2 Sheets--Sheet 1.

J. W. BOWERS.

Box-Dressing Machine.

No. 165,784. Patented July 20, 1875.

Fig. 1.

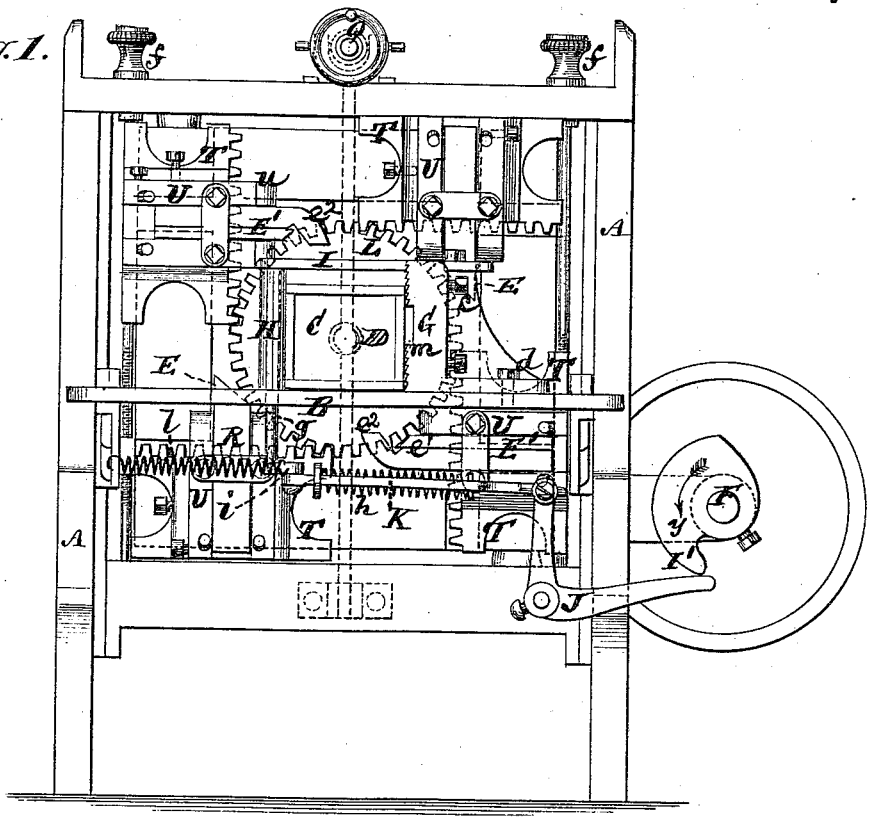
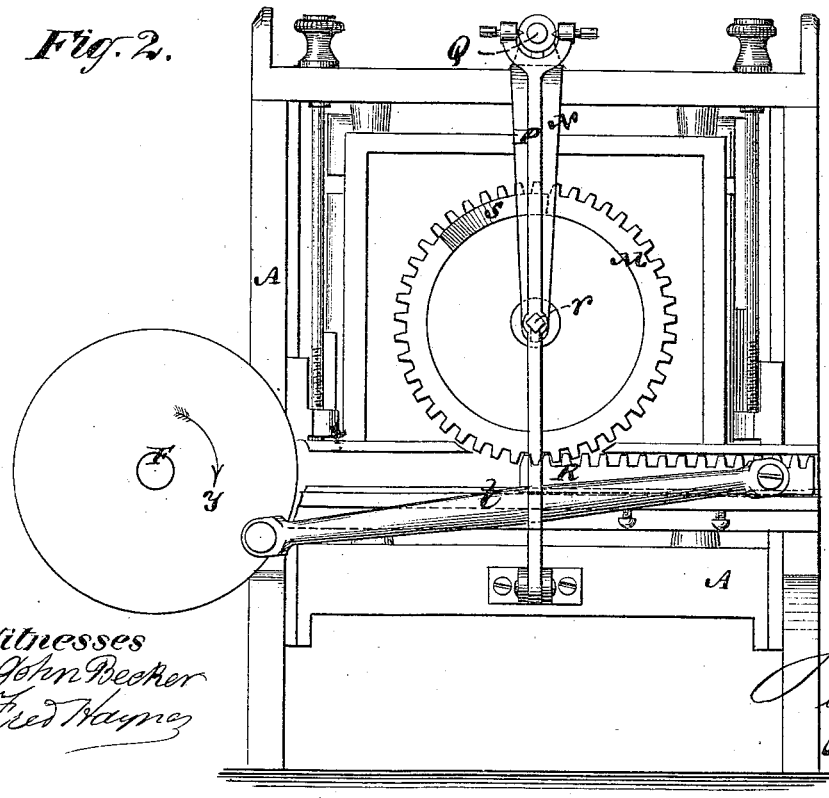


