March 16, 1937. H. W. NEUNHERZ 2,073,848

METHOD OF ASSEMBLING FRAMES

Filed June 20, 1935 4 Sheets-Sheet 1

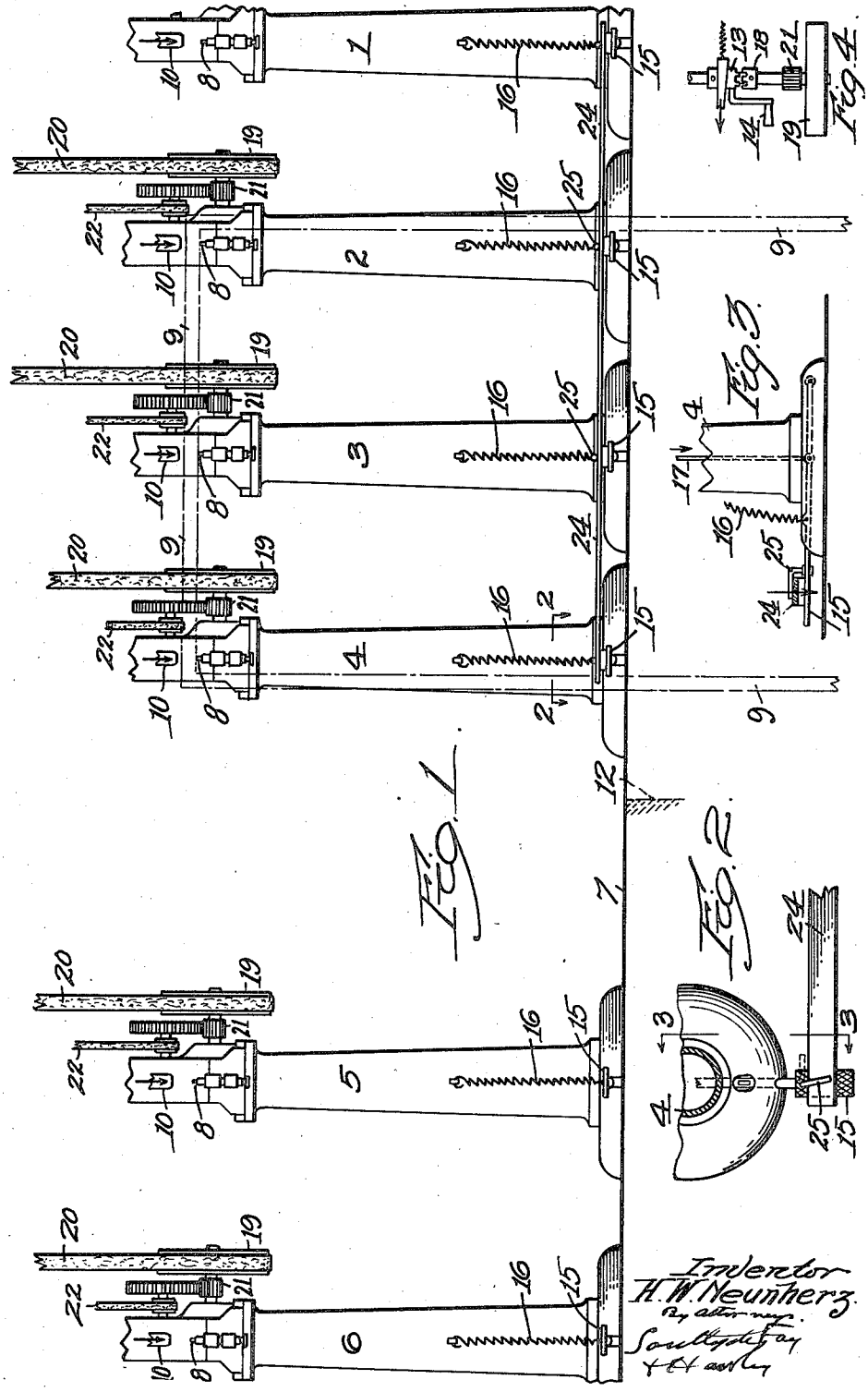


Fig. 1

Fig. 4

Fig. 3

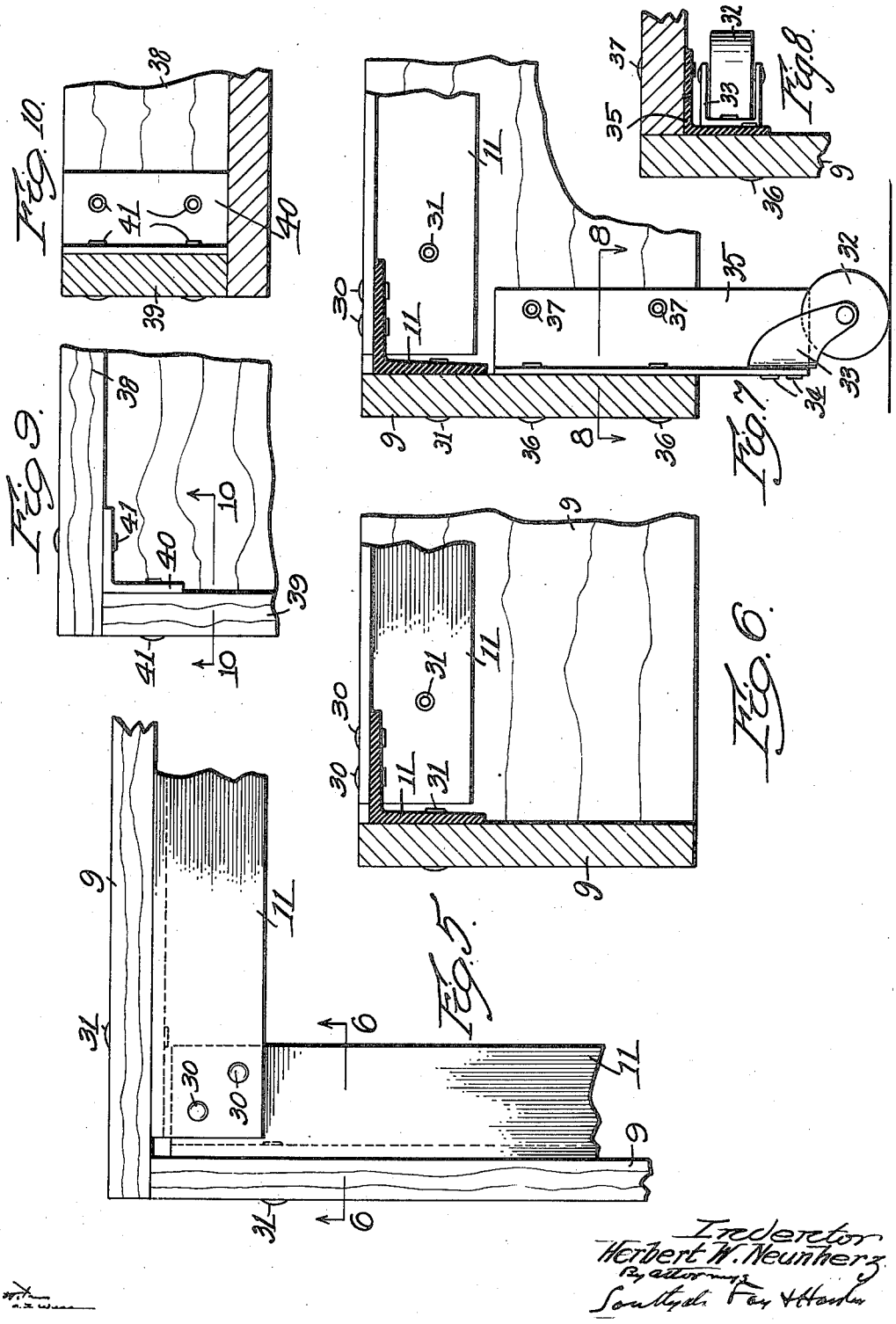
Fig. 2

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METHOD OF ASSEMBLING FRAMES

Filed June 20, 1935 4 Sheets-Sheet 2



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March 16, 1937. H. W. NEUNHERZ 2,073,848

METHOD OF ASSEMBLING FRAMES

Filed June 20, 1935 4 Sheets-Sheet 3

Fig. 11.

