

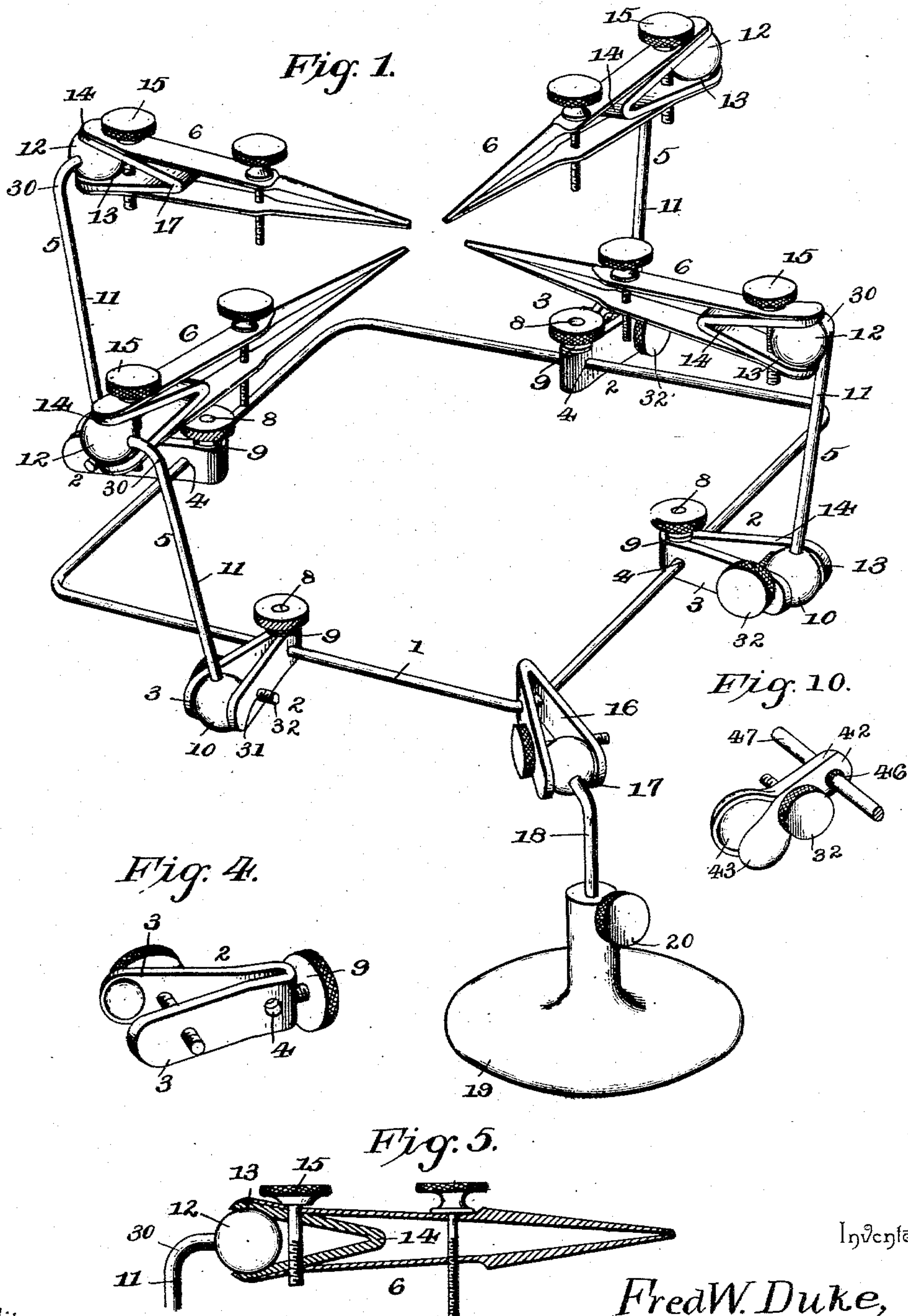
(No Model.)

