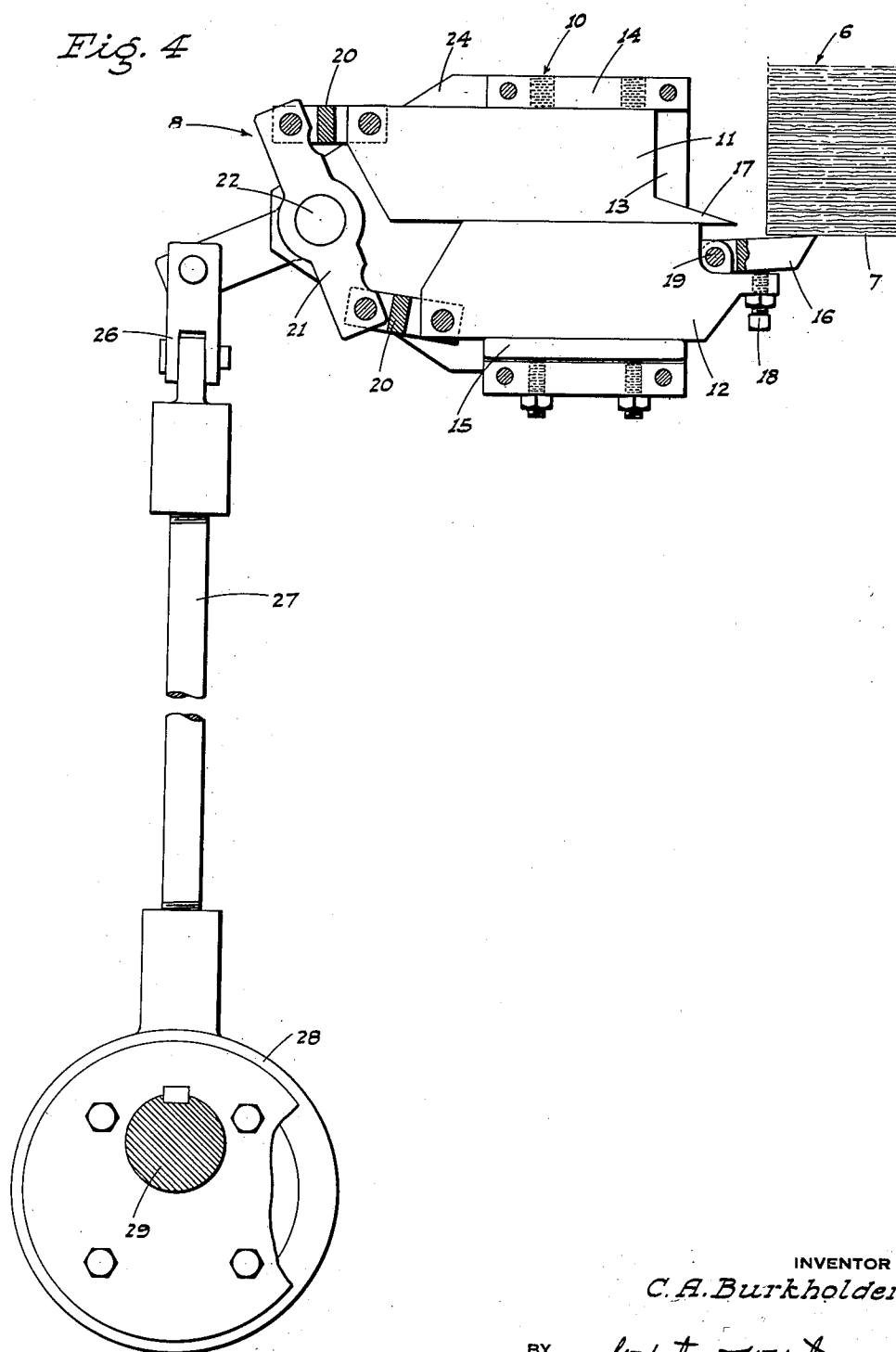
C. A. BURKHOLDER

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FEEDING DEVICE FOR BOX-PART ASSEMBLING MACHINES

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INVENTOR  
*C. A. Burkholder*