Fig. 2.



Witnesses
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Fred Hayne

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by his Attorneys
Brown & Allen

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Fig. 3.

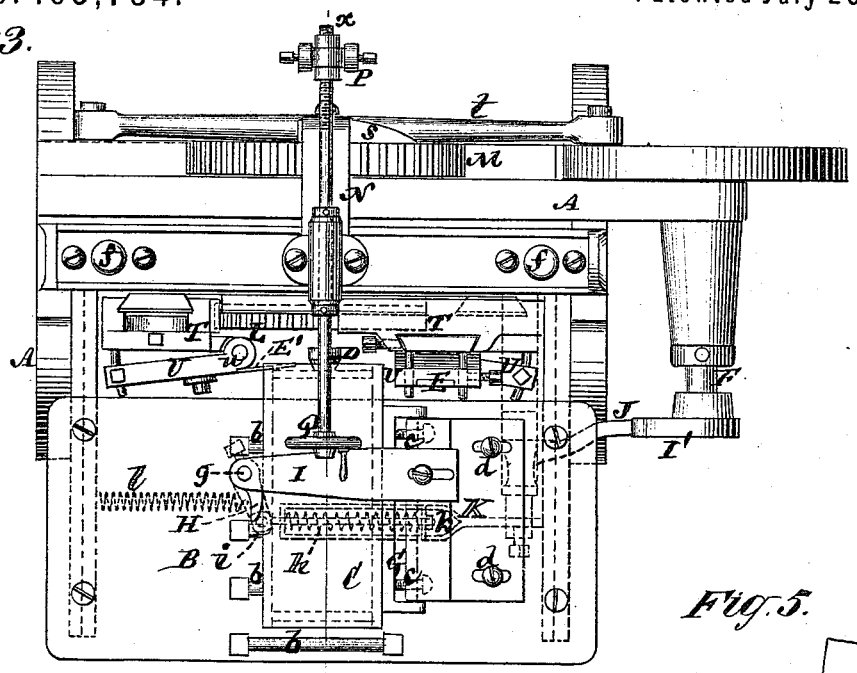


Fig. 4.

