Aug. 6, 1929. H. MALARKEY 1,723,050

DOOR ASSEMBLING MACHINE

Filed Oct. 13, 1927 3 Sheets-Sheet 1

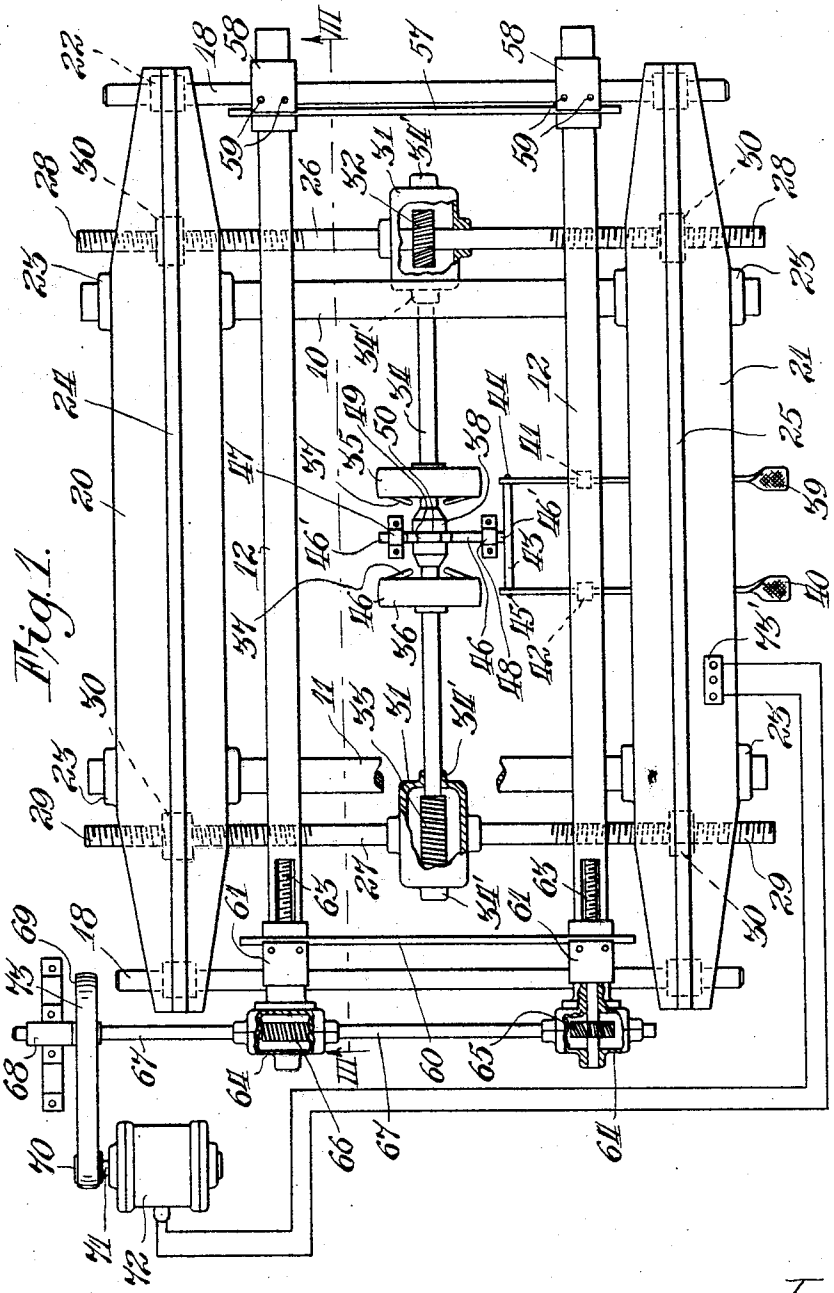


Fig. 1.

