E. G. RAFF.

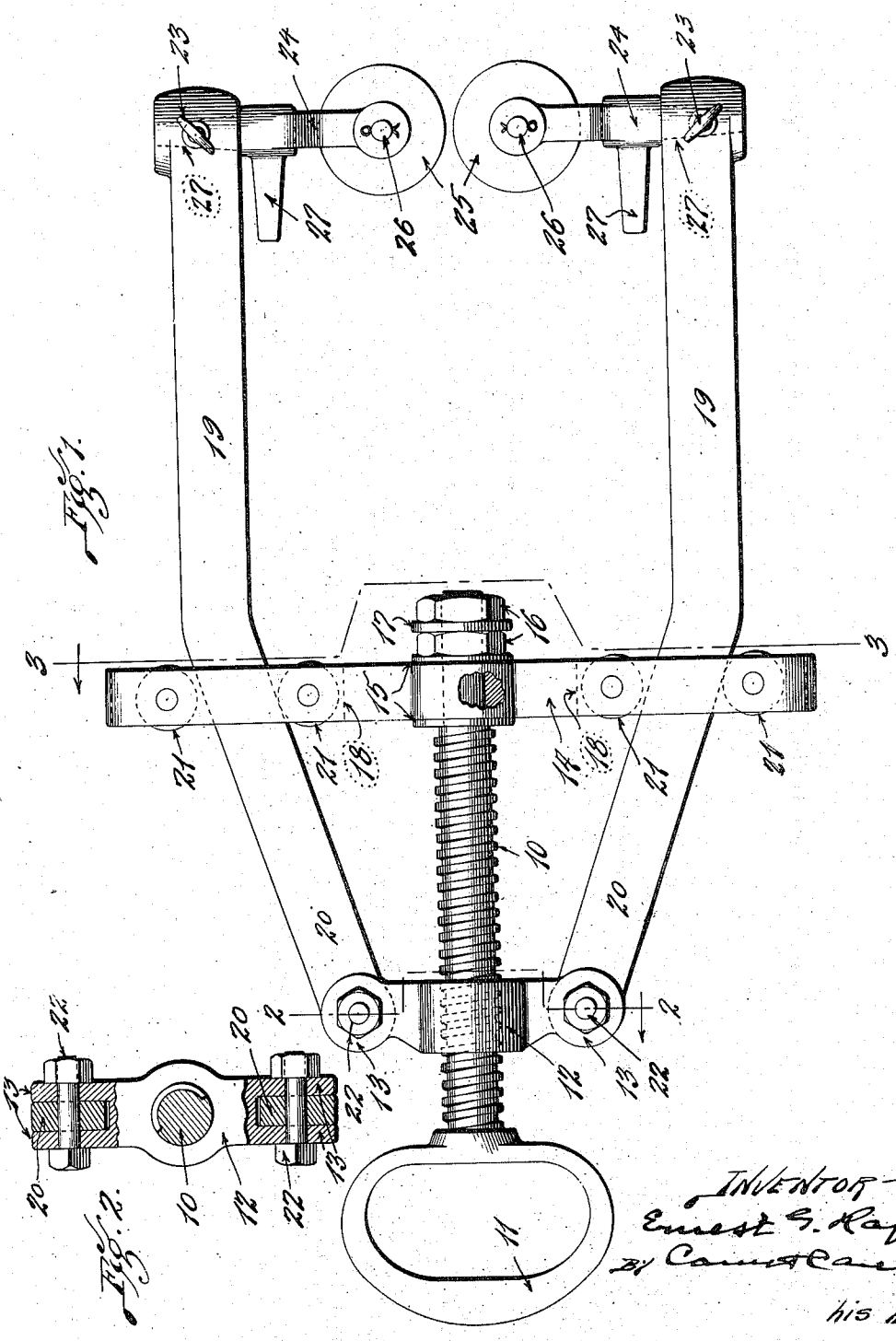
IMPLEMENT FOR SMOOTHING METAL.