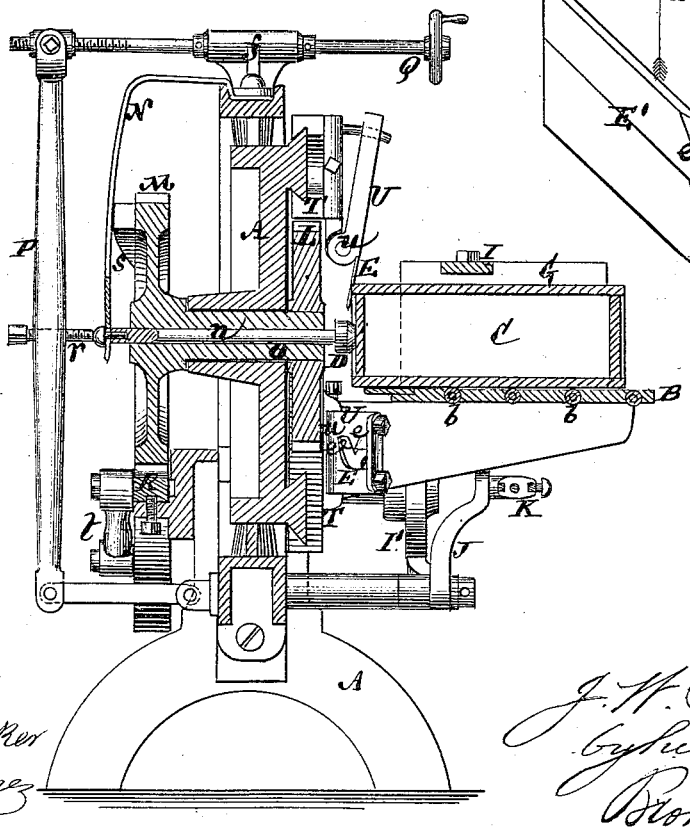
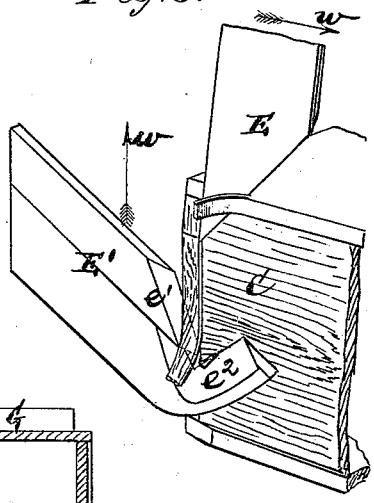


Fig. 5.



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UNITED STATES PATENT OFFICE

JOHN W. BOWERS, OF SOUTH CARVER, MASSACHUSETTS.

IMPROVEMENT IN BOX-DRESSING MACHINES.

Specification forming part of Letters Patent No. **165,784**, dated July 20, 1875; application filed June 11, 1875.

To all whom it may concern:

Be it known that I, JOHN W. BOWERS, of South Carver, in the county of Plymouth and State of Massachusetts, have invented certain new and useful Improvements in Box-Dressing Machines; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawing, which forms part of this specification.

This invention relates to machines for trimming or dressing the ends of wooden boxes, including packing-boxes, after the sectional portions of the same—such as the bottom, sides, and ends; also, if desired, or temporarily at least, the lid—have been nailed or secured to their places, for the purpose of giving a neat or flush finish to the ends of the box. To this end the invention consists in a novel combination of reciprocating knives arranged to operate in transverse relation with each other, and so that one adjacent knife finishes where the other commenced, thereby avoiding all chipping or splintering. It also consists in a novel construction of the knives or certain of them, made in duplicate, with their cutting-edges arranged, the one cutter to trim off the ends of the stock, and the other cutter to shave, by a drawing cut in an outward direction, any protruding surface of the end of the box beyond the ends of the stock composing the bottom, sides, and lid, or either of these pieces, said duplicate cutters being separately attached for the convenience of sharpening the knife. The invention likewise consists in certain combinations of guides and clamps for directing and holding the box, the one of which clamps is automatically adjustable to hold and release the box at the proper intervals in the operation of the cutters. Furthermore, the invention consists in a combination, with the automatically-adjustable clamp, of an expansible rod or connection for operating said clamp, with a yielding pressure to adapt it to boxes of different sizes without any liability of crushing them, the opposite clamp only, if necessary, being adjustable by hand to adapt the clamp to different-sized boxes. The invention likewise comprises an automatically-adjustable combined stop and discharger for determining the period of the box's entry within the range of the cutters, and for discharging the box after the cut has been made. This combined stop and discharger is also adjustable by hand to vary the extent of the box's entry between the cutters. An adjustable roller-table, over which the box is fed, is also combined with the clamps for holding the box, and with the combined stop and discharger, which latter occupies an approximately central position in relation with the end of the box.

In the accompanying drawing, Figure 1 represents a front elevation of a box-dressing machine constructed in accordance with my invention; Fig. 2, a rear view of the same; Fig. 3, a plan thereof; and Fig. 4 a transverse vertical section on the line *x x*. Fig. 5 is a view in perspective, upon a larger scale, of a pair of adjacent knives as in operation on the end of a box.