2 Sheets—Sheet 1.

F. W. DUKE.
SOLDERING CLAMP.

No. 546,421.

Patented Sept. 17, 1895.



Witnesses

Chas. A. Ford
[Signature]

By *his* Attorneys.

Fred W. Duke,

CA Snow & Co.

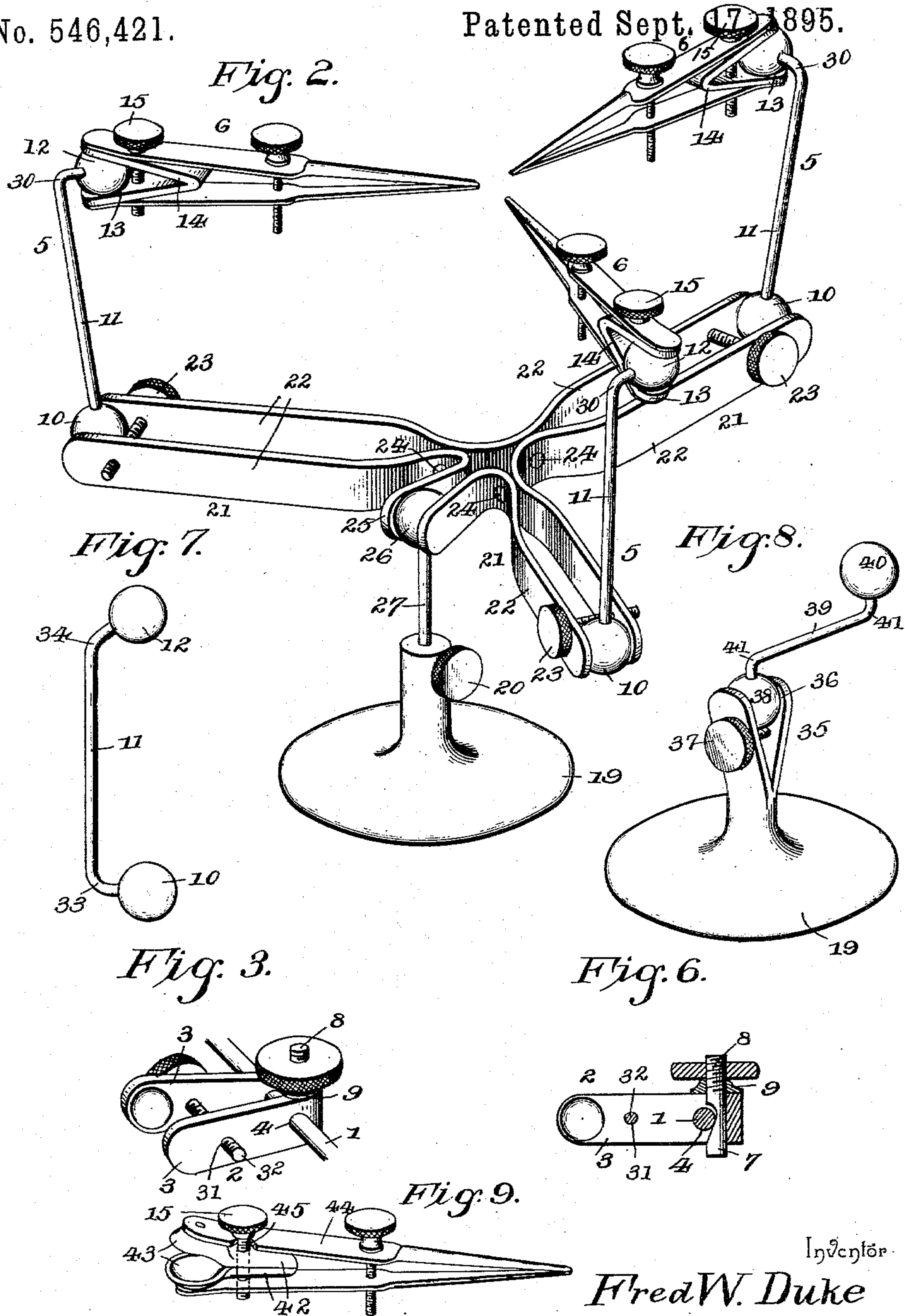
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Chas. A. Ford

Inventor

Fred W. Duke

UNITED STATES PATENT OFFICE.

