

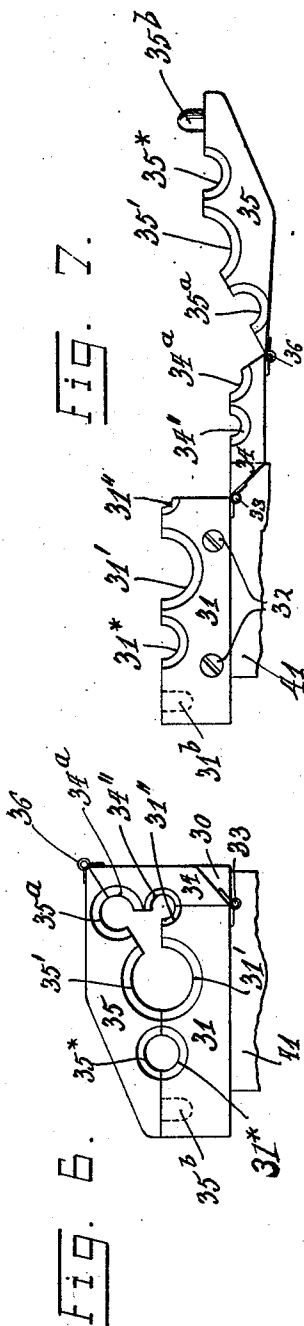
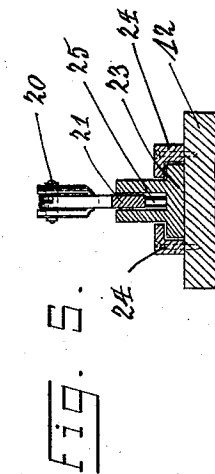
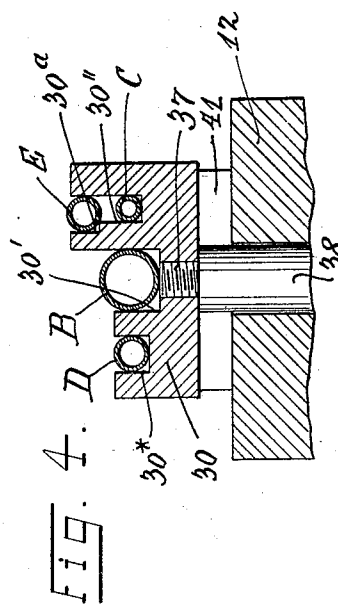
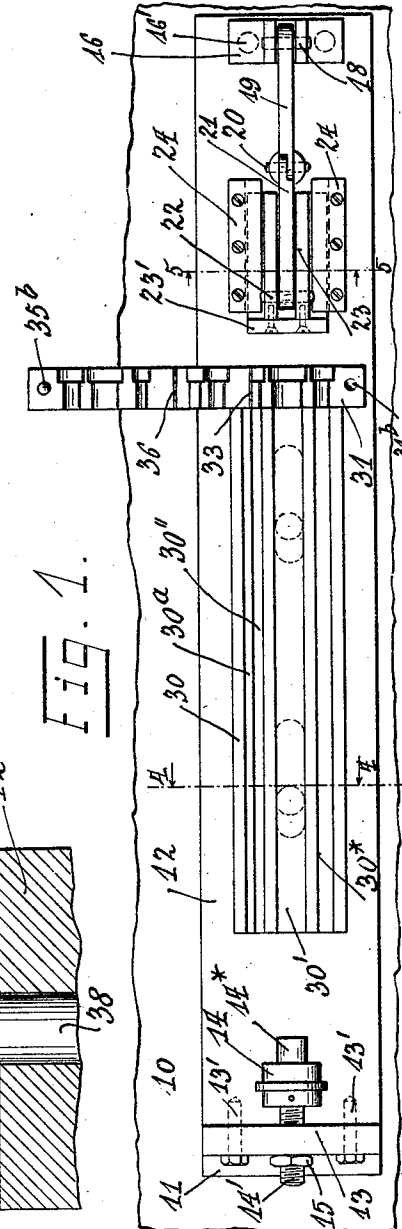
Apr. 10, 1923.