BY

*Robert T. Winter*  
ATTORNEYS

March 18, 1952

C. A. BURKHOLDER

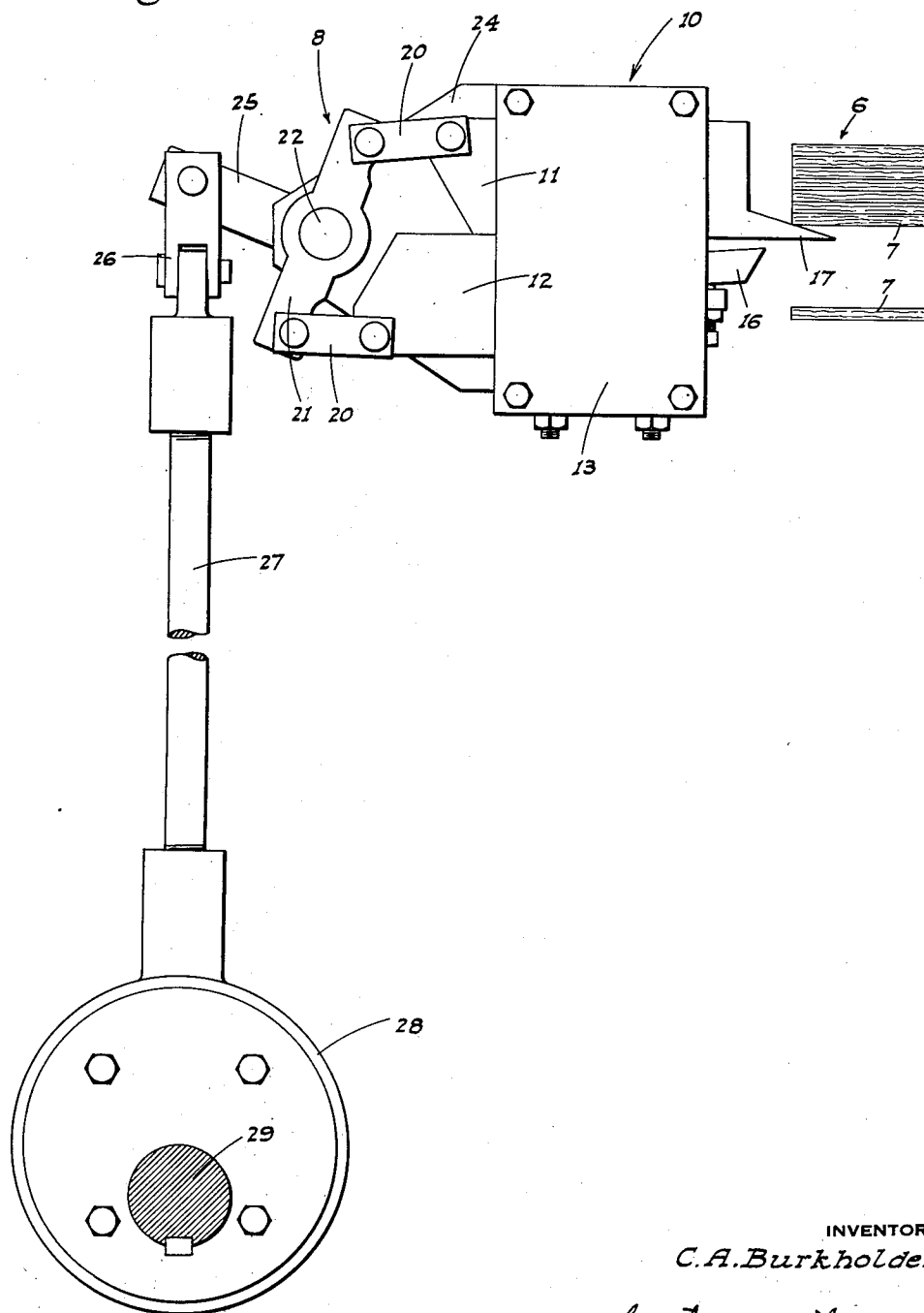
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FEEDING DEVICE FOR BOX-PART ASSEMBLING MACHINES

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Fig. 5



INVENTOR

C.A. Burkholder

BY

*Wm. H. Runtz*

ATTORNEYS

## UNITED STATES PATENT OFFICE

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FEEDING DEVICE FOR BOX-PART  
ASSEMBLING MACHINES

Claude A. Burkholder, Fresno, Calif., assignor to  
General Box Distributors, Fresno, Calif., a cor-  
poration of California

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4 Claims. (Cl. 271-44)

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This invention is directed to, and it is an object to provide, a novel mechanical device for automatically and successively feeding wooden box parts, such as flat box cover or side panels, one at a time, downwardly from the bottom of a supported stack of such parts; each box part, as fed from the stack, being deposited on a conveyor in proper position relative to other box parts traveling therewith and the assembled parts then moving to a nailing or "stitching" machine. The nailing or "stitching" machine forms no part of the present invention and is not here shown.

Another object of the invention is to provide a feeding device for use with flat, very thin box parts which are otherwise quite difficult to mechanically and automatically feed one at a time and successively from the bottom of a stack.

