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A schematic diagram of a magnetic core assembly. A rectangular magnetic core is shown with a coil wound around its central section. A movable contact, labeled i , is positioned to make contact with a fixed contact, labeled i' . The core is labeled I . The diagram illustrates the mechanical and electrical components of the relay.

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UNITED STATES PATENT OFFICE.

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BOX-MAKING VISE.

SPECIFICATION forming part of Letters Patent No. 525,501, dated September 4, 1894.

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To all whom it may concern:

Be it known that we, WILL O. KNAUER, residing at Woodland, county of Yolo, and ARTHUR V. TYLER, residing at Sacramento, county of Sacramento, State of California, citizens of the United States, have invented an Improvement in Box-Making Vises; and we hereby declare the following to be a full, clear, and exact description of the same.

Our invention relates to that class of devices used in the manufacture of boxes, in which suitable clamps, rests and stops are employed to hold and adjust the parts of the box during the operation of nailing.

Our invention consists in the novel constructions, arrangements and combinations of the parts of the vise hereinafter described and specifically claimed.

The object of our invention is to provide a vise or clamp of simple construction, adapted to hold the loose parts of the box until they are partially joined and to receive and accurately adjust the box during the further processes of putting its parts together, and finally to adapt the device to different sizes of boxes.

Referring to the accompanying drawings for a more complete explanation of our invention,—Figure 1 is a perspective view of our box-making vise. Fig. 2 is a perspective detail showing the application of the third resting bar b^6 . Fig. 3 is a cross section. Fig. 4 is a detail of guides i .

Upon a table or bench A is properly and rigidly secured the bed B of our vise. Across each end of the bed is secured a resting bar b , the upper surface of which is suitably protected by a metallic wearing plate b' .

C are clamps, one at each end. These are fitted over the resting bars b and are adapted to be moved to and from said bars, these movements being simultaneous in opposite directions and effected by means of the intermediate lever D pivoted to the bed at d , and controlled at its other end by a spring d' .

To this lever on one side of its pivot point is connected the yoke E which extends to and is connected with one of the clamps C.

To the lever D, on the other side of its pivot point, is connected a link e , to the other end of which is connected a yoke E', the ends of which are connected with the other clamp C. The extremities of both yokes pass freely through ways or grooves in the resting bars b , and are connected with angled stops c secured to the outer surfaces of the clamps, said stops resting on the bed B and serving as supports for the clamps as well as stops for limiting their inward movement upon the resting bars. The end of the lever D projects sufficiently beyond the bench A to enable the operator to conveniently press upon it with his body, and it will be seen that by pressing it over in one direction, the clamps C will be forced outwardly away from the vertical planes of their respective resting bars; and upon relieving the lever, the spring d' will return the clamps inwardly to their normal position over the edge of the resting bars, in which position they are limited by their stops c .

Upon the inner sides of the resting bars b rise fixed guides F. These are near one end. Other guides F', nearer the other end, are pivoted to the bars b and are adapted to be turned from a vertical position to a horizontal position for purposes hereinafter described. Upon the inner ends of the resting bars b are vertical end stops G which are adjustable back and forth by means of having their feet slotted over their securing bolts g as shown.

In order to make the device applicable for various sizes of boxes, one of the end bars of the bed B is made adjustable upon the side bars of said bed, this being effected by means of slotting said side bars as shown at b^2 and passing bolts b^3 secured by nuts b^4 down through said slots whereby the end bar of the bed may be moved back and forth over the side bars and tightened in any position desired. To conform to the adjustments of this end bar, the yoke E' is connected adjustably with its link e by means of slotting said link, as shown at e' , and connecting the yoke E' with it by a bolt e^2 ; and further to conform to this adjustment the resting bar b at that

end is cut or grooved out as shown at b^5 to enable it to pass over the link e , and to allow said link to play back and forth through it.

Some classes of boxes have a transverse partition. To provide for this we have a third resting bar b^6 extending transversely of the bed B, and removably and adjustably secured to said bed by means of bolts b^7 passing down through the slots b^2 of the sides of the bed. This resting bar when not in use is laid to one side, but when required may be quickly applied to the bed and adjustably secured in the desired position for the transverse partition of the box. This bar is cut out at b^8 to allow the passage of the link e and it has on its sides the uprising guides H, one of which is adjustable to and from the other by means of a slot h and bolt h' . At the end of the bar is a standard I having at its top guides i , one of which is adjustable to and from the other by means of a slot i' and nut i^2 .

