(No Model.) 2 Sheets—Sheet 1.

C. M. BROWN & E. P. HOLDEN.

METHOD OF AND MACHINE FOR TREATING THE MARGINS OF SHEET METAL VESSELS.

No. 479,181. Patented July 19, 1892.

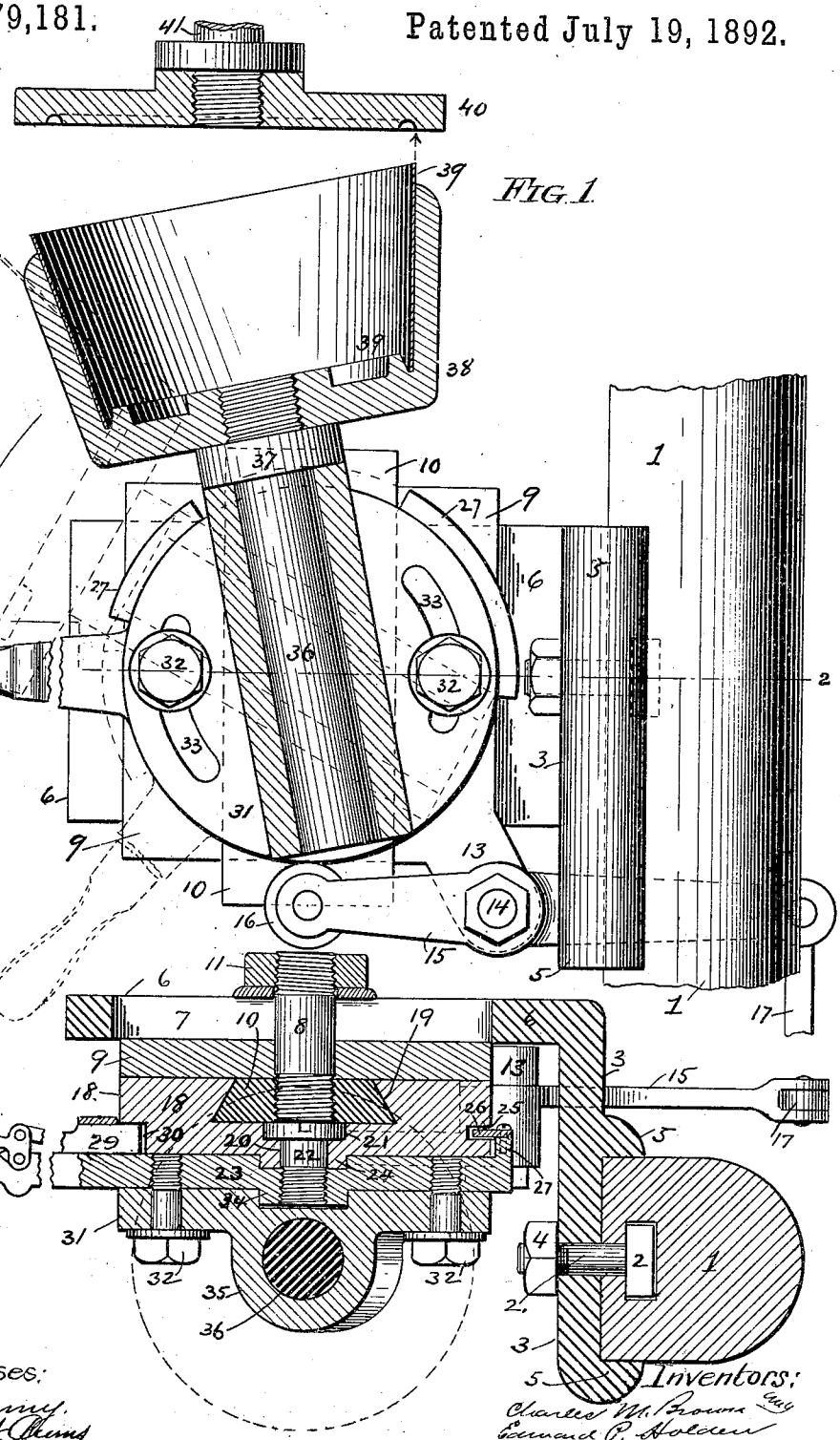

FIG. 1.