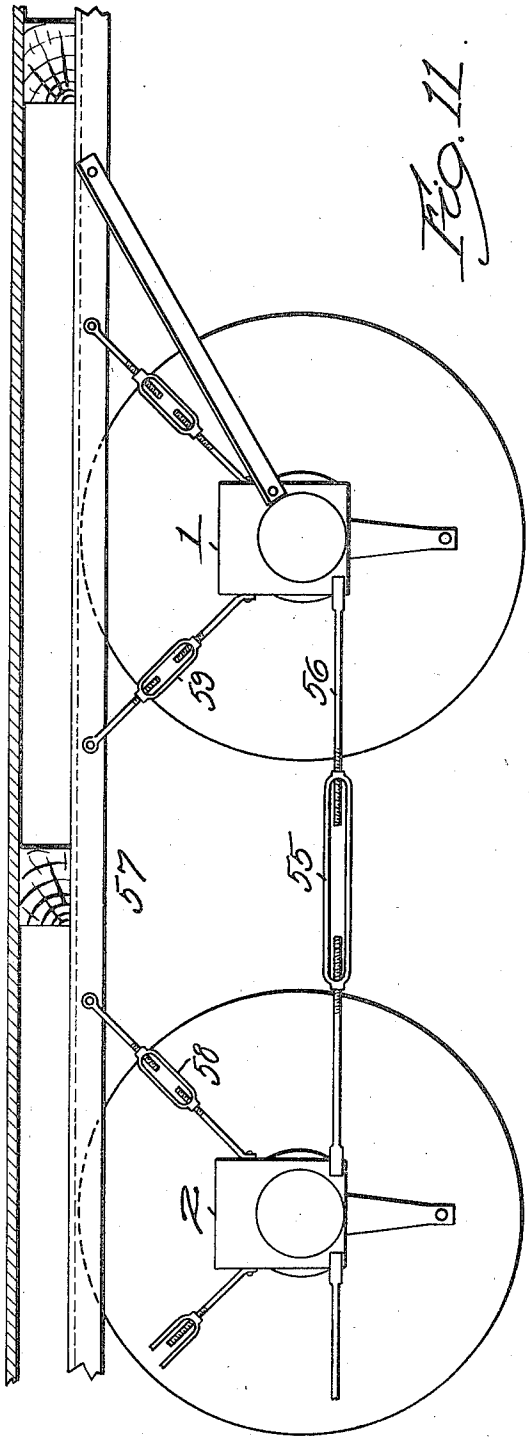
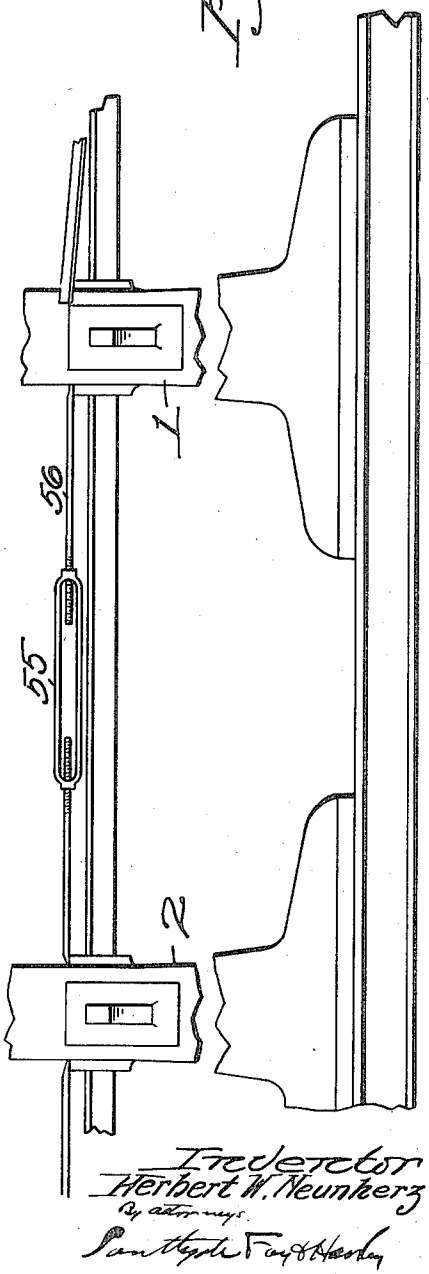


Fig. 12.