Inventor.
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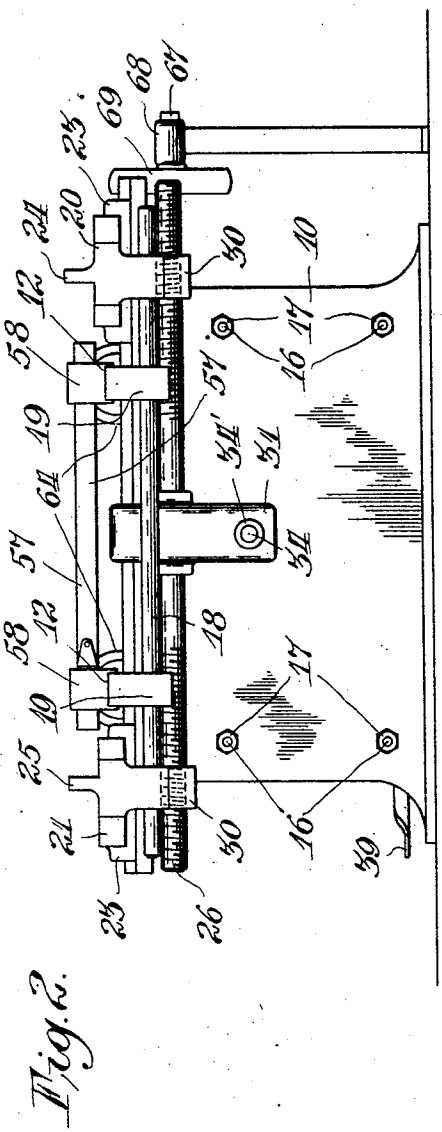


Fig. 2.

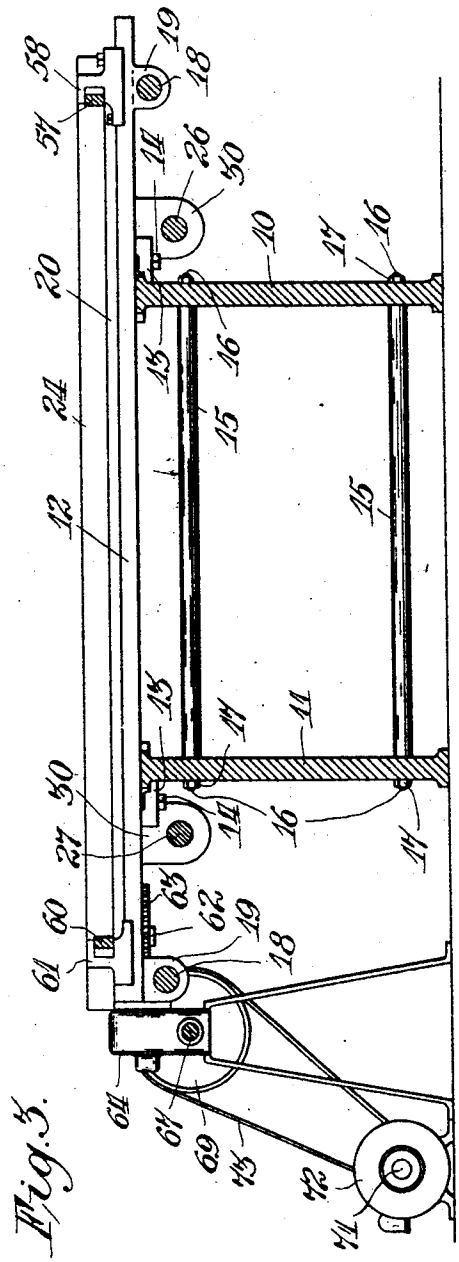


Fig. 3.

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DOOR ASSEMBLING MACHINE

Filed Oct. 13, 1927 3 Sheets-Sheet 3

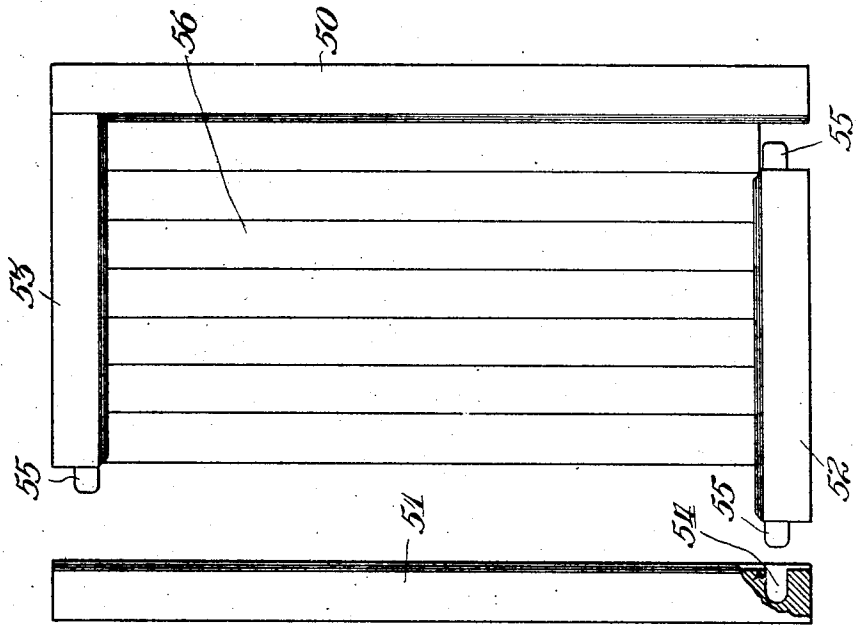


Fig. 6.