1,451,381

H. E. TUNNELL
ASSEMBLING MACHINE

Filed Apr. 5, 1920

2 sheets-sheet 1



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2 sheets-sheet 2

FIG. 2.

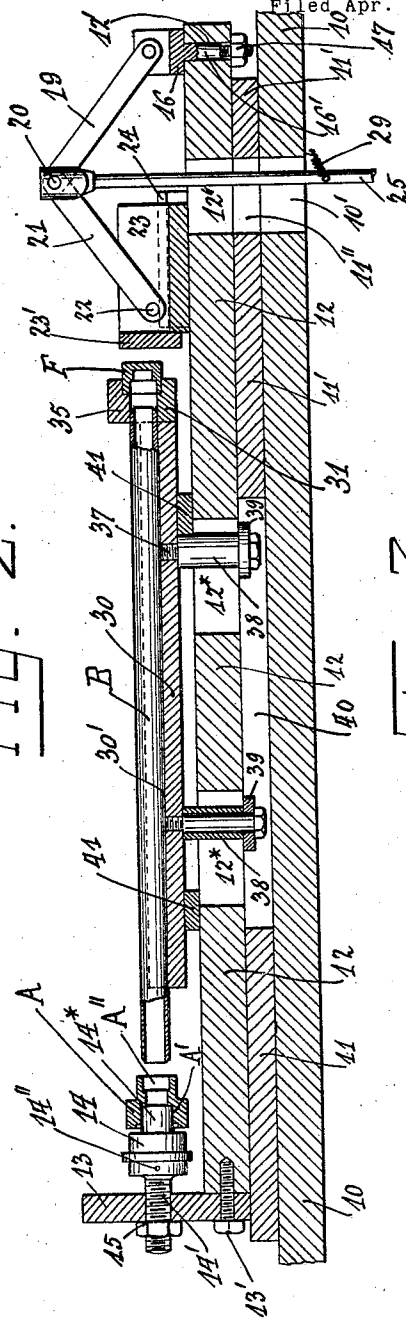
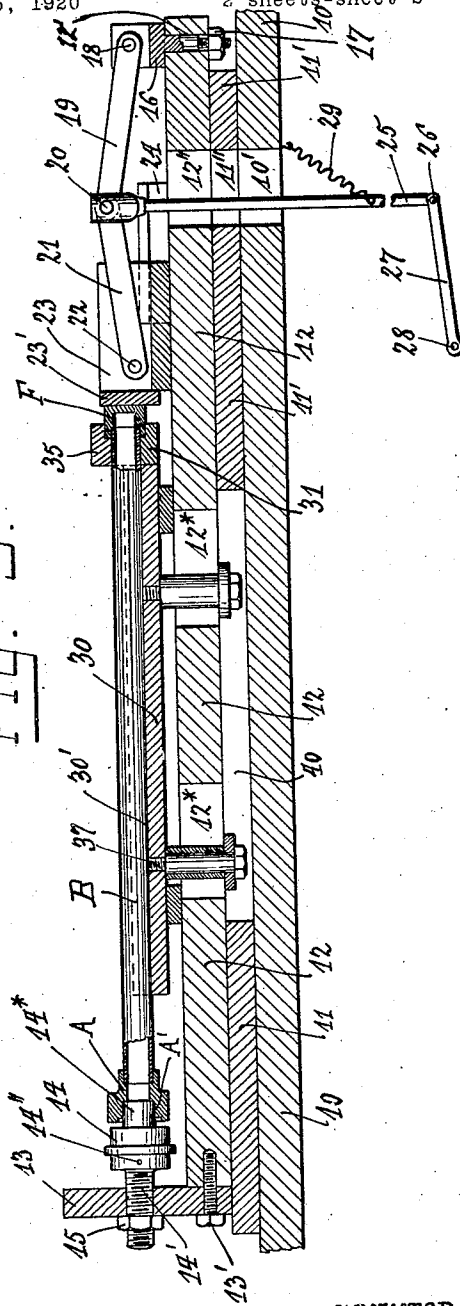


FIG. 3.



