Sept. 22, 1925. 1,554,408

C. J. COBERLY

METHOD AND MEANS FOR SLOTTING METALLIC BODIES

Filed March 17, 1924

Fig. 1.

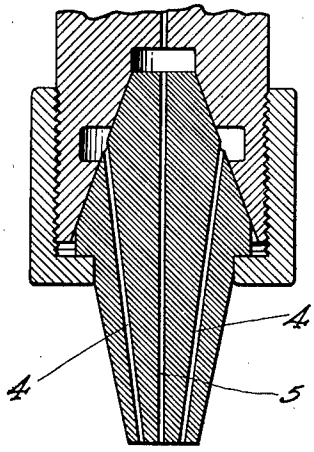


Fig. 2.

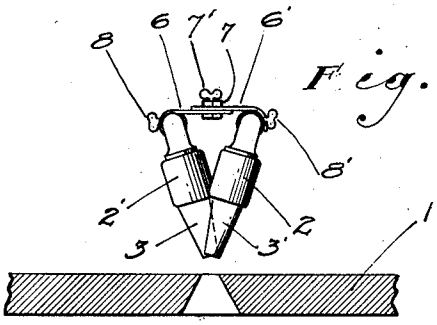


Fig. 3.

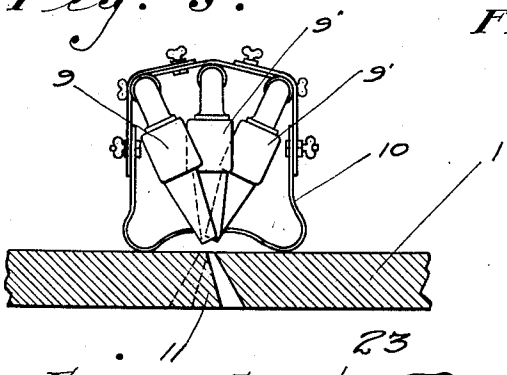


Fig. 4.

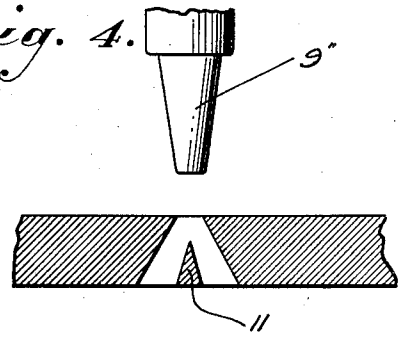
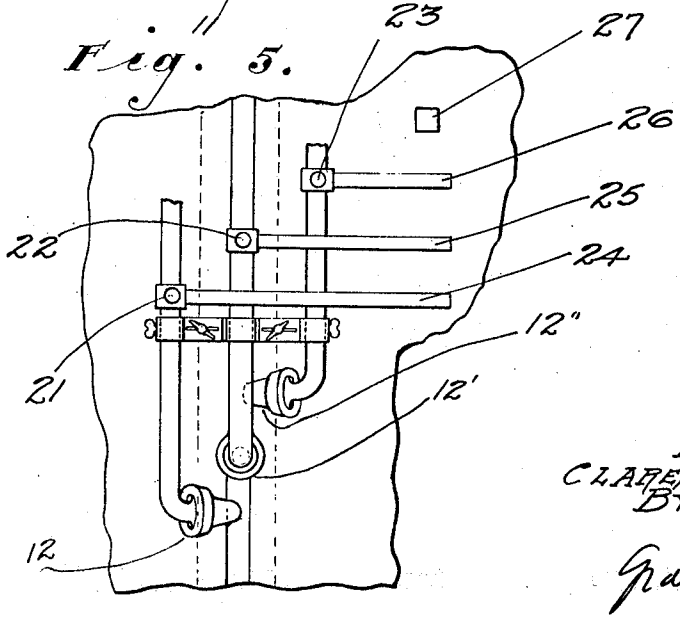


Fig. 5.



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UNITED STATES PATENT OFFICE.

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METHOD AND MEANS FOR SLOTTING METALLIC BODIES.

Application filed March 17, 1924. Serial No. 699,945.

To all whom it may concern:

Be it known that I, CLARENCE J. COBERLY, a citizen of the United States, residing at Los Angeles, in the county of Los Angeles, State of California, have invented a new and useful Method and Means for Slotting Metallic Bodies, of which the following is a specification.