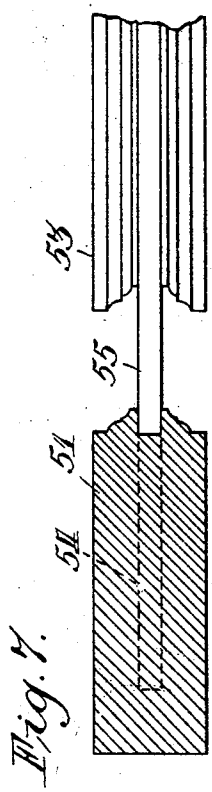


Fig. 7.

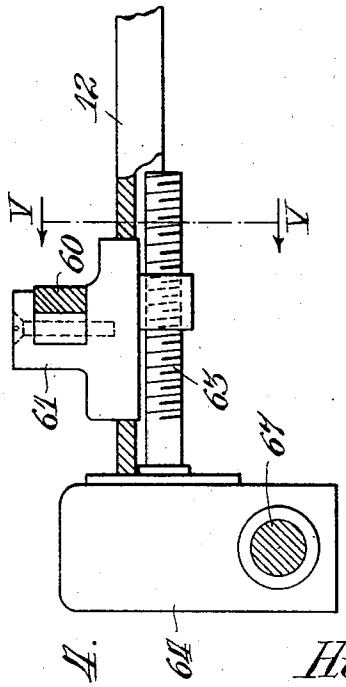


Fig. 4.

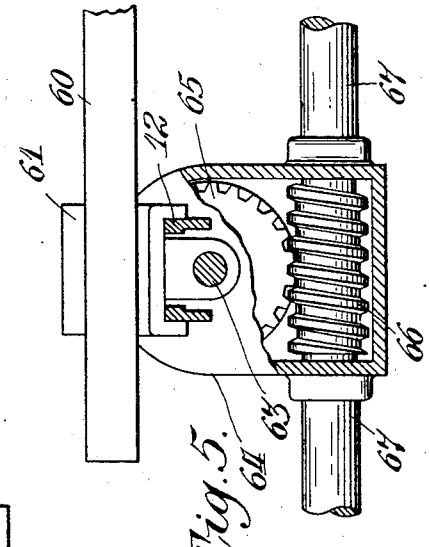


Fig. 5.

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Patented Aug. 6, 1929. 1,723,050

UNITED STATES PATENT OFFICE.

HUNTINGTON MALARKEY, OF PORTLAND, OREGON.

DOOR-ASSEMBLING MACHINE.

Application filed October 13, 1927. Serial No. 225,902.

This invention relates to door assembling machines and more particularly pressure clamps for effecting the association of complemental members, although certain features thereof may be employed with equal advantage for other purposes.

It contemplates more especially the provision of power controlled clamps for effecting the proper association of complemental elements in the assembly of doors and similar structures.

Numerous types of connections are employed to effect the proper association of complemental door members, and perhaps dowels have been most universally restorted to for reception within holes filled with glue prior to the introduction thereof for the purpose set forth.

Assembly is effected by subjecting the door stiles to a pressure reaction so that the holes therein will receive the dowels provided on the rails. The proper association thereof is effected for retaining a panel therebetween to constitute a door. Obviously, the application of a side pressure on the stiles effects the assembly length-wise thereof owing to the stile and dowel connection.

Mortise and tenon connections have become extremely popular in that their construction is more rugged, such arrangement being productive of a much stronger door. This is particularly important in garage door constructions in that rigidity and strength are requisite features thereof. However, the cost of mortise and tenon constructions has heretofore been preventative in that much more labor is entailed in the assembly thereof. The assembly of stiles and rails connected by mortise and tenon joints necessitates end-wise as well as length-wise pressure thereon. In view thereof, the complications incident to their manufacture have caused resort to the dowel connection in spite of the fact that it is much inferior to the mortise and tenon arrangement.

One object of the present invention is to provide a device capable of applying pressure in normally related directions.

Another object is the provision of a door clamping device having normally related confronting members mounted to selectively approach or recede from each other.

Still another object is the provision of a simple and inexpensive device to effect the assembly of complemental members confined therebetween.

A further object is the provision of independently operable members for effecting the application of pressure in normally related directions.

A still further object is the provision of means for imparting side and end-wise pressure to members confined therein for effecting the assembly thereof.