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1,451,381

UNITED STATES PATENT OFFICE.

HARRY E. TUNNELL, OF NEW YORK, N. Y.

ASSEMBLING MACHINE.

Application filed April 5, 1920. Serial No. 371,542.

To all whom it may concern:

Be it known that I, HARRY E. TUNNELL, a citizen of the United States, and resident of the borough of Manhattan, city, county, and State of New York, have invented certain new and useful Improvements in Assembling Machines, of which the following is a specification.

My present invention relates to machines or apparatus for assembling the parts of articles which are fitted together with parallel joints, so that they may be assembled by movement and pressure in one direction. The object of this invention is to provide a simple apparatus of this class, particularly adapted for assembling structures embodying tubes both ends of which are to be connected with heads or casings, said ends being parallel. As an instance of such an article, I will name fire-extinguishers of the type comprising a pump barrel and fluid-conveying tubes extending along-side such barrel.

A specific example of my improved assembling machine is shown in the accompanying drawings, in which Fig. 1 is a partial plan view of the apparatus; Figs. 2 and 3 are longitudinal vertical sections through the center or axis of the apparatus, showing the parts in two different positions; Figs. 4 and 5 are transverse vertical sections on lines 4-4 and 5-5 respectively of Fig. 1; Fig. 6 is an end view of a cradle forming part of the apparatus, showing said cradle in the closed or operative position; and Fig. 7 is an end view of the same cradle opened for the insertion of the parts to be supported thereby.

Upon a table or other support 10 are secured rigidly two blocks or distance pieces 11, 11', one in advance of the other at a relatively considerable distance, for a purpose set forth hereinafter. On these blocks is fastened rigidly a base plate 12, with a bracket or end plate 13 projecting therefrom upwardly at one end of the base, and secured thereto as by screws 13'. In the longitudinal axis of the apparatus, the plate 13 is provided with a screw-threaded aperture to receive the correspondingly-threaded shank 14', of an abutment 14, adjustable lengthwise by turning it about said axis, and locked in position, after adjustment, by means of a lock-nut 15. The abutment 14 may be provided with holes 14'' for the insertion of a suitable pointed tool for turn-

ing it, and has an axially projecting stud 14* on its inner side, said stud being preferably cylindrical. At the other end of the base 12 a fulcrum-block 16 is secured rigidly, as by means of a nut 17 fitted under the base 12 upon a threaded shank 16' which extends through a slot 12' at this end of the base. On this block 16 is located the transverse horizontal fulcrum pin 18 for a toggle link 19, the other end of which is connected pivotally at 20 with a similar link 21. That end of the link 21 which is nearest the abutment 14, is connected pivotally at 22 with a slide 23 sliding horizontally along longitudinal guides 24 and formed at its inner end with a transverse plate 23' forming a presser, as will be explained hereinafter. At the point 20, the toggle links 19, 21 are connected with an operating rod 25 extending downwardly through a longitudinal slot 12'' of the base 12 and through similar slots 11'' and 10' of the block 11' and table 10 respectively, the lower end of said rod being connected at 26 with a pedal 27 fulcrumed at 28, a spring 29 tending to restore these parts to the normal upper position shown in Fig. 2. Other suitable mechanism may be substituted for operating the toggle links 19, 21.