FRED W. DUKE, OF FORT DODGE, IOWA.

SOLDERING-CLAMP.

SPECIFICATION forming part of Letters Patent No. 546,421, dated September 17, 1895.

Application filed October 10, 1894. Serial No. 525,497. (No model.)

To all whom it may concern:

Be it known that I, FRED W. DUKE, a citizen of the United States, residing at Fort Dodge, in the county of Webster and State of Iowa, have invented a new and useful Soldering-Forceps, of which the following is a specification.

My invention relates to soldering-forceps designed for the use of jewelers, dentists, plumbers, and others in making and repairing small articles and designed to hold such articles in convenient positions for soldering and manipulation, the different parts or members of the apparatus being capable of occupying an infinite number of relative positions.

The objects and advantages of the invention will appear in the following description, and the novel features thereof will be particularly pointed out in the appended claims.

In the drawings, Figure 1 is a perspective view of a device embodying my invention. Fig. 2 is a similar view of a device having a modified form of frame for supporting the articulated arms. Fig. 3 is a detail view in perspective of one of the clips for attachment to and adjustment upon the frame shown in Fig. 1. Fig. 4 is a modified form of clip, also adapted for use in connection with the frame shown in Fig. 1. Fig. 5 is a detail view of one of the clamps or tweezers for engaging the work. Fig. 6 is a detail sectional view of the clip shown in Figs. 1 and 3. Fig. 7 is a detail view of an intermediate arm provided at each end with an elbow. Fig. 8 shows a modified form of base and stem. Fig. 9 is a detail view of tweezers, showing a modified form of clip. Fig. 10 is a similar view, showing said modified form of clip attached to a frame, a portion only of the frame being shown.

Similar numerals of reference indicate corresponding parts in all the figures of the drawings.

Various-shaped frames may be employed—such as round, square, or other convenient form; but in the construction illustrated in Fig. 1 the numeral 1 designates a frame which is of rectangular shape with rounded or curved corners, adapted to facilitate the fastening thereto and the adjustment thereon of the clips 2. These clips are approximately V-shaped and the arms 3 thereof are provided

near the apex of the clip with aligned perforations 4 for the reception of the round bar or rod forming the frame. These clips are the inner members of articulated arms 5, which carry the terminal clamps or tweezers 6, said clamps being of any suitable or preferred construction.

Various means for securing the clips in the desired position and at the desired points on the frame may be employed, the form shown in Fig. 1 and in the detail view, Fig. 3, consisting of a small wedge-block 7, arranged in the angle of the clip and between the inner surface thereof and the adjacent surface of the wire or rod forming the frame, said wedge-block having a threaded extension or stem 8, upon which is fitted a loose collar 9, to bear upon the edge of the clip, and a thumb-nut, preferably having a milled periphery, threaded upon the extremity of said extension or stem. By tightening the thumb-nut the beveled surface of the wedge-block is forced into frictional contact with the surface of the rod or wire forming the frame, thereby locking the clip in the desired position.

In Fig. 4 I have shown a modified form of the means for securing the clip at the desired adjustment, in which a thumb-screw 9 is threaded in a perforation in the apex of the clip and is adapted to bear at its extremity against the surface of the rod or wire forming the frame.

The terminals of the arms of the clip are provided with opposite depressions or partial spherical sockets for the reception of a ball 10 on the inner end of an intermediate arm 11, forming one member of the articulated-arm 5. The outer extremity of said member 11 is fitted with a similar ball 12, which fits in partial spherical sockets 13 in the inner surfaces of the arm 14 at the inner end of the clamp or tweezers 6. The arms 14 may be adjusted to secure the necessary frictional contact during operation and to take up lost motion between the ball and the sockets, by means of a set-screw 15, which is loosely fitted in one of the arms and is threaded in a suitable opening in the other arm. This construction provides for tightening the sockets sufficiently to allow the members to be adjusted and hold the same in the desired positions without manipulation of the thumb-

screws after each adjustment. The frictional contact is not sufficient to lock the parts against movement, but is adapted to prevent accidental change of position.