APPLICATION FILED JULY 28, 1919.

1,344,960.

Patented June 29, 1920.

2 SHEETS—SHEET 1.



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2 SHEETS—SHEET 2.

Fig. 3.

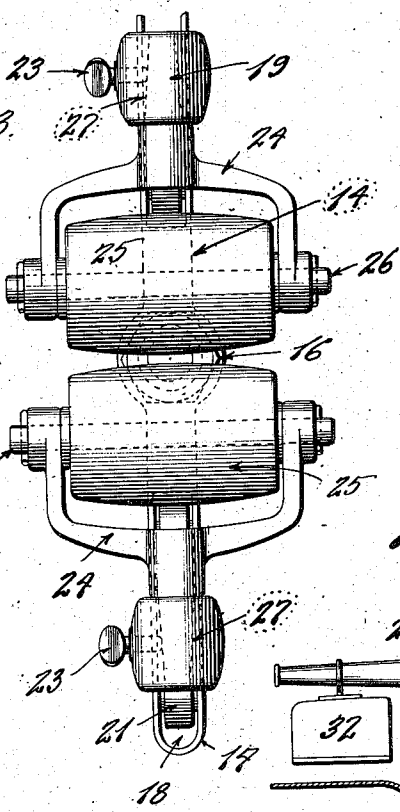


Fig. 4.

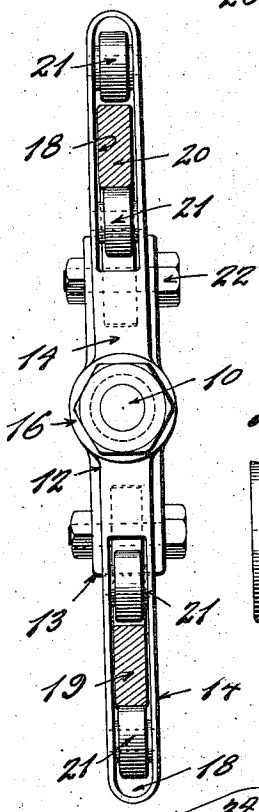


Fig. 7.

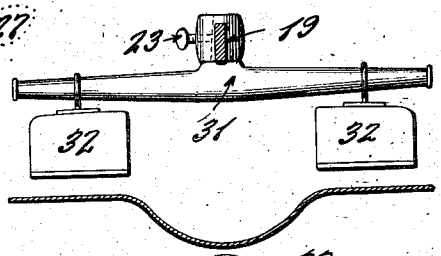


Fig. 5.

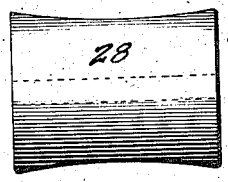
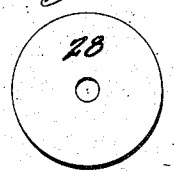


Fig. 6.



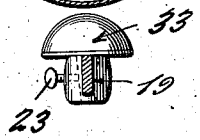


Fig. 8.

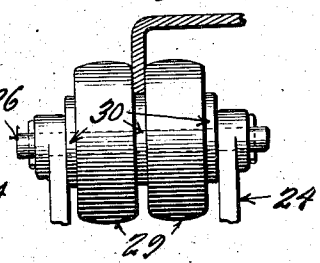
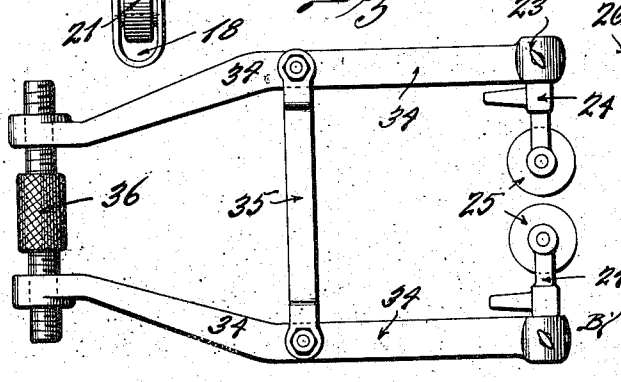


Fig. 9.