A further object of the invention is to provide a box-part feeding device, as above, which comprises a frame-supported hopper for a stack of the flat box parts, and stack supporting and box-part feeding units at opposite ends of the hopper adjacent the bottom thereof; said units being actuated in unison. Each such unit includes a stack supporting foot and a box-part separating wedge thereabove a distance substantially equal to the thickness of the individual box parts; the foot and wedge being mounted for simultaneous opposite reciprocation in a horizontal plane whereby when so actuated the foot first supports the stack from below the lowermost box part and the wedge is retracted, and then the wedge advances and engages between said lowermost box part and the next one above in supporting relation to the stack as the foot retracts and said lowermost box part is fed or dropped downwardly onto the conveyor therebelow.

An additional object of this invention is to arrange the stack supporting and box-part feeding units so that the same may be easily and initially adjusted to effectively feed different sized flat box parts of predetermined like thickness and rectangular size in plan.

A further object of the invention is to provide a practical feeding device for box-part assembling machines, and one which will be exceedingly effective for the purpose for which it is designed.

These objects are accomplished by means of such structure and relative arrangement of parts as will fully appear by a perusal of the following specification and claims.

In the drawings:

Fig. 1 is a top plan view of the box-part feeding device; there being a stack of box parts supported therein.

Fig. 2 is a side elevation of the device.

Fig. 3 is an opposite side elevation of the device.

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Fig. 4 is an enlarged fragmentary side elevation of one of the stack supporting and box-part feeding units; said unit being in its initial or starting position.

Fig. 5 is a similar view, but shows the positions of the parts of said unit upon release of the lowermost box-part for feeding and engagement of the remainder of the stack to support it against downward movement.

Referring now more particularly to the characters of reference on the drawings, the device comprises an open, upstanding main frame 1 provided with a rectangular, horizontal top frame 2, which top frame is adjustable as to size.

The top frame 2 is open and supports a box-part stack hopper, indicated generally at 3, which hopper comprises a plurality of spaced upstanding hopper-forming rods 4 carried on the inner ends of laterally outwardly projecting brackets 5 secured to said frame 2 whereby the size of the hopper can be varied.

The numeral 6 indicates generally a stack of box parts, indicated specifically at 7. The box parts 7 are flat and rectangular, such as box covers or side panels. These box parts are relatively thin, and the present device is especially adapted for feeding such thin box parts, one at a time and successively, from the bottom of the stack 6. This is accomplished by means of the following structure:

A pair of stack supporting end box-part feeding units, indicated generally at 8, are mounted at opposite ends of the top frame 2, being suspended centrally from the end bars 9 of said top frame.

Each of the stack supporting and box-part feeding units comprises a guide housing 10 through which an upper slide block 11 and a lower slide block 12 are slidable in guided relation horizontally in a direction toward and away from the adjacent end of the stack 6. The housing 10 includes side plates 13 spaced by an upper guide bar 14 and a vertically adjustable lower guide bar 15.

The upper slide block 11 is initially retracted relative to the stack 6, while the lower slide block 12 is initially advanced relative to said stack; the lower slide block 12 including an outwardly projecting stack supporting foot 13 which then engages beneath the adjacent end of the stack 6 in supporting relation to the same.

At the end adjacent the foot 16 the upper slide block 11 is formed with an outwardly projecting panel separating wedge 17, the distance between the top working face of the foot 16 at its outer end, and the point of the wedge 17, being substantially equal to the thickness of each of the flat box parts 7. This spacing between the foot 16 and wedge 17 is variable so that the device may be adjusted for use with box parts of different

thicknesses. Such adjustment is accomplished by an adjustment screw 18 bearing against the foot 16 from below; the latter being pivoted, as at 19, for vertical adjustment.

At their outer ends the upper and lower slide blocks 11 and 12 are pivotally connected by links 20 with the upper and lower ends, respectively, of an upstanding, double-ended lever 21 fixed centrally of its ends to a transverse stub shaft 22. The stub shaft 22 is journaled in a bearing 23 fixed in connection with an ear 24 which comprises an extension of one of the housing side plates 13.

The stub shaft 22 of one of the above described stack supporting and box-part feeding units 8 is fitted with a radial arm 25 pivotally connected by a clevis link 26 with the upper end of an upstanding connecting rod 27. At its lower end the connecting rod 27 is secured to an eccentric unit 28 mounted on a power-driven shaft 29 suitably journaled in the main frame 1 and driven by power means (not shown).

The stack supporting and box-part feeding unit at the opposite end of the stack from the unit which is actuated by the connecting rod 27 is simultaneously actuated with the parts working in the same directions relative to the stack 6, by means of the following arrangement:

One stub shaft 22 is fitted with a downwardly projecting crank arm 30, while the stub shaft 22 of the other unit 8 has an upwardly projecting crank arm 31 thereon. The crank arms 30 and 31 are coupled together by a connecting rod 32 which includes an L-shaped, vertically disposed offsetting member 33 adjustably secured to the remainder of the rod 32. This adjustment is necessary to compensate for adjustment of the top frame 2. The connecting rod 32 is disposed to one side of the hopper 3 so that it is out of the way of feeding of box parts downwardly from the latter.