FIG. 2.

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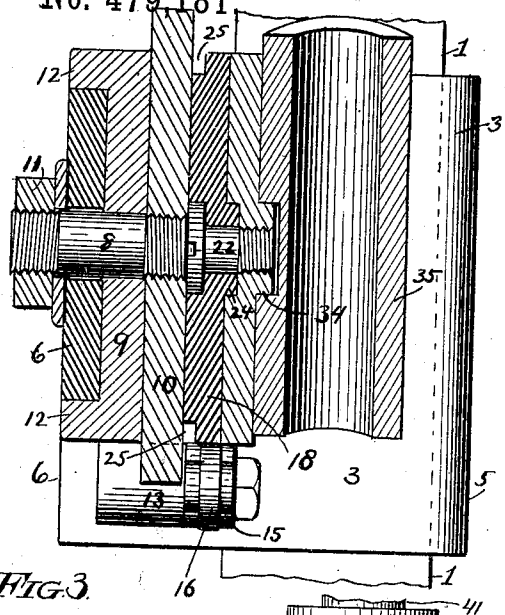


FIG. 3.

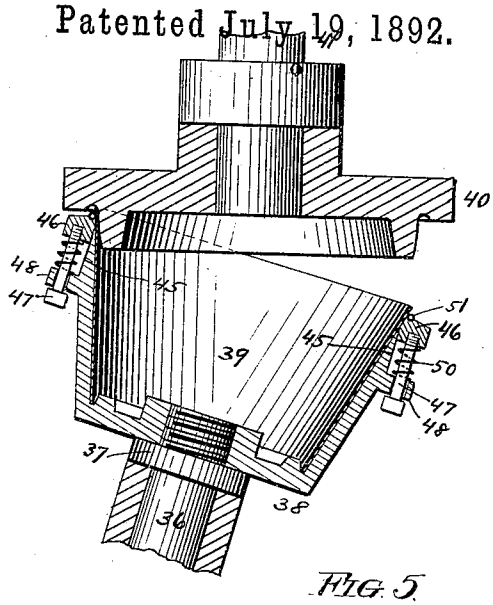


FIG. 5.

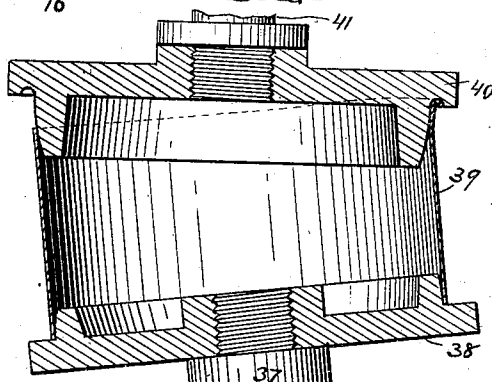
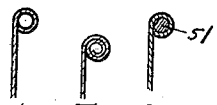
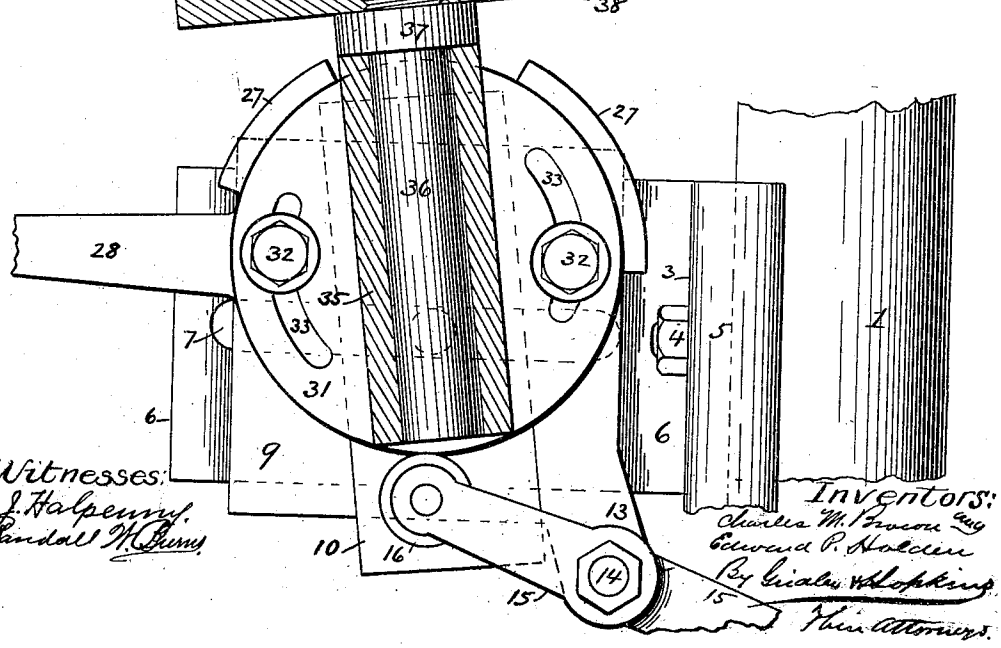