INVENTOR

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by Cameron & Cameron

his ATTYS.

UNITED STATES PATENT OFFICE.

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IMPLEMENT FOR SMOOTHING METAL.

1,344,960. Specification of Letters Patent. Patented June 29, 1920.

Application filed July 28, 1919. Serial No. 313,892.

To all whom it may concern:

Be it known that I, ERNEST G. RAFF, a citizen of the United States, and a resident of the city of St. Louis and State of Missouri, have invented a new and useful Improvement in Implements for Smoothing Metal, of which the following is a specification.

This invention relates to implements for smoothing and straightening sheet metal and is particularly adapted for use in removing creases, dents, and the like, from sheet metal parts of automobiles such as fenders or mud-guards, without removing said parts from the machine.

Heretofore, in automobile repair shops, the practice has been to straighten the damaged sheet metal parts of automobiles such as mud-guards and the like, by removing the parts from the machine, and after heating the parts in the region of the dented or twisted portion, to restore the parts as closely as possible to their normal condition by hammering. One of the principal objections to the above described process of restoring the parts to their normal condition is the trouble, time and expense incident to the removal and replacement of the parts of the automobile. Another objection is that the heat treatment followed by the hammering of the parts causes the enamel to crack and break off, which necessitates reënameling and also tends to elongate the metal and thus cause trouble when it is attempted to replace the parts.

The principal object of the present invention is to overcome the above mentioned difficulties; and it consists principally in a portable element for removing dents, creases and the like from damaged sheet metal parts of automobiles without removing said parts from the automobile and without materially damaging or disturbing the enamel. The invention further consists in divers attachments or tools for said implement and in the combinations and arrangements of parts hereinafter described and claimed.

In the accompanying drawing, wherein like reference numerals refer to like parts wherever they occur,

Figure 1 is a side view of an implement embodying my invention, the implement being shown provided with tools comprising convex rollers;

Fig. 2 is a vertical section taken through the implement adjacent to the collar or nut in which the screw turns, the section being taken on the line 2—2 in Fig. 1;

Fig. 3 is an end view of the implement looking at the ends of the arms to which the tools are attached;

Fig. 4 is a vertical section taken through the implement, the section being taken adjacent to the follower-arm on the line 4—4 in Fig. 1;

Fig. 5 is a side view of one of the concave rollers adapted to be used with the implement;

Fig. 6 is an end view of the same;

Fig. 7 is a vertical section through the implement showing a set of tools for pressing out dents, one of said tools being in the form of a cross-arm provided with blocks, and the other of said tools being in the form of a button;

Fig. 8 is a view showing narrow rollers having spacing washers arranged therebetween, the rollers being used for straightening flanges; and

Fig. 9 is a side view of a modified form of implement.

The implement shown in the accompanying drawings comprises a screw 10 whose rearward end is provided with a handle portion 11. The screw turns in the threaded bore of a cross-link in the form of a collar or nut 12 which is provided with a pair of spaced lugs 13 disposed on opposite sides thereof, the purpose of which will hereinafter more fully appear.

The forward end portion of the screw is reduced and extends through a smooth bore in the middle portion of a cross-head or follower-arm 14 and is swiveled thereto so as to permit the screw to turn freely around on its axis. This swivel connection between the cross-head 14 and the reduced forward end portion of the screw 10 is formed by placing washers 15 on opposite sides of the cross-head, and the cross-head is held between these washers so as to travel with the screw by means of a pair of lock-nuts 16 having a washer 17 interposed between their adjacent faces.

The follower-arm 14 extends on opposite sides of the screw 10 at right angles to the longitudinal axis thereof and is provided near each end with a slot 18 which extends through the cross-head parallel with the longitudinal screw 10.