Between the stationary abutment or backing 14 and the sliding presser 23, 23' is located a cradle adapted to support one or more of the parts to be assembled, said cradle being freely slidable in a direction parallel to the path of the presser. In the specific construction shown, the cradle comprises three members connected by hinges extending parallel to the path of the presser and of the cradle. One of these parts, 30, may be termed the cradle base, and is provided with longitudinal recesses or sockets 30', 30'', 30* and 30^a, the recess 30* being on one side of the recess 30', while the recesses 30'' and 30^a are on the other side thereof, with the recess 30^a above the recess 30''. To the end of the cradle base 30 which is nearest the presser 23, 23' is secured rigidly a head 31, as by means of screws 32, said head being provided with three recesses 31*, 31', and 31'' respectively, adapted for registry with the corresponding recesses of the cradle base 30. At one of the longitudinal lower edges of the head section 31, there is a hinge 33 for a section 34 having sockets 34'' and 34^a, the former adapted to register with the recesses 30'' and 31'', and the latter with the

recess 30*. At the free longitudinal edge of the section 34 is another hinge 36 for a third section 35, having longitudinal recesses 35* and 35' adapted for registry with the corresponding recesses of the base 30 and section 31, and also having a recess 35^a adapted to register with the corresponding recesses of the base 30 and section 34 respectively. To secure a proper alignment of the sections when folded upon one another in the operative position shown in Fig. 6, the section 35 may be provided with a pin 35^b adapted to enter a socket 31^b of the section 31. The various sockets or recesses of the sections 31, 34, and 35 are preferably enlarged on the side facing the presser 23, 23', for a purpose to be set forth presently. The cradle is guided in its longitudinal movement by means of vertical bolts 37 screwed into the bottom of the base 30 and extending through longitudinal slots 12* of the base plate 12, sleeves 38 being preferably mounted loosely on said bolts, while washers 39 located on the bolts under the plate 12 prevent any vertical movement of the cradle. The heads of the bolts 37 and the washers 39 are adapted to move in the space 40 left under the plate 12 between the blocks 11, 11'. In order to reduce the friction surface on which the cradle slides, I may secure two transverse bars 41 to the upper face of the plate 12, and the opposing edges of these bars may also serve as stops to limit the longitudinal movement of the cradle. The bars 41 may be secured to the plate 12 at different points according to the particular place at which it is desired to stop the cradle in each individual case, and this is a more convenient way to limit the movement of the cradle than to rely on the ends of the slots 12* to act as stops.

The drawings illustrate the use of my invention in assembling certain parts of a fire-extinguisher, viz. a head or casing A, a pump barrel B, fluid-conveying tubes C, D, E parallel to said barrel, and a second head or casing F at the end opposite to the head A. The latter has a socket A' of cylindrical shape to receive the axially-projecting stud 14* of the abutment 14, which abutment is first adjusted lengthwise to the proper position for the work required. The pump barrel B is placed in the recesses 30', 31' while the cradle or rather its head 31, 34, 35 is in the open position Fig. 7, and similarly, while the cradle head is in this open position, the tubes C, D, E are placed in the recesses 30'', 31'' and 30*, 31* and 30^a respectively, while the head F will be placed so that three of its four longitudinal nipples (one of which is shown in Figs. 2 and 3) will fit into the enlarged portions of the recesses 31*, 31', and 31'' respectively, the fourth nipple, which lies at a higher level, not being in engagement with any part of the

cradle at this time. Then, while the operator holds the head F in this position, the cradle head is closed to the position Fig. 6, by swinging its sections 34, 35 on the hinges 33, 36 respectively, thus bringing the fourth or upper nipple of the head F in engagement with the walls of the enlarged portions of the recesses 34^a, 35^a, while the other three nipples are also engaged by the walls of the enlarged portions of the recesses 35*, 35'', and 34'', whereby the head F is held in this position steadily even after the operator has withdrawn the support of his hand. The closing of the cradle head also brings the barrel B and the tubes C and D into engagement with the walls of the recesses 35', 34'', and 35* respectively, and the tube E into engagement with the walls of the recesses 34^a and 35^a. The nipples of the head F are thus brought into proper longitudinal alignment with the barrel B and tubes C, D, E. By making the cradle head so that it may be opened (Figs. 1 and 7), I am enabled to place the said tubes, barrel, and the head F in the proper relative position quickly from above. The members 34, 35 and even the member 31 might be omitted; if the sections 34, 35 are omitted, the head F will have to be held by hand until it is engaged by the presser head 23'; if the section 31 also is omitted, the head F would have to be brought by hand into registry and engagement with the ends of the barrel B and of the tubes C, D, E, and held in this position until the advancing presser plate 23' establishes a firm relation between the head F and the barrel and tubes. I prefer the sectional cradle head construction shown. The head A is provided with sockets or nipples to receive the ends of the barrel B and of the tubes C, D, E, one of these sockets being indicated at A'' in Fig. 2.