FIG. 4.



FIGS. 6. 7. 8.



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UNITED STATES PATENT OFFICE.

CHARLES M. BROWN AND EDWARD P. HOLDEN, OF CHICAGO, ILLINOIS.

METHOD OF AND MACHINE FOR TREATING THE MARGINS OF SHEET-METAL VESSELS.

SPECIFICATION forming part of Letters Patent No. 479,181, dated July 19, 1892.

Application filed November 24, 1891. Serial No. 412,902. (No model.)

To all whom it may concern:

Be it known that we, CHARLES M. BROWN and EDWARD P. HOLDEN, citizens of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in the Method of and Machines for Treating the Margins of Sheet-Metal Vessels and other Articles, of which the following is a specification.

The present invention relates to the method of and also to the machines for "wiring," "false-wiring," and otherwise treating the margins of sheet-metal vessels and other articles. Heretofore these operations have been performed by forcing against the margin of the article a die having in its face an annular groove of curved cross-section that curls the metal either inward or outward, as may be desired, the die and article being at all times during the operation in contact with each other throughout their entire circumference, or else the periphery of a roller has been brought in contact with the margin of the article and the article revolved to bring all parts of its circumference under the action of the roller. Without discussing the merits and demerits of these old methods and of the machines used in carrying them out, we will state simply that the object of our present invention is to so improve both method and machine that better results may be obtained. To this end we use a tool consisting of a disk having a working surface on one of its flat sides, (as distinguished from its periphery,) and we present the working surface of the tool and the margin of the article to each other in planes that converge, so that only a small portion of the circumference of the article can have contact with the tool at any one time, and we rotate them so as to bring all parts of the circumference of the article under the action of the tool.

Our invention consists in certain features of novelty that are particularly pointed out in the claims hereinafter; and in order that it may be fully understood we will describe it with reference to the accompanying drawings, which are made a part of this specification, and in which—

Figure 1 is a side view of a machine embodying our invention, some of the parts being shown in section and others in elevation. This figure shows the machine provided with a chuck for holding articles having conical bodies and a tool for false-wiring. Figs. 2 and 3 are respectively a horizontal and a vertical section thereof, the cutting-planes being indicated by the lines 2 2 and 3 3, respectively. Fig. 4 is a view similar to Fig. 1, the machine being here shown as provided with a chuck for holding a cylindrical article. Fig. 5 is a sectional elevation of a chuck and tool for wiring a vessel having a conical body. Figs. 6 and 7 are sections of fragments of sheet-metal articles the margins of which have been false-wired, and Fig. 8 is a section of a fragment of an article the margin of which has been wired.