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March 16, 1937. H. W. NEUNHERZ 2,073,848

METHOD OF ASSEMBLING FRAMES

Filed June 20, 1935 4 Sheets-Sheet 4

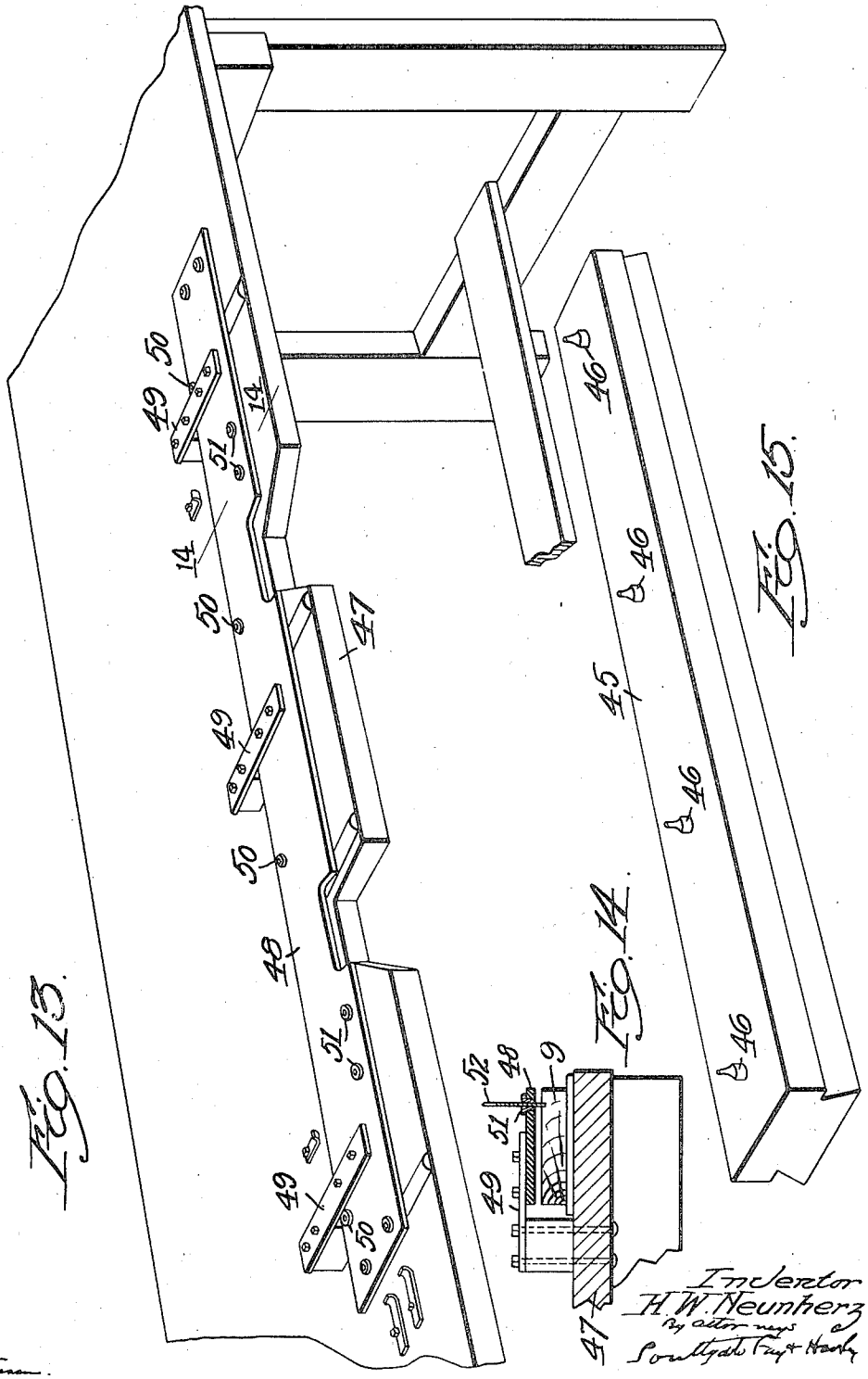


Fig. 13.

Fig. 14.

Fig. 15.

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UNITED STATES PATENT OFFICE

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METHOD OF ASSEMBLING FRAMES

Herbert W. Neunherz, Gardner, Mass.

Application June 20, 1935, Serial No. 27,614

2 Claims. (Cl. 29—148)

This invention relates to a method by which frames of various kinds can be assembled and is particularly adapted for the assembling of the frames of studio couches and the like. The invention also includes mechanism by which the frames are assembled and the product of the method.

The principal objects of the invention are to provide for the convenient, expeditious, and exact assembling of frames made up of longitudinal and lateral members, each composed generally of two parts, as for example, a metal frame and a wooden box frame consisting of sides and ends; to provide a method by which wooden sides and ends can be secured in an absolutely definite relation to a four-sided frame of metal or wood without the use of screws or other fastening devices of an inexact nature; to provide a method and means whereby a plurality of fastening devices, as rivets, are inserted in two pieces of material simultaneously so as to prevent the deflection of any of these fastening devices while being applied, as will be the case where screws are inserted individually in wood, thus affording an opportunity for the first screw to be put in at a slight angle, thus throwing out the accuracy of the whole assembly; to provide an arrangement of a plurality of riveting machines spaced at predetermined distances apart for placing the rivets in the desired positions according to the above mentioned objects so that a studio couch frame and a bedding box frame, for example, can be assembled on the same series of machines; to provide a means of assembly which will not only be absolutely accurate but will decrease the time required for the assembly, and to provide an improved product manufactured in accordance with the above principles.