A is the main frame of the machine, and B its table, over rollers *b*, in which the box C, requiring its ends to be dressed—that is, one end at a time—is shoved or fed till arrested by a central combined stop and box-discharger, D, for action on it of the knives E E′. F is the driving-shaft, arranged to revolve as indicated by the letter *y*.

G is a combined guide and clamp on the table B, the same being to one side of a forward extension of the axial line of the stop D, and serving to direct and hold the box on its one longitudinal surface. This guide and clamp are adjustable by hand, as by screws and slotted connections *c d*, in or out from the axial line of the stop D, to adapt it to various sizes of boxes, such adjustment being to the extent of one-half of the variation in size of the box in a transverse direction of the latter, the other half of the adjustment being provided for by an opposite yielding and automatically-adjustable clamp, H, on the other side of the axial line of the stop D, and such double adjustment of the two clamps or clamping devices G H serving to centralize in a horizontal direction the box C relatively to the stop D. The table B is also adjustable up or down by hand-screws *f f*, to provide for a corresponding vertical adjustment.

The yielding clamp H is here shown as of a swinging wing-like construction, having a

vertical rocking fulcrum-pin, *g*, which has its bearings in the table B below, and in an upper arm or top guide, I, connected with the standard of the clamp G. Said clamp H is automatically adjusted to open or freely receive, at the proper time in the action of the knives, the box C in between it and the opposite guide and clamp G, and then to close with a spring-pressure on the box, so as not to crush it, and, after the cut has been made, to open again for liberation of the dressed box by the combined stop and discharger D. The means for doing this are as follows: On the shaft F is a toe-cam, I′, which, when it strikes on the one arm of a bell-crank, J, causes the other arm thereof to draw on the one longitudinal section or portion of an expansible connecting-rod, K, as against the pressure of a spring, *h*, carried by the other longitudinal section or portion of said rod, which other longitudinal section or portion carries the spring *h*, and is attached to a crank, *i*, on the rock-shaft or fulcrum *g* of the clamp H.

This operation gives an elastic griping action or hold of the clamp H after the box has been adjusted to its place, and while undergoing the cut, which elastic hold, that prevents all crushing to or injury of the box, may be varied by regulating the tension of the spring *h*, through or by means of a screw-nut, *k*.

After the box has been dressed at either of its ends, then the rise of the cam I, in wake of its toe, recedes from the arm of the bell-crank on which it acts, and allows of said arm rising by the pull of an independent spring, *l*, on the crank *i*, and thus admits of the clamp H opening or freeing itself, till the box is discharged and another box inserted, or the same box reversed end for end, after which the toe of the cam I comes round again, and acts upon the bell-crank J, to cause the clamp H to hold with a yielding pressure on the box for a succeeding operation of the knives.

The hose C may be introduced to the dressing-machine either with its lid temporarily nailed down or without its lid, but preferably with the lid, and in that case, the guides and clamps G H may either of them be formed with a depression or groove, *m*, for the clearance of the nail-heads.

The combined central stop and box discharger D, which occupies an approximately central position in relation with the end of the box when adjusted, has a rear shank or spindle, *n*, made capable of sliding backward or forward relatively to the end of the box C. For this purpose the shank *n* passes through a revolving sleeve, *o*, having on its front end a gear-wheel, L, and on its back end another gear-wheel, M, and the stop D is kept forcibly pressed forward or outward by a spring, N, but is at liberty to be moved backward at intervals till arrested by a stop, *r*, which determines the feed of the box C to or within the range of the knives E E′. This backward adjustment of the combined stop and discharger D is effected by the action of a cam, *s*, on the wheel M, made to act upon the spring N to draw back the stop D, such withdrawal taking place whenever it is necessary to insert a box within the machine, or to reverse its ends for the operation of the knives upon the ends of the box, and the combined stop and discharger D is thus held back against its regulating-stop *r*, till the knives E E′ have effected their cut by the hold of the clamps G H on the box after the latter has been adjusted to its place for the cut. After the knives E E′, however, have made their cut, and by which time, or before, the cam *s* will have passed away from the spring N, the clamps G H are released, and the spring N throws the combined stop and discharger D forcibly outward, and suddenly ejects the box from the range of the knives, and facilitates its removal or reversal. The stop *r* is adjustable in or out to vary the extent of the box's entry between the knives by determining the distance to which the stop D may be forced back when introducing the box to receive its cut. This adjustment may be accomplished by the attachment of the stop *s* to a lever, P, which is adjustable by a screw, Q, from the front of the machine.