The vertical post or column for supporting the working parts of the machine is shown at 1. Its front side is squared off and provided with a T-slot, in which fits a bolt 2, that passes through the arm 3 of a bracket and receives a nut 4, whereby the bracket may be clamped to the column at any desired height. The bracket is held against turning upon the bolt by means of vertical flanges 5 on the arm 3, that bear against the sides of the column. The other arm 6 of the bracket is provided with a horizontal slot 7, through which passes a heavy bolt 8, that passes, also, through a plate 9 and is screwed into a plate 10. By means of a nut 11 on the outer end of the bolt the plates 9 and 10 may be securely clamped to the arm 6 of the bracket, the slot 7 enabling their adjustment toward and from the column 1. Before tightening the nut 11 the plate 10 may be adjusted to the required position—that is, it may be placed in the vertical position shown by Fig. 1, or it may be placed at any desired inclination, it being shown at an inclination by Fig. 4. The plate 9 is confined to a strictly horizontal movement by means of flanges 12, which embrace the top and bottom edges of the arm 6. Said plate is also provided at one of its lower corners with a projection 13, perforated for the passage of the fulcrum-pin 14 of a lever 15, one end of which is provided with an anti-friction roller 16, while the other end is connected with a foot-treadle by means of a rod 17. The treadle and the foot of the column or pedestal are not shown, because such parts are common in machines of many

kinds and can be easily constructed by any skilled mechanic without the aid of a minute drawing and specification.

18 is a slide consisting, preferably, of a disk of metal provided with an undercut groove 19, corresponding in cross-section to the cross-section of the plate 10, which latter fits in said groove and constitutes a guide upon which the slide may move up and down. The slide is provided with a central perforation 20, counterbored at 21 for the reception of a screw 22, which is screwed into a disk 23, whereby said disk is swiveled to said slide so that the one may turn upon the other. In order to strengthen this connection and relieve the swivel-screw 22 as much as possible, the slide 18 is provided with a circular projection or hub 24, while the disk 23 is provided with a corresponding socket for its reception. To still further relieve the screw, the slide 18 is provided with a peripheral groove 25, into which project tongues 26, secured to lugs 27, projecting from the periphery of the disk 23. Instead of separate tongues, one secured to each of the lugs 27, a continuous ring may be used, if desired. Projecting from one side of the disk 23 is a handle 28, carrying a dog 29, which is adapted to engage a notch 30 in the periphery of slide 18 for holding the disk 23 in the position shown by full lines. To the disk 23 a third disk 31 is secured adjustably by means of screws or bolts 32, which are tapped into the disk 23 and passed through slots 33, formed through the disk 31, concentrically with its center, whereby one of said disks is capable of a rotary adjustment with relation to the other. In order to preserve the concentricity of the two disks, one is provided with a circular boss or hub 34 and the other with a corresponding recess to receive it. Formed upon the outer face of the disk 31 and extending diametrically across it is an enlargement 35, provided with a cylindrical bore and forming the socket or bearing for a spindle 36, which latter is provided with an enlargement or shoulder 37, that bears upon the upper end of the socket and sustains the spindle. The spindle carries at its upper end a chuck 38 for supporting the article 39 that is to be operated upon. The tool is shown at 40 secured to a spindle 41, to which rotary motion is imparted by any convenient or suitable means. As the chuck and tool must conform with reasonable exactness to the size of the article to be operated upon, and as the shape of the article and the character of the operation to be performed require corresponding variations in the character of these parts, they are preferably attached to their spindles by screw-threads or other suitable means that will enable their ready removal.