The ends of the barrel B and of the tubes C, D, E are preferably tapered or sharpened as indicated in Figs. 2 and 3 so that they may more readily enter the corresponding sockets or nipples in the heads A and F; the outside diameter of this barrel and of the tubes (except at the tapered ends) is slightly larger than the inside diameter of the sockets or nipples, so that the ends of the barrel and of the tubes will be gripped firmly by said sockets when driven into them as will be set forth presently. The barrel B and tubes C, D, E are generally made of a metal which is harder than the one of which the heads A and F consist.

Fig. 2 illustrates the position of the parts after the barrel B, tubes C, D, E, and head F have been placed in the cradle and the latter closed, while the head A has been placed on the stud 14* and turned about the axis of said stud until the several nipples or sockets of the head A are in proper registry with the adjacent ends of the barrel

and of said tubes. The presser 23, 23' is in the retracted position. By depressing the pedal 27, the operator then moves the presser 23, 23' toward the abutment 14. This movement first brings the cross plate 23' against the head F and by contact with said head slides the entire cradle with the parts supported thereby, toward the abutment 14. As the cradle moves in this direction, the ends of the barrel and of the tubes enter the sockets of the head A, and are stopped thereby temporarily. The cradle then continues its sliding movement while the barrel and tubes remain stationary, or substantially so, in the slideways or recesses of the cradle, and this relative movement causes the other ends of the tubes and of the barrel to be driven into the corresponding sockets of the head F, since the latter continues to move in unison with the cradle. At the same time, or immediately thereafter, the opposite ends of the barrel and of the tubes are driven into the sockets of the head A, so that finally the position of the parts is as in Fig. 3, the sockets of the heads A, F expanding slightly to allow the ends of the barrel B and of the tubes C, D, E to enter as far as the stop shoulders provided in said heads; and fluid-tight joints being thus formed at the ends of the barrel and of the tubes, it being understood that the material of the heads A, F fits tightly, with contractile tension, against the outer surfaces of said barrel and tube ends. Preferably, the construction is so arranged that the movement of the presser parts will be arrested before the toggle links 19, 21 come into exact alignment, so that the spring 29 will readily restore these parts to the normal position Fig. 2 as soon as the pedal 27 or other actuating member is released. The cradle will then be moved by hand toward the presser, to an extent sufficient to release the head A from the stud 14*, the sections 34, 35 of the cradle head are swung to the open position Figs. 1 and 7, and the assembled unit (heads A and F, barrel B, and tubes C, D, E) can be lifted readily out of the cradle sockets 30', 31', 30'', 31'', 30*, 31*, and 30^a respectively.

The shoulders at the inner ends of the socket enlargements of the cradle head will compel the assembled unit to move with the cradle as the latter is separated from the abutment 14, thus pulling the head A away from the stud 14* and enabling the assembled unit to be removed readily from the cradle, after opening the cradle head, if such head is made with the extra sections 34, 35.

Various modifications may be made without departing from the nature of my invention as defined in the appended claims.