Other objects and advantages of the invention will appear hereinafter.

Reference is to be had to the accompanying drawings, in which

Fig. 1 is a front elevation, somewhat diagrammatic in form, illustrating a series of riveting machines set up for the particular purpose of assembling a studio couch frame and a bedding box to go with it;

Fig. 2 is a horizontal sectional view on the line 2—2 of Fig. 1;

Fig. 3 is a sectional view on the line 3—3 of Fig. 2;

Fig. 4 is a plan of the clutch mechanism for starting the operation of a riveting machine;

Fig. 5 is a plan of a corner of a frame adapted to be manufactured by the apparatus and process above illustrated;

Fig. 6 is a sectional view on the line 6—6 of Fig. 5;

Fig. 7 is a similar cross sectional view of a studio couch frame constructed in accordance with this invention;

Fig. 8 is a sectional view on the line 8—8 of Fig. 7;

Fig. 9 is a plan of a corner of a frame which is formed of wood on metal and the sides and ends secured together according to this invention by means of angle irons;

Fig. 10 is a sectional view of the same on the line 10—10 of Fig. 9;

Fig. 11 is a plan of some of the riveting machines showing how they are securely and accurately screwed together and to a wall;

Fig. 12 is a front view of the same;

Fig. 13 is a perspective view of a jig for accurately boring the wooden part of the frame to secure absolute accuracy of the spaces between the holes;

Fig. 14 is a transverse sectional view on the line 14—14 of Fig. 13, and

Fig. 15 is a perspective view of the jig used for punching the holes in the metal frame.

This arrangement is provided for the purpose of riveting two pieces together in such a way that the riveting can be accomplished very expeditiously and with absolute accuracy and so that any two sets of such pieces can be absolutely alike. Couch frames, for example, can be made by this method with extreme accuracy so that they will all be absolutely alike, for the first time. The distances between rivets are previously designed to fit a set of riveting machines, as, 1, 2, 3, 4, 5 and 6, which are set up with their rivet heads at certain accurate distances apart.