The operation of the machine is as follows: Assuming the parts to be as shown by Fig. 1, by drawing the treadle-rod 17 downward the end of the lever 15, carrying the roller 16, is moved upward, carrying with it the slide 18 and all parts attached thereto, the movement of said parts being directed by the guide 10. The margin of the article 39 will come in contact with the annular groove of the revolving tool 40, (see Fig. 4,) and as the two are pressed together the said margin will be curled over, forming the round bead or roll known as a "false wire." By continuing the pressure a roll of more than one complete turn may be made. The tool has contact with only a small portion of the entire circumference of the article at a time; but the friction between them will cause the article to partake of the rotary motion of the tool, (the chuck turning, also,) so that all parts of its circumference come under the action of the tool. The angle of divergence of the planes of the tool and upper margin of the article may be greater or less than shown in the drawings, the essential requisite being that the point of contact be short. It will be seen that, as shown by Fig. 1, the margin of the article will come in contact with the outside edge of the groove in the tool, and consequently the metal will be curled inward, making a bead on the inside of the article. If the bead is to be on the outside, the margin of the article should be brought in contact with the inner edge of the groove, as shown by Fig. 4. As soon as the operation is completed pressure is removed from the treadle-rod and the parts drop down to the position shown by full lines. The dog 29 is then withdrawn from engagement with the notch 30 and the lever 28 is depressed, carrying the disk 23 and the attached parts to the position shown by dotted lines. When the parts are in these positions, the finished article may be removed from the chuck and an unfinished one put in its place. The handle is then returned to its normal position, as shown by full lines, and the operation repeated, as above described.

The machine shown in Fig. 4 does not differ in construction from the one shown in Fig. 1, excepting that it has a chuck of the form preferred for articles having cylindrical bodies; but the positions of the parts are not the same in both figures, each being adjusted to perform certain operations—that is, in both figures the guide 10 is shown so placed that the slide 18 will move in a plane parallel with that side of the article that is for the time being in contact with the tool; but as one of the figures shows the machine arranged for operating upon an article having a conical body and the other shows it arranged for operating on an article having a cylindrical body the two figures do not show the guide in exactly the same position with relation to other parts. Furthermore, both do not show the spindle of the chuck in exactly the same position with relation to the guide. The figures differ, also, in that Fig. 1 shows the parts in their lowermost position and the tool out of contact with the article, while Fig. 4 shows the parts elevated and the tool and article in contact.

We desire to have it understood that while we prefer the construction shown in the drawings still our invention is not necessarily limited thereto.

Among the many possible changes that might be made without departing from our invention are the following: Instead of moving the article toward and from the tool, the tool may be moved toward and from the article, the tilting disk 23 and its accessories may be dispensed with if the tool and chuck are moved a sufficient distance apart, the shape of the chuck may be changed to meet the requirements of particular cases, the tool may also be changed, and so, also, may the shapes of many other parts be altered without departing from our invention.

In Fig. 5 a chuck similar to that shown in Fig. 1 is shown, except that its upper part is cylindrical on the exterior, as shown at 45. Surrounding this cylindrical portion is a ring 46, into which bolts 47 are tapped at suitable intervals, said bolts being passed loosely through lugs 48 on the exterior of the chuck and surrounded by coiled springs 50, that bear at their opposite ends against said lugs and the under side of the ring, whereby the latter is held normally elevated. The top inner corner of the ring is provided with a half-round groove in which rests the wire 51, that has been formed into a ring and is to have the metal rolled around it. The article projects slightly above the ring and when acted upon by the tool as already described curls over the wire and completely envelops it, the springs 50 allowing the ring to be depressed by the curling metal.

We are aware that it is not new to use a tool consisting of a roller having a working surface on its periphery and to revolve the article in order to bring all parts of its circumference under the action of the tool, the axis of the tool being inclined with respect to the axis of the article. This, however, is not the equivalent of a rotary tool consisting of a disk having a working surface on one of its flat sides, said working surface and the margin of the article being presented to each other in planes that converge. So far as we are aware, we the first to use a rotary tool having a flat working surface—that is, a working surface that is located on one of the flat sides of a disk instead of on the periphery thereof. We do not mean by this that the working surface of the tool is without elevations or depressions, for it may have either or both; but we mean simply that it is arranged on a flat surface instead of on a cylindrical surface.

We are also aware that a tool for closing cartridges has been constructed of a central hub adapted to be secured to a spindle, a number of arms radiating therefrom and having their working faces rounded off, and a ring or rim supported by said arms concentric with the hub for centering the shell, and we do not claim such as our invention. Where the margin of the article converges with the working surface of the tool, it is necessary that said working surface be continuous, or practically so.