A still further object is the provision of normally related jaws movable with respect to each other to clamp component elements therebetween to effect the assembly thereof.

Other objects and advantages will appear from the following description of an illustrated embodiment of the present invention.

In the drawings:

Figure 1 is a plan view of a machine embodying features of the present invention;

Figure 2 is an end view in elevation of the machine shown in Figure 1;

Figure 3 is a sectional view taken substantially along line III—III of Figure 1;

Figure 4 is an enlarged fragmentary sectional view of an end clamping member showing the means for effecting the travel thereof.

Figure 5 is a sectional view taken substantially along line V—V of Figure 4, portions of the transmission casing being removed to clarify the showing.

Figure 6 is a plan view of a door with the parts thereof shown in disassociated relation for assembly with a device illustrated in Figure 1.

Figure 7 is a fragmentary end view of the door disclosed in Figure 6, the parts thereof being shown in disassociated relation to disclose the mortise and tenon connection therebetween.

The structure selected for illustration comprises spaced standards 10 and 11 of any suitable configuration. Spaced cross members 12 are associated therewith for support thereby, clamps 13 being secured thereto for detachable engagement with the standards 10 and 11 owing to suitable fasteners 14. A plurality of rods 15 provided with threaded extremities 16 project through the standards 10 and 11 to receive nuts 17 in threaded engagement therewith for effecting the retention of the standards 10 and 11 in their proper spaced relation.

A pair of rods 18 are disposed transversely of the cross members 12 for support thereby owing to the brackets 19 secured thereto for the purpose of effecting a rigid joinder therebetween. Side clamping members 20 and 21

extend longitudinally of the frame parallel to the supports 12 for guided movement in a transverse direction owing to its slidable connection with the rods 18 and the standards 10 and 11 intermediate the extremities thereof. The members 20 and 21 are provided with bearings 22 which are bored to slidably receive the rods 18 to effect the guided support thereof. Further, the members 20 and 21 are provided with depending bosses 23 complemental to the standards 10 and 11 to serve as a guide therefor in their movement relative to each other, thereby assuring the approach or recession thereof in parallel relation for effecting the assembly of stiles in true parallelism. As shown, the side clamping members 20 and 21 are provided with upstanding ridges 24 and 25, respectively, constituting engaging jaws for articles disposed on the members 20 and 21 to apply pressure thereon.

The members 20 and 21 carrying the jaws 24 and 25 are relatively and selectively driven with respect to each other by means of parallel transversely disposed driving shafts 26 and 27. The driving shafts 26 and 27 have threaded extremities 28 and 29, respectively, to engage correspondingly threaded bosses 30 depending from the under side thereof, thereby establishing an operative connection therebetween. Intermediate the extremities of the driving shafts 26 and 27, transmission casings 31 confine worm wheels 32 therein, the worm wheels 32 being carried by the driving shafts 26 and 27 for movement in unison therewith. The worm wheels 32 mesh with correspondingly toothed worms 33 which are fixed to a transversely disposed shaft 34 journalled in suitable bearing 34′ provided in the transmission casings 31. The shaft 34 carries pulleys 35 and 36 which normally idle thereon, the pulleys 35 and 36 being provided with clutch mechanisms 37 for cooperation with a double cone clutch element 38 slidable on the shaft 34 for selective engagement therewith. Movement of the cone clutch element 37 axially of the shaft 34 effects the driving engagement of either of the pulleys 35 or 36 with the shafts 34 to impart rotation thereto in any desired direction.

The pulleys 35 and 36 are harnessed to any suitable source of power by means of the usual leather belting (not shown) in frictional contact therewith. It is to be noted that the belting is so harnessed to the pulleys 35 and 36 as to effect the rotation thereof in opposite directions, thereby facilitating the approach and recession of the jaws 24 and 25 by controlling the directional movement of the shaft 34. Pedal controls 39 and 40 are pivoted to the forward cross member 12 by means of depending lugs 41 and 43, respectively, to enable the selective movement of the cone clutch element 38 in either direction along the shaft 34. This is effected by virtue of a link 43 which has the extremities thereof fastened to the free ends of the pedals as at 44 and 45.

The link 43 is secured to a rod 46 intermediate the length thereof along a transverse medial line to effect the rotation thereof in suitable bearings 47 and 48, which have the elevated rod extremities 46′ journaled therein. The rod 46 is provided with an intermediate aperture 49 which engages an annular groove 50 provided in the periphery of the cone clutch element 38, so that rotation of the rod 46 in its offset bearings 47 and 48 by either of the pedal members 39 or 40. This will cause slidable movement of clutch element 38 to engage the clutch mechanisms 37 or either of the pulleys 35 or 36 to effect the movement of the shaft 34 in either direction, thereby controlling the approach or recession of the jaws 24 and 25.