The metal frames are punched the proper places at exactly the right distances apart. The wooden pieces are likewise bored at exactly the same distances apart. The machines shown cannot be tripped unless these prior operations are performed exactly.

The frames shown are generally composed of an inner frame of angle irons 11 and outer boards 9. The inner frame is first riveted together by rivets 30 so as to constitute a solid rectangular frame. Then the boards 9 are riveted to this frame individually, but not necessarily directly fastened to each other.

In order to prepare for the finishing of the frame, one side at a time of the metal frame 11 is prepared by punching holes in at predeter-

mined distances apart. This is done by the use of a jig 45 having a series of stationary punch bushings 46, which, of course, are stationary.

The boards 9 are bored, one at a time, by the use of a boring jig comprising a bench 47 on which the board is accurately located. A template 48 is held in position by brackets 49. At the same distances apart as the bushings 46 are located on the template the same number of boring bushings 50. Other bushings 51 are shown for other purposes. A plurality of drills 52 are simultaneously brought down through the bushings 50. Thus in one stroke four holes may be bored in a wooden piece to constitute the outer wall of the frame. The corresponding side of the frame is punched with one stroke. The two sets of holes are at exactly equal distances apart.

The machines 1, 2, 3, etc. are fastened together by turnbuckles 55 and rods 56 so that they can be rigidly and accurately connected and can be adjusted to preserve that accuracy. They are also rigidly and adjustably connected to a wall 57 behind by turnbuckles 58 and 59 in a similar way.

Fig. 1 shows several riveting machines 1, 2, 3, 4, 5 and 6 set up on a floor 7 at certain predetermined distances apart. These distances are very important and they are not uniform ordinarily. Each one of these riveting machines is provided with a pilot pin 8 and they are set up with a definite horizontal distance between the axes of the several pilot pins. These distances are selected so as to adapt this set-up of machines for doing whatever work may be desired.

In Fig. 1 a dotted frame 9—11 is shown which is placed on three of the pilot pins so that when the three plungers 10 come down they will insert three rivets simultaneously in the frame. The frame preferably contains two pieces, the outer frame 9 and an inner frame 11. These rivets fasten these two pieces together in certain definitely located places. In the position shown the frame extends down below the floor line through an opening 12 in the floor.

These riveting machines do not constitute in themselves a part of this invention. A well known form of riveting machine is shown in which the plunger 10 is operated from a clutch 13 which can be set into operation by a hand lever 14 or by a foot treadle 15. The foot treadle is pivoted, as indicated in Fig. 3, and held up by a spring 16. When it is depressed, it pulls down a rod 17 which operates the clutch 13 to connect up the mechanism for operating the plunger 10 with a clutch section 18. This clutch section is fixed with respect to a pulley 19 operated by a power belt 20. On the same shaft as the member 18 and 19 is a pinion 21 which operates a belt 22 for feeding the rivets. The other parts of the riveting machine are not shown.

For the purpose of permitting the riveting operations to be performed simultaneously, as indicated in Fig. 1, a bar 24 is laid across three or four of the treadles 15 and each of these treadles is provided with an oscillatable hook 25 which, when placed in the position shown in Fig. 3, will cause these treadles to work together by the depression of one treadle. By reversing the hook 25 each machine can be operated individually. In the instance illustrated the depression of any one of the three treadles of the machines 2, 3 and 4 will result in the simultaneous descent of their three plungers 10 and the simultaneous riveting together of the end members of which the frame 9 is composed.

It will be understood that when the frame 9 is turned a quarter of the way around, its side will rest on four pilot pins of the four machines 1, 2, 3 and 4, but the operation will be substantially the same. It may be stated further that the two machines 5 and 6 are located at a definite space from each other different from that of any other machines and that the space between the central lines of the machines 4 and 5 is a still different dimension. These two machines 5 and 6 are used in making another frame but in the same way as that previously described.