Any suitable means for adjusting the jaws of the clamp or tweezers may be employed.

From the above description it will be seen that the terminal clamps carried by the articulated arms of the apparatus may be arranged in any desired position relative to each other to hold the article engaged in the desired position over a flame or blow-pipe, and the substantially rectangular or parallel sided construction of the frame provides for the proper bracing of the parts to secure firmness during operation.

To one side or angle of the frame is attached a clip 16, similar in construction to those above described, but preferably fixed in position, the terminal arms of this clip being provided with opposite concaved surfaces or sockets for the reception of a ball 17 on the upper end of a stem 18 and with a set-screw 16^a to adjust said arms. This stem is fitted in a vertical socket in the base or standard 19 and is held at the desired vertical adjustment by means of a set-screw 20.

Referring to the modified form of my invention, which is illustrated in Fig. 2, it will be seen that the articulated arms are of substantially the same construction, but that the frame, instead of being parallel-sided, consists of a series of radial arms 21, preferably bifurcated to form divergent cheeks 22, which perform the function of the divergent arms of the clips described in connection with Fig. 1. These divergent cheeks 22 are provided with terminal concavities or sockets for the reception of the balls on the inner ends of the intermediate members of the articulated arms, and said divergent cheeks are adjusted to take up lost motion by means of set-screws 23. This frame is preferably constructed of a series of flat bars, which are bent upon themselves medially, and are secured together by means of rivets or similar fastening devices, as shown at 24. The inner ends of two of the flat bars are arranged in contact to form a clip 25 for the engagement of the ball 26 on the upper end of the stem 27.

The arms of the clips are provided near their outer ends with registering perforations 31 for the reception of set-screws 32, whereby lost motion may be taken up between the balls and the sockets.

The uses and manner of operation of devices of this class are well known, and therefore a detailed description thereof is unnecessary, it being obvious that the ball-and-socket joints, which are provided between the members composing the arms, together with the bends in the arms, allow free adjustment in all directions, so that the clamps may be disposed in the most convenient relative positions.

I preferably employ large balls in the con-

struction of the joints, in order to provide greater frictional surface between the balls and the sockets, to insure the necessary steadiness when the joints are adjusted. It should be noted, furthermore, that the adjustment of the joint between an intermediate member and a clamp is accomplished by the thumb-screws 15 without affecting the adjustment of the jaws of the clamp, and therefore, after an article has been engaged between the jaws of a clamp any desired change in the position of the arm supporting the clamp or of the members of said arm may be made without releasing the article. In the same way the adjustment of the clips upon the frame is entirely independent of the adjustment of the joints between the outer ends of said clips and the contiguous ends of the intermediate members of the arms.

In the drawings I have illustrated two forms of intermediate members of the arms, one having a single and the other twin angular bends located near the balls, but it will be understood that the amount of deflection at these bends, and the particular location of the bends may be altered to suit the particular class of work for which the apparatus is designed. In Figs. 1 and 2 these intermediate members 11 are shown provided with one bend or elbow 30, whereas in the detail view the corresponding member is provided with terminal bends 33 and 34, the bend 33 being right angular, while the bend 34 is an obtuse angle.

In Fig. 8 I have shown a modified form of base which terminates at its upper end in spring-jaws 35, having opposite cavities or sockets 36, said jaws being connected by the set-screws 37, and fitting in the sockets or cavities of the jaws is a ball 38 on the extremity of a stem 39, which corresponds in function with the stem 18 hereinbefore described. This stem 39 is provided at its opposite end with a ball 40 similar to the ball 17 and adapted to fit in the clip on a frame, as before described, the stem at points adjacent to the terminal balls thereof being provided with annular bends or elbows 41.