Stiles 50 and 51 of a door are disposed on the members 20 and 21 so as to enable the confronting surfaces of the jaws 24 and 25 to engage therewith to effect the approach thereof when the rails 52 and 53 of the door are disposed normally thereof. As shown, the stiles 50 and 51 are provided with mortises 54 near the extremities thereof to receive correspondingly shaped tenons 55 on the rails 52 and 53 to effect the rigid joinder therebetween. Obviously, end pressure must be applied to the rails 52 and 53 to effect the desired association of the stiles and rails arranged to confine a suitable panel 56 therebetween.

The desired end pressure is applied to the rails 52 and 53 by means of an elongated member 57 disposed transversely of the jaws 24 and 25, it being held stationary by means of brackets 58 which secure the member 57 to the cross members 12 by means of fasteners 59 provided for that purpose. The end clamping member 57 is held stationary relative to a correspondingly shaped member 60 disposed parallel to and in confronting relation therewith for movement relative thereto. The end member 60 is carried by spaced brackets 61 which have depending bosses 62 provided with threaded bores to engage correspondingly threaded stub shafts 63 journaled in suitable transmission casings 64.

The stub shafts 63 carry worm wheels 65 meshing with worms 66 for movement relative thereto occasioned by a driving shaft 67 which rotates in unison with the worms 66 fixed thereon. The driving shaft 67 is journaled in the transmission casings 64 intermediate the ends thereof, there being provided a bearing 68 to sustain the extremity of the shaft 67 in proper position to resist the vibratory forces occasioned by harnessing a suitable source of power thereto. A pulley 69 is fixed to the driving shaft 67 in proximity to the bearing 68 to effect a driving connection with a pulley 70 disposed in

alignment therewith, the pulley 70 being carried by the armature shaft 71 of an electric motor 72. A suitable belt 73 is in frictional contact with the pulleys 69 and 70 to effect rotation of the shaft 67 responsive to movement of the armature shaft 71.

It will be observed that the directional rotation of the shaft 67 controls the approach or recession of the member 60 relative to the stationary member 57 disposed in confronting relation therewith thereby imparting an endwise thrust to the rails 52 and 53 constituting component elements of a door confined between the relatively movable side and end engaging members 24—25 and 57—60. The member 60 is caused to recede from the member 57 by reversing the motor 72 which is controlled by a switch 74 provided within convenient reach of the attendant. The switch 74 is preferably secured to the side member 21 to enable the operator to both control the pedal members 39—40 and the switch 74 which is electrically connected to the motor 72 to effect the rotation thereof in either direction.

With the arrangement of parts above described it will be apparent that a novel and inexpensive device has been provided to impart both side and end thrusts to the complemental members of a door or similar object to effect the assembly thereof. Although the side and end members 24—25 and 57—60 are independently operable in the present embodiment, it is within the province of the present invention to provide means to effect the operation thereof in unison responsive to a single control. Obviously, suitable power means other than those disclosed herein may be employed with equal advantage. Thus the movable end jaw 60 will apply sufficient pressure to draw up all of the longitudinal members 50—56—51 tightly. Thereafter, the side clamps or jaws 24—25 effect the assembly of the mortise and tenon joints which are held together until properly nailed by the attendant.

Various changes may be made in the embodiment of the invention herein specifically described without departing from or sacrificing any of the advantages thereof as defined in the appended claims.

I claim:

1. The combination with a frame for sustaining a door thereon, of stile engaging members mounted on said frame, each of said stile engaging members having a shelf portion to support said stile and the end of the door rails, rail engaging members, and means for effecting movement between said members to effect the assembly of the said component elements of a door confined therebetween.

2. The combination with a frame for horizontally sustaining a door thereon, of stile engaging members mounted on said frame, each stile engaging member having an inwardly directed shelf to support said stile its full length and an end of the door rails, rail engaging members, power means operatively connected to said stile engaging members for actuating said members to conjoint movement in opposite directions, and independent power means in operative association with said rail engaging members to effect the assembly of the component elements of a door confined therebetween.

3. The combination with a frame of stile engaging members comprising a stile supporting member having a flange to engage the edge thereof mounted on said frame, end members for engaging the edge of rails supported at their ends upon said stile engaging members, power means operatively connected to said stile engaging members for moving said members conjointly but in opposite directions, and other means for effecting movement of one of said rail engaging members.

HUNTINGTON MALARKEY.