This frame 9 is shown as being provided with side and end pieces of wood, not fastened at their ends, and an internal rigid metal frame 11 formed of four angle irons which are secured together at their corners by rivets 30 or in any other desired way so as to provide a rigid frame. Rivets 31 which are introduced in the manner previously described through the wood and the flange of the angle iron are located along the length and width of this frame and may constitute the only means for securing the frame parts together and the only means especially for securing the wooden pieces 9 together. They do not have to be secured at the corners for some classes of work.

In this case a frame is provided which comprises at the top the angle iron internal frame 11 and the wooden frame outside it. This particular frame is especially suitable as a studio couch frame and the frame illustrated in Figs. 1, 5 and 6 is intended for a studio couch frame. Ordinarily, on such a frame four casters or rollers are desired and this fact is taken advantage of, according to this invention, by providing these casters 32 on brackets 33 riveted at 34 to a vertical angle iron leg 35. This angle iron leg can fit into the corner of the frame, as shown in Figs. 7 and 8, and constitutes an addition to what is shown in Figs. 5 and 6. The angle iron leg does not need to touch the angle iron frame 11 but it is secured in place to the wooden frame 9 by rivets 36 and 37. These rivets can be put in individually or by the use of two of the machines shown in Fig. 1.

It will be seen that these legs 35 constitute a means for securing together directly the side and end wooden members 9 so that, even without the frame 11, this can be a complete frame with legs, and would also be rigid and exact in construction. In fact, in Figs 9 and 10, is shown a frame consisting of side members 38 and end members 39 of wood or metal, but wood being shown. These side and end members are secured together by angle iron corner pieces 40 riveted at 41 to the wooden members, in this case there being no casters and no need of any other fastening devices for securing these pieces together. This construction can be used for many purposes, including a bedding box to go with the couch frame to constitute a studio couch. The machines 5 and 6 are shown as set up at proper distances from the machine 4 for making the bedding box frame. The distance apart of the machines 4 and 5 is the distance between two rivets in the sides of the bedding box frame. The distance between the machines 5 and 6 correspondingly is equal to the distance between two rivets in the ends thereof.

It will be seen that by this method various kinds of frames consisting not only of one set of sides and ends but having another rigid frame for connecting said sides and ends can be formed

expeditiously and with absolute exactness. Also, it will be seen that the invention can be applied to the connecting together of wooden sides and ends, which are not directly fastened to each other, by means of legs **35**, or angle irons **40**, or their equivalent.

This invention is capable of use in making frames of other kinds than those specifically illustrated and, in fact, is capable of a variety of uses for forming frames or corresponding parts of various articles. The number of riveting machines employed will depend, of course, on the complication of the article produced and in many cases one of the machines can be eliminated if the distance apart of the rivets in the different frames can be made duplicates of each other. The first four machines can be employed alone for the manufacture of a single frame and the other two machines will not then be necessary.

Frames made by this method are not only exactly alike, as they come from the machines, but wooden frames connected in this way are much stronger and more rigid than they could be made by fastening the wooden pieces directly together by means of screws or other fastening devices. The utilization of the legs **35**, both for supporting the casters and for strengthening the frame and in some cases constituting the only strengthening or holding means of the frame, is an economical construction.

Having thus described my invention and the advantages thereof, I do not wish to be limited to the details herein disclosed, otherwise than as set forth in the claims, but what I claim is:—

1. The method of assembling frames which comprises forming rivet holes in elements of which the frames are to be made at accurate different predetermined distances apart, locating one of the elements having a plurality of such holes in the desired position with respect to another of said elements, and simultaneously operating a plurality of riveting machines, set at the said different distances apart, to insert rivets and rivet the two elements together in the desired number of places in a single operation.

2. The method of assembling frames which comprises forming rivet holes at accurate predetermined distances apart, in elements of which the frames are to be made, locating one of the elements having a plurality of such holes in the desired position with respect to another of said elements, placing the two elements on a plurality of complete riveting machines, set up at the proper distances apart and each separately driven, and riveting the two elements together simultaneously in the desired number of places.

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