Fig. 9 illustrates a modified form of clip for attaching the tweezers to the outer ends of the intermediate arms. The clip consists of opposite parts or members 42 having concavo-convex cups 43 for engaging the balls at the outer end of an intermediate arm, and a thumb-screw passing loosely through a perforation in one of the members and threaded in a similar perforation in the other member. The parts of the tweezers 44 are pivotally connected to the outer surfaces of the cups, and the thumb-screw passes through a perforation 45, which registers with the perforations in the clip member engaged by the thumb-screw. Said clip members are also provided with perforations 46, as shown in Fig. 10, for engagement with a frame, (shown at 47,) one of the members being soldered, keyed, or otherwise permanently secured to the frame, while the

other member is loose and is adapted to be adjusted by means of the thumb screw previously described.

The frame shown in Fig. 1 or a frame which is endless and incloses an intermediate space is preferable to other forms of frames, for the reason that there are no loose extremities to vibrate and interfere with the rigidity necessary in holding the parts of a piece of jewelry firmly in position. A further advantage of an open frame is that it allows of manipulation through the frame, and therefore upon all sides of each arm, and at the same time provides for placing the frame over a lamp or jet, whereby the flame rises through the space inclosed by such frame.

The form of clip 2, which is shown in the drawings, is especially adapted for allowing freedom of movement through an extensive arc, such freedom being secured by forming the seats or cavities of such depth as to cover a very limited portion of the surface of the ball. The two seats or cavities in the arms of the clip when combined cover less than one-half the area of the ball, and by leaving the open spaces between said arms of the clip the connected member of the device may be swung between the arms of the clip when necessary for adjustment through a large arc. The above-described construction of clip is also used in forming the connection between the base and the frame, the rod 18 being provided with a bend or elbow which allows the clip to swing through a larger arc in a vertical plane than is possible with a straight rod. Furthermore, the fact that the arms of the clip are separated contiguous to the opposite seats or depressions therein allows the clip to be arranged in positions in which the upper portion of the rod 18 is between said arms. This provides for the movement of the frame, independently of the movement of the articulated arms, through an arc greater than one hundred and eighty degrees, and only limited by the plane or surface upon which the base rests. In other words, the frame can be swung down upon opposite sides of the base until its extremity is in the same plane with the bottom of the base, whereby adjustment of the frame to arrange the soldered portion of an article at the lower side thereof, or to secure the proper arrangement of the article with relation to a lamp or flame, can be accomplished independently of the engagement of the article by the clamps at the extremities of the articulated arms. In other words, the question of the position of the article does not come into consideration until such article has been engaged by the clamps and is arranged in position for access from all sides.

Various changes in the form, proportion, and the minor details of construction may be resorted to without departing from the spirit or sacrificing any of the advantages of this invention.

Having thus described my invention, I claim—

1. In a device of the class described, the combination with a frame, of a plurality of articulated arms having clips adjustably mounted upon the frame, terminal clamps for the engagement of work, and intermediate members connecting said clips and clamps, the articulations between the intermediate members, and the clip and clamp of each arm consisting of universal joints, substantially as specified.

2. In a device of the class described, the combination with a frame, of a plurality of articulated arms comprising clips adjustably mounted upon the frame, clamps for the engagement of work, and intermediate members provided with angular bends or elbows, the articulations between the parts of the arms consisting of universal joints, substantially as specified.

3. In a device of the class described, the combination with a frame, of a plurality of articulated arms comprising clips adjustably mounted upon the frame, terminal clamps for the engagement of work and intermediate members provided with angular bends or elbows, said intermediate members being provided with terminal enlarged balls, and the clips and clamps being provided with sockets for the reception of said terminal balls and means for adjusting the sockets to secure the parts in the desired relative positions, substantially as specified.

4. In a device of the class described, the combination with a frame, of a plurality of articulated arms supported by the frame and each having a terminal clamp and an intermediate member arranged between the clamp and the frame, a universal joint being arranged at the inner and outer end of the intermediate arm, substantially as specified.