I claim as my invention:

1. A machine of the character described, comprising an abutment located at one end

of the machine, a sliding presser at the other end of the machine, and a cradle adapted to support some of the parts to be assembled, and located between said abutment and said presser, and freely slidable relatively to the presser and to the abutment in a direction parallel to the path of the presser, said cradle being perfectly loose so that, during the placing of such parts on said cradle, it will stay in any position to which it may be brought between the abutment and the presser.

2. A machine of the character described, comprising a stationary abutment, a presser located at a distance from said abutment and movable toward and from the same, and a cradle located between said presser and said abutment and movable freely relatively to the presser and to the abutment in the same direction as the presser, said cradle being perfectly loose so that, during the placing of such parts on said cradle, it will stay in any position to which it may be brought between the abutment and the presser.

3. A machine of the character described, comprising an abutment, a presser spaced therefrom, means for effecting relative movement of said presser and abutment to vary the distance between them, and a cradle freely movable between said presser and abutment relatively to both of them in the direction of such relative movement, said cradle being perfectly loose so that, during the placing of such parts on said cradle, it will stay in any position to which it may be brought between the abutment and the presser.

4. A machine of the character described, comprising an abutment and a presser movable relatively to each other, a cradle located between said presser and said abutment, a base having guide slots extending lengthwise, in the direction of said relative movement, projections extending from the cradle into said slots, transversely to said direction, and rollers mounted on said projections and engaging the walls of said slots.

5. A machine of the character described, comprising an abutment and a presser movable relatively to each other, and a cradle located between said presser and said abutment and provided with supporting slideways in which some of the parts being assembled may move lengthwise during the said relative movement.

6. A machine of the character described, comprising an abutment and a presser movable relatively to each other, a cradle located between said presser and said abutment, a base having a guide surface extending lengthwise, in the direction of said relative movement, a projection extending from said cradle adjacent to said guide surface, transversely to said direction, and a roller mounted on said projection and engaging said guide surface.

7. A machine of the character described, comprising an abutment and a presser movable relatively to each other, said abutment being provided with a stud projecting toward the presser to pivotally support one of the parts to be assembled, and an article-supporting cradle located between said presser and said abutment.

8. A machine of the character described, comprising an abutment and a presser movable relatively to each other, one of said elements being provided with a part projecting toward the other element, in the direction of such relative movement, to support one of the parts to be assembled, and an article-supporting cradle located between said presser and said abutment.

9. A machine of the character described, comprising an abutment and a presser movable relatively to each other, and a cradle located between said abutment and said presser and including a cradle head made of separable sections provided with registering recesses for engaging the article being assembled.

10. A machine of the character described, comprising an abutment and a presser movable relatively to each other, and a cradle located between said abutment and said presser and including a cradle head made of separable sections connected by hinges parallel to the direction of such relative movement, said sections being adapted to engage the article being assembled.

11. A machine of the character described, comprising an abutment and a presser movable relatively to each other, and a cradle located between said presser and said abutment and including a cradle head made of

sections connected by a plurality of parallel hinges and adapted to engage the article being assembled.

12. A machine of the character described, comprising an abutment and a presser movable relatively to each other, and a cradle located between said presser and said abutment and including a cradle head made of hinged sections adapted to embrace part of the article being assembled.

13. A machine of the character described, comprising an abutment and a presser movable relatively to each other, a cradle located between said presser and said abutment, a base having a plurality of spaced guide surfaces extending lengthwise, in the direction of said relative movement, and projections extending from said cradle transversely to said direction and engaging said guide surfaces.

14. A machine of the character described, comprising an abutment and a presser movable relatively to each other, said abutment being adjustable lengthwise, in the direction of such relative movement, and a cradle located between said presser and said abutment.

15. A machine of the character described, comprising a table provided with spaced cross bars on its upper face, an abutment at one side of said cross bars, a longitudinally-movable presser on the other side of said bars, and a longitudinally-movable cradle located between said presser and said abutment and in sliding engagement with said cross bars.

In testimony whereof I have signed this specification.

HARRY E. TUNNELL.