Although my present invention is referred to as a method of slotting, using associated torches, my present invention may be regarded as covering both means and methods especially applicable in the forming of relieved or undercut or inwardly expanding slots, and my invention may be especially useful in the forming of "keystone" or "inverted keystone" slots in sections of pipes for use within oil or other wells.

It is an object of this invention to utilize a plurality of torches, whose bodies may be permanently or adjustably secured in parallel relationship and whose delivery tips may converge toward an intermediate plane, in the production of slots whose transverse dimensions and taper may depend upon the relationship maintained between the associated torches and also upon the working distance maintained between said torches and the surface of the work,—any desired means being employed to secure the respective torch elements in their intended relationships to one another and to the work during a relative traversing movement between said associated torches and said work.

Other objects of my invention will appear from the following description of an illustrative embodiment thereof, taken in connection with appended claims and the accompanying drawings, in which:

Fig. 1 is a somewhat diagrammatic vertical or longitudinal section through one known form of torch suitable for use in the practice of my invention.

Fig. 2 is an elevational end view showing a number of torches associated suitably for the practice of my invention, a plate slotted thereby being shown as sectioned substantially at right angles to a line of slotting.

Fig. 3 is a view corresponding to Fig. 2, but showing three associated torches and guide means therefor.

Fig. 4 illustrates a mode of procedure in which, after two inclined slots are cut, the ends of an intermediate strip of metal may be cut.

Fig. 5 is a top plan view of a torch organization similar to that shown in Fig. 3, and in which the torch which cuts the central portion of a slot is positioned between a pair of torches inclined relatively thereto.

Referring to the details of that specific embodiment of my invention chosen for illustration in Fig. 2, 1 may be a plate or other work to be slotted; and my novel means therein shown for providing the same with inwardly or downwardly expanding slots comprises a pair of torches 2, 2′ provided respectively with tips 3, 3′ which may be of the general character shown in Fig. 1, each tip being provided with a plurality of passages 4 for the delivery of a combustible mixture therethrough and with an additional passage or passages 5 for the delivery of a cutting gas such as oxygen.

In the form of my invention shown in Fig. 2, the respective torches 2, 2′ are adjustably secured to one another, my disclosed means for this purpose comprising a pair of straps 6, 6′, whose overlapping ends may be slotted to receive a retaining bolt 7 carrying a wing nut 7′, the relative inclination of the respective tips 3, 3′ being maintained by means such as set screws 8, 8′. It will be obvious that by the means described, one of the tips referred to being positioned slightly in advance of the other, to avoid an intersection or interference of the jets projected thereby, and a suitable distance being maintained between the work and the tips, a slot of predetermined configuration may be produced by advancing the work beneath the associated torches (no means for this purpose being shown) or by advancing the associated torches in a predetermined direction, or by a relative traversing movement in which both the associated torches and the work may participate.

In the form of my invention shown in Fig. 3, three torches 9, 9′ and 9″ being shown as associated by means similar to those disclosed in Fig. 2, except that an additional adjustable guiding loop 10 is shown as provided for use in connection with the described retaining and adjusting means, the

leading torch 9 is shown as followed by a vertically disposed torch 9'' and then by the additional oppositely inclined torch 9'.

Although any suitable number of torches may be associated in the manner described, the exact means for such association being variable within wide limits, it is advantageous to maintain the torches near enough to one another to render them mutually supportive in their heating effect; and in order to avoid any undue cooling, I consider it advantageous, when employing three torches, to associate them in the manner best shown in Fig. 5, in which the leading torch 12 may be so closely followed by a second torch 12', whose tip is shown as projecting a jet perpendicularly to the surface of the work, that the latter may act upon metal which is already at a temperature close to the ignition point, as a result of the heat imparted by the jet delivered through the tip 12,—a similar relationship being maintained between the tips 12' and 12''.

Although I have herein suggested means by which the predetermined distance and angular relationship may be maintained between associated torches, and also means by which torches may be held at a desired distance and a desired inclination relatively to the work, and although it will be obvious that diverse effects may be obtained by varying not only the distances and inclinations referred to but also by varying the orientation of an association of torches relatively to a line of traversing movement, it is believed that the general nature and mode of operation of my present invention will be fully understood from the foregoing illustrative examples.