5. The combination with an endless frame surrounding an open space, articulated arms having terminal clamps, and means for securing the inner ends of said arms adjustably to the frame, of a base, and a universal joint between the base and the frame, substantially as specified.

6. The combination with a frame, of articulated arms having intermediate members adjustably mounted upon the frame and provided with outer terminal balls, and clamps having divergent arms provided with shallow sockets for the reception of said outer terminal balls and fitted with set-screws for adjusting the deflection of said arms, the sockets receiving the balls at the extremities of their diameters, only, substantially as specified.

7. The combination with a frame, of a series of articulated arms having outer terminal clamps, inner V-shaped clips, and intermediate members provided at their inner ends with balls fitting in sockets in the inner surface of the arms of the clips, said clips being provided adjacent to their apices with registering perforations for the reception of a rod or wire forming the frame, means for adjusting the arms of the clips to take up lost motion

between the sockets and balls, and means for locking the clips at the desired adjustment on the frame, substantially as specified.

8. The combination with a frame, of articulated arms having terminal clamps, and inner V-shaped clips provided in their arms with registering perforations for the reception of the rod or wire forming the frame, and means for locking the clips on the frame, such means consisting of wedge-blocks inserted between the rod or wire and the apex of the clip and provided with a threaded stem, and a thumb-nut threaded upon said stem and seated upon the edge of the clip, substantially as specified.
9. The combination with a frame, of a series of articulated arms carried thereby, each arm comprising a clip slidably and rotatably mounted upon the frame, means for securing the clip at the desired adjustment, an intermediate arm universally jointed to the clip and having an outer terminal ball, means for locking the joint between the clip and the intermediate member to hold the latter in the desired relative position, a clamp having adjustable jaws, and provided at its rear end with adjustable arms having terminal sockets for the reception of the ball at the outer end of the intermediate arm, and a thumb screw for adjusting the arms of the clamp to cause the desired frictional contact between the sockets and the balls, substantially as specified.
10. The combination with a frame, of a series of articulated arms carried thereby, each arm comprising a terminal clamp, an intermediate arm universally jointed at one end to the clamp and provided at the opposite end with a ball, means for locking the joint between the clamp and the intermediate arm to hold said parts in the desired relative position, a V-shaped clip provided in the inner surfaces of its arms near their outer extremities with sockets or depressions for the reception of the said ball, on the intermediate arm and provided near the meeting point of its arms with registering perforations for the reception of a rod or wire forming a part of the

frame, a thumb-screw connecting the arms to the clip contiguous to the sockets at the outer ends thereof, and means arranged near the apex of the clip for securing the latter at the desired adjustment upon the frame, substantially as specified.

11. In a device of the class described, an articulated arm having a clip comprising flat, twin, opposite relatively adjustable arms provided with shallow seats or depressions, means for adjusting the arms of the clip, and a member provided with a ball mounted in said seats or depressions, the seats or depressions covering less than one-half the area of the ball, substantially as specified.

12. In a device of the class described, the combination with a frame, and articulated arms carried thereby and provided with clamps, of a support and a universally jointed connection between the frame and the support, said connection having a clip provided with opposite seats or depressions, and a rod having a ball mounted in said seats or depressions, the rod being provided adjacent to the ball with a bend or elbow, substantially as specified.

13. In a device of the class described, the combination with a frame, and articulated arms carried thereby and provided with clamps, of a support and a universally jointed connection between the frame and the support, said connection having a clip comprising spaced arms provided with opposite seats or depressions, means for adjusting the arms of the clip, and a rod having a ball fitted in said seats or depressions, the interval between the arms of the clip being sufficient to allow the portion of the rod contiguous to the ball to pass therebetween, substantially as specified.

In testimony that I claim the foregoing as my own I have hereto affixed my signature in the presence of two witnesses.

FRED W. DUKE.

Witnesses:

C. P. BERRIAN,
R. REES.