The wheel M, which has a reciprocating motion about its axis, is actuated by a sliding rack, R, which receives its motion through a rod, *t*, from a crank or wrist pin on a disk-carrier by the main shaft F. Said rack and wheel serve to give a reciprocating movement to the front gear L, which in its turn communicates the necessary motion to the knives E E′, by or through racks attached to or forming part of slides T, which carry the knife-stocks V, and which are arranged in straight or tangential directions around the front gear L, and are reciprocated by said gear in transverse or right-angled relation with each other, and so that, in the case of each two adjacent knives E E′ operating in this described relation, the one knife finishes on that end of the angle or corner of the box at which the other knife commenced, thereby avoiding all splintering or chipping at the finishing of each knife's cut.

Two or more knives working in the relation just described may be used, according to the number of ends of the stock it is required to dress at the same time; but it is preferred to use four of such knives, so as to dress all the ends of the stock of a box, C, having its lid temporarily nailed to its place. These knives E E′ are not only adjustable within their stocks or holders V, but the latter may be made adjustable in various directions, including the adjustment of them to bevel the ends of the stock in a backwardly or inwardly direction relatively to the ends of the box, for which purpose the stocks or holders V are hinged or jointed at *u*, and made adjustable by screws from said joint as a center of motion.

Each of these knives E E′ might be formed

of a single bevel-nosed cutter, as shown for the knife E in Fig. 5; or each knife might be formed in duplicate, especially those knives which work in a transverse direction to the end of the box, as shown for the knife E′ in Fig. 5, which knife E′ is composed of independent cutters, the one, e^1, of which is beveled like the knife E, to trim the end of the stock over which it works; and the other cutter, e^2, is constructed to shave, by a drawing cut in an outward direction, any protruding surface of the end of the box beyond the ends of the stock composing the sides and bottom, and it may be the lid, of the box, whereby a neat and smooth finish is given to the box at its ends. These cutters e^1 e^2 are separately attachable and detachable, for the convenience of sharpening and repair; and all the knives in the machine may, if desired, be similarly constructed.

Fig. 5 of the drawing not only illustrates such construction of the one knife of an adjacent pair of knives, but also, as indicated by the arrows *w w*, the directions in travel of such pair of knives to insure the one knife finishing at a point where the other knife commenced, in order to avoid splintering or chipping at the finishing of the cut.

I claim—

1. The combination, in a box-dressing machine, of two or more reciprocating knives, E E′, arranged to operate in transverse relation with each other, and so that each adjacent knife finishes its cut at the place where the other commenced its dressing action, substantially as specified.

2. The knives, constructed of duplicate cutters e^1 e^2, arranged so that as the one cutter, e^1, trims the end of the stock, the other cutter, e^2, shaves, by a drawing cut, in an outward direction on the end of the box, essentially as described.

3. The combination of the automatically-adjustable guide and clamp H with the stationary guide and clamp G, made adjustable by hand in relation to the guide and clamp H, substantially as specified.

4. The expansible connecting-rod K, in combination with the automatically-operating guide and clamp H, essentially as described.

5. The automatically-adjustable stop and box-discharger D, with the knives which dress or trim the ends of the box, substantially as specified.

6. The adjustable hand-stop *r*, in combination with the automatic stop and box-discharger D, essentially as described.

7. The combination of the adjustable table B, the adjustable guides and clamps G H, and the automatic stop and box-discharger D, for operation in relation with each other and the knives, substantially as specified.

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Witnesses:

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