When it is desired to have the torches operate automatically, they may be equipped with valves 21, 22 and 23 controlling the cutting or oxygen jets only, each valve provided with a lever 24, 25 and 26. A stop 27 is affixed to the work to be cut and projects up a sufficient distance to strike against the levers 24, 25 and 26. Since all the valves are the same distance from their respective torches, it is evident that the cutting flame of each will start to operate at the same portion of the desired slot, as the work and torches are moved relative to each other. This insures a uniform shaped slot throughout its length.

Either manual means or any desired mechanical means, constituting no part of the present invention, may obviously be employed in producing the desired movement between my association of torches and work to be slotted thereby; and, although I have herein described but a limited number of alternative forms of my invention, it will be obvious not only that my invention is capable of various additional embodiments, but also that various features thereof might be independently employed, without involving the slightest departure from the spirit and scope of my invention as the same is indicated above and in the following claims.

I claim as my invention:

1. In means for slotting metallic bodies, the combination of: a plurality of cutting torches positioned in proximity to the surface to be slotted and relatively arranged so that their respective jets all impinge on said surface along the line of the desired slot.

2. In means for slotting metallic bodies, the combination of: a plurality of cutting torches positioned in proximity to the surface to be slotted and relatively arranged so that their respective jets all impinge on said surface along the line of the desired slot; and means maintaining the discharge ends of said torches a predetermined distance from said surface.

3. In means for cutting in metallic bodies slots having inclined walls, the combination of: a plurality of torches secured with their axes of projection relatively inclined but non-intersecting.

4. In means for cutting in metallic bodies a slot having inclined walls, the combination of: a plurality of torches secured with their axes of projection relatively inclined, but non-intersecting; and adjustable means for the rigid retention of said torches in a predetermined relationship.

5. In means for cutting in metallic bodies, a slot having inclined walls, the combination of: a plurality of torches secured with their axes of projection relatively inclined, but non-intersecting; and means for automatically controlling the jets of said torches.

6. In means for cutting in a metallic body a slot having walls diverging from the surface of said body, the combination of: a plurality of cutting torches positioned in proximity to said surface so that their respective jets impinge on said surface along the line of the desired slot, one torch being angled so that its jet will make a cut defining one angled wall of the slot, and another of said torches being oppositely angled so that its jet will make a cut defining the opposite angled wall of the slot.

7. In means for cutting in a metallic body a slot having walls diverging from the surface of said body, the combination of: torch means in proximity to said surface for directing three cutting jets to impinge thereon at relatively spaced intervals along the line of the desired slot, one jet being angled so as to make a cut defining one angled wall of the slot, another jet being oppositely angled so as to make a cut defining the opposite angled wall of the slot, and the third jet being directed to cut out the intervening metal.

8. The method of slotting metallic bodies

which consists of directing a plurality of cutting torch jets to impinge on the surface of the metal at relatively spaced intervals along the line of the desired slot, and producing relative traversing movement of said surface and the jets in the direction of the slot.

9. The method of slotting metallic bodies which consists of directing a plurality of non-interfering cutting torch jets to impinge on the surface of the metal along the line of the desired slot at intervals spaced to maintain intervening metal at a relatively high temperature, and producing relative traversing movement of said surface and the jets in the direction of the slot.

10. The method of producing in a metallic body a slot having inclined walls, which consists of directing a plurality of cutting torch jets to impinge on the surface of the metal at relatively spaced intervals along the line of the desired slot, and producing relative traversing movement of said surface and the jets in the direction of the slot, the axes of projection of the respective jets being angled to coincide with the angles of the respective inclined walls of the slot.

11. The method of producing in a metallic body a slot having opposed inclined walls, which consists of directing a plurality of cutting torch jets to impinge on the surface of the metal at relatively spaced intervals along the line of the desired slot, and producing relative traversing movement of said surface and the jets in the direction of the slot, one jet being directed at an angle to said surface to make an angled cut defining one angled wall of the slot, another of said jets being directed at an opposite angle to said surface to make an angled cut defining the opposed angled wall of the slot, and a third jet being directed to cut away the intervening metal.

In testimony whereof, I have hereunto set my hand at Los Angeles, California, this 7th day of March, 1924.

CLARENCE J. COBERLY.