The operation of the device is as follows:— It is intended to facilitate nailing together rectangular wooden boxes. The parts of these boxes being located within convenient reach of the operator, two end pieces are taken and are set up on edge on the resting bars b and are held in this position by the clamps C pressing them against the guides F, F' on the inner sides of the resting bars. Being thus held, one of the sides of the box, or the top or bottom, as the case may be, is then laid upon and nailed to the upper edges of the ends. The clamps are then relieved, and the partially completed box taken out and reversed. As it now has a side nailed to it which in the second position of the box is down, it is obvious that before being able to fit it upon the resting bars b , the latter must be clear of the vertical guides F or F', and for this purpose we make the outermost guides F', as heretofore mentioned, adapted to turn downwardly to a horizontal position; and in this position the greater portion of the length of the resting bars is free, and the partially completed box may rest upon this unobstructed portion and there be held steady by the indrawing clamps. The opposite side of the box is now nailed on, and the operation is repeated for the remaining walls or sides of the box. The end stops G limit and adjust the initial insertion of the ends of the box, and said stops by being made adjustable provide for squaring up the box when necessary. By means of the adjustability of one of the end bars of the bed and the parts which it carries, boxes of different sizes may be made in the same vise. When a box has to be made which has a central partition the third transverse resting bar b^6 is secured in proper place on the bed. Upon it is placed the transverse partition, which is held in an upright position by the guides H and i , the adjustability of said guides being for the purpose of accommodating different thicknesses of partitions. This partition is put in place at the same

time that the ends are first placed, and the first side or top or bottom is nailed to it, as well as to said ends.

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

1. In a box making vise, the combination of a bed having resting bars at its ends, one of said bars being fitted to the side bar of the bed so that it may be adjusted, to lengthen or shorten said bed, the clamp bars fitted over the resting bars, a yoke for each clamp bar having its ends passed through the resting bars and connected with the clamp bars, a lever intermediate of the yokes and pivotally secured to the bed, one of said yokes having its inner end secured to the lever at one side of the pivotal connection of the latter, a slotted link pivoted to said lever upon the opposite side of the pivotal connection of said lever, a means for adjustably securing the outer end of said slotted link to the inner end of the adjacent yoke, and a spring connected with one end of the lever for returning it and the clamps to their initial positions.

2. In a box making vise, the combination of a bed, having at each end resting bars to support the box, clamps for holding the box on the resting bars, guides on said resting bars, pivotally secured and adapted to be turned from a vertical to a horizontal position to clear the resting bars and means for operating the clamps consisting of the intermediate pivoted lever and the oppositely connected yokes joining the lever to the clamps, substantially as herein described.

3. In a box making vise, the combination of a bed, oppositely moving clamps at each end thereof, and guides opposing said clamps whereby the ends of the box are received and held upright, said guides adapted to be turned from a vertical to a horizontal position, whereby a partially completed box may rest upon an unobstructed portion of the bed, substantially as herein described.

4. In a box making vise, the combination of the bed, the resting bars secured at each end thereof, clamps moving to and from said resting bars, and the vertical guides F F' on the inner side of the resting bars and opposing the clamps, the guides F' being adapted to turn from a vertical to a horizontal to clear the resting bars, substantially as herein described.

5. A box making vise consisting of a bed having at each end transverse resting bars for the ends of the box to rest upon, and oppositely moving clamps for holding said ends and the box upon said resting bars, and an intermediate transverse resting bar secured to the bed and having guides for maintaining a transverse partition in an upright position, substantially as herein described.

6. A box making vise consisting of a bed having at each end transverse resting bars

for the ends of the box to rest upon and oppositely moving clamps for holding said ends and the box upon the resting bar and an intermediate transverse resting bar adjustably
5 secured to the bed and having guides for maintaining a transverse partition in an upright position substantially as herein described.

In witness whereof we have hereunto set our hands.

WILL O. KNAUER.
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Witnesses:

CHARLES A. NEALE,
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