Upon rotation of the shaft 29 and reciprocation of the connecting rod 27 the radial arm 25 is oscillated together with the shafts 22 of both of the units 8, said shafts 22 oscillating in opposite directions by reason of the described crank arm and connecting rod arrangement between said units 8. With such oscillation of the shafts 22 the double-ended levers 21 rock back and forth, causing opposite reciprocation of the upper and lower slide blocks 11 and 12 of each of said units 8. This produces the following result:

At the outset, with both lower slide blocks advanced, the stack 6 is supported against any downward movement. Thereafter as the lower slide blocks 12 retract and the upper slide blocks 11 advance, the wedges 17 engage between the lowermost box part and the next uppermost box part from opposite ends of said stack, and this engagement occurs just before the feet 16 retract clear of said lowermost box part. When the feet 16 clear the lowermost box part it falls or feeds downwardly from the hopper 3, the wedges then supporting the remainder of the stack.

With successive reciprocation of the slide blocks 11 and 12 of each unit 8, the blocks 11 are alternately advanced or retracted whereby the box parts 7 are fed, one at a time, in a downward direction. By reason of the particular assembly of the feet 16 and wedges 17, very thin box parts may be effectively fed downwardly, one at a time, with the present device.

The individual box parts 7 as fed downwardly from the hopper 3 fall onto other box parts 34, such as end cleats, carried on the upper run of

an endless conveyor, indicated generally at 35, which passes directly below said hopper 3. The conveyor 35 travels in such timed relation to operation of the units 8 that the box parts 7 are fed onto said conveyor in proper relation to the box parts 34.

From the described feeding device the conveyor 35 carries the assembly of box parts 7 and 34 to a nailing or "stitching" machine (not shown), where said parts are secured together.

The above described feeding device provides a convenient, practical, and wholly automatic apparatus for the downward feeding, one at a time, but in successive order, of flat box parts—even though very thin—from the bottom of a supporting stack.

From the foregoing description it will be readily seen that there has been produced such a device as substantially fulfills the objects of the invention as set forth herein.

While this specification sets forth in detail the present and preferred construction of the device, still in practice such deviations from such detail may be resorted to as do not form a departure from the spirit of the invention, as defined by the appended claims.

Having thus described the invention, the following is claimed as new and useful, and upon which Letters Patent are desired:

1. In a feed device for a stack of flat box parts which includes sets of spaced fingers movable in and out and adapted at one end to alternately support the stack; a mounting means for each set of fingers comprising a substantially rectangular frame which includes upper end bars, a guide housing supported from each end bar, a pair of slide blocks slidably mounted in each guide housing in superimposed relation for horizontal movement, adjacent horizontal edges of said blocks being in face to face engagement, one of said fingers projecting from one end of each block, means to reciprocate said blocks alternately in opposite directions relative to each other; means pivoting the lower one of said fingers on the corresponding block, and an adjustment screw mounted in said block below the last named finger and engageable with the under side of such finger intermediate its ends to adjust the latter relative to the other adjacent finger whereby to vary the spacing between the fingers.

2. In a feed device for a stack of flat box parts which includes sets of vertically spaced fingers movable in and out and adapted at one end to alternately support the stack at opposite ends thereof, separate mounting means for the sets of fingers each comprising a substantially rectangular frame which includes an upper end bar, a guide housing supported from the end bar, and superimposed slide blocks slidably mounted in each housing for horizontal movement, one of the corresponding set of fingers projecting from one end of each block, means to reciprocate the blocks alternately in opposite directions relative to each other, the adjacent horizontal edges of the blocks being adjacent each other, and means to effect adjustment of the slide blocks to maintain the adjacent horizontal edges thereof in engagement with each other.

3. A device as in claim 2 in which said last named means comprises a vertically adjustable guide bar disposed in the guide housing, one guide block being slidably seated on one face of said bar, and set screws mounted in the housing and engaging the face of said bar opposite that engaged by said one block.

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4. In a feed device for a stack of flat box parts which includes sets of vertically spaced fingers movable in and out and adapted at one end to alternately support the stack at opposite ends thereof, separate mounting means for the sets of fingers each comprising a substantially rectangular frame which includes an upper end bar, a guide housing supported from the end bar, and superimposed slide blocks slidably mounted in each housing for horizontal movement, one of the corresponding set of fingers projecting from one end of each block, means to reciprocate the blocks alternately in opposite directions relative to each other, and means to relatively adjust the end bars horizontally toward and from each other.

CLAUDE A. BURKHOLDER.

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