What we claim as new, and desire to secure by Letters Patent, is—

1. The method of treating sheet-metal articles, which consists in forcing the margin of the article into contact with a tool consisting of a disk having a working surface on one of its flat sides, maintaining the margin of the article and the working surface of the tool in planes that converge so that only a small portion of the circumference of the article has contact with the tool at any one time, and successively bringing all parts of said circumference under the action of the tool, substantially as set forth.

2. The method of treating sheet-metal articles, which consists in presenting the margin of the article to the flat working surface of a revolving tool, maintaining said article in a plane that converges with the plane of the working surface of the tool, so that only a small portion of the circumference of the article has contact with the tool at any one time, forcing them together by pressure applied in a plane parallel with the side of the article that is for the time being in contact with the tool, and successively bringing all parts of the circumference of the article under the action of the tool.

3. The combination of a tool consisting of a disk having a working surface on one of its flat sides, a rotary chuck for holding the article, and means for pressing the margin of the article against the flat face of the tool, the axes of the tool and chuck being inclined with relation to each other, so as to maintain the tool and the margin of the article in converging planes, substantially as set forth.

4. The combination of a rotary chuck for holding the article, a tool consisting of a rotary disk having a working surface on one of its flat sides, the axis of said tool being situated within the circumference of the margin of the article and at an angle to the axis of the chuck, and means for forcing the margin of the article against the face of the tool, substantially as set forth.

5. The combination of a revoluble tool consisting of a disk having a half-round annular groove in one of its flat sides, a chuck for holding the margin of the article in a plane that converges with the plane of the working surface of the tool, and means for forcing the article and tool together, substantially as set forth.

6. The combination, with a tool, of a chuck, a spindle by which it is supported, a plate adjustable about an axis perpendicular to said spindle, a fixed bearing for said spindle carried by said plate, and means for securing said plate so as to hold the parts in the positions to which they are adjusted, substantially as set forth.

7. The combination, with a tool, of a chuck,

a spindle by which it is carried, a tilting plate having a socket in which said spindle is journaled and by which it is held against lateral movement relatively thereto, and means for tilting the plate, substantially as set forth.

8. The combination, with a tool, of a chuck, the tilting plate 23, supporting said chuck, a hand-lever for moving said plate, and a dog for locking it in position, substantially as set forth.

9. The combination, with a tool and a chuck, of a tilting plate 23, a handle for operating it, a plate 31, supporting the chuck, and means adjustably connecting the two plates, substantially as set forth.

10. The combination, with a rotary tool and a chuck having axes inclined with relation to each other, of a slide carrying said chuck and a guide for compelling said slide to move in a plane parallel with the side of the article that is for the time being in contact with the tool, substantially as set forth.

11. The combination, with a rotary tool and a chuck having axes inclined with relation to each other, of a slide carrying said chuck and a guide for said slide adjustable to different angles with respect to the tool, substantially as set forth.

12. The combination, with a tool and a chuck, of a slide, means for adjustably connecting the chuck thereto, and an adjustable guide for said slide, substantially as set forth.

13. The combination, with a tool and a chuck, of the slide 18, the adjustable guide 10, upon which it works, the plate 31, carrying the chuck, and means for adjustably connecting the plate 31 and slide 18, substantially as set forth.

14. The combination of the guide 10, the slide 18, fitting thereon, the plate 23, swiveled to the slide and having the handle 28, the dog 29, the plate 31, secured adjustably to plate 23 and having the socket 35, the spindle 36, occupying said socket, the chuck 38, carried by said spindle, and the tool, all constructed and arranged to operate substantially as set forth.

15. The combination, with the chuck having lugs 48, of the ring 46, surrounding the chuck near its top, the bolts 47, loosely connecting the ring and lugs, and the springs 50, surrounding the bolts and bearing in opposite directions against the lugs and ring, substantially as set forth.

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