Arranged on opposite sides of the screw 10, and extending beyond the forward end thereof are spaced arms or levers 19, which have their inner end portions 20 inclined or bent inwardly toward each other. The inclined portions 20 of the spaced arms extend through the slots 18 in the cross-head 14 and are supported therein on anti-friction rollers 21. A pair of these rollers 21 are preferably mounted on pins in the slots 18 and the opposite ends of the cross-arm 14, one of said rollers being arranged on each side of the inclined portion 20 of the respective arms 19 which extend therefrom. The inner ends of the inclined portions 20 of the arms 19 are pivotally secured to the oppositely projecting spaced pairs of lugs 13 of the collar or nut 12 by means of screw bolts 22.

The outer ends of the arms 19 are provided with alined tapered holes or sockets adapted to receive various forms of tool holders which are held therein preferably by means of thumb-screws 23. Each of the tool holders shown in Figs. 1 and 3 of the drawings comprises a yoke or forked member 24 having a removably mounted convex roller 25 rotatably mounted between the forked member 24 on a pin 26, which extends through both arms of the forked member and is held therein by means of cotter pins. The yoke members 24 are provided with outwardly extending lugs 27 arranged at right angles to each other. These lugs are adapted to fit into the sockets formed in the forward end of the lever arms 19 and are held therein by the thumb screws 23.

A concave roller 28 adapted to be mounted in the forked member 24 is shown in Figs. 5 and 6 of the drawings. Fig. 8 shows narrow rollers 29, which are separated by washers 30. Both of the foregoing types of rollers are adapted to be mounted in the yoke members 24 and are provided with axial holes for the reception of the pins 26.

Referring to Fig. 7 of the drawings, the upper arm 19 is provided with a cross-arm 31 having a lug at its middle portion which projects at right angles to its longitudinal axis. The lug of the cross-arm is adapted to be fitted into one or the other of the arms 19 of the implement. A block 32 is sleeved on each end of the cross-arm and is faced with leather on its under face to prevent scratching of the metal. The lower arm or lever 19 is illustrated as being provided with a semi-spherical wood or metal button 33 having a lug or projection adapted to fit into the socket of one or the other of the arms 19.

The arms 19, which are fulcrumed at their inner ends to the collar 12, are opened and closed by actuation of the screw 10. When turned backward, the screw travels through the collar or nut 12 and also carries with it the cross-head which is swiveled thereto. This backward movement of the follower-arm 14 causes the innermost rollers 21 of the follower-arm to engage the inner faces of the inclined portions 20 of the lever arms 19, which act as cam faces, thereby forcing the free ends of the arms 19 outwardly. When it is desired to bring the lever arms 19 of the implement together, the screw is turned so as to move through the collar or nut 12 in a forward direction. This forward movement of the screw causes the outermost rollers 21 of the follower-arm 14 to engage the outer faces of the alined portions 20 of the lever arms 19, acting after the manner of a cam and thus forcing the free ends of the lever arms 19 together.

Fig. 9 shows a modified form of implement, wherein spaced lever arms 34 have their middle portions pivoted to the opposite ends of the cross-link 35. A screw 36 is arranged crosswise of the lever arms at the inner ends thereof, one end of said screw being provided with a left-handed thread which is threaded into one of the lever arms, and the other end of said screw being provided with a right-handed thread which is threaded into the other of said lever arms. Thus when the screw 36 is turned in one direction, the free ends of the lever arms 34 are brought together, and when turned in the opposite direction the free ends of the lever arms are separated.

The operation of the implement is as follows: When it is desired to remove a large dent from a piece of sheet metal the cross-arm 31 having the leather faced wooden blocks 32 is secured to one of the arms of the implement and the wooden button 33 is secured to the other of said arms. The lug of the cross-arm is inserted in the socket of one arm and the lug of the button 33 is inserted in the socket of the opposite arm, both cross-arm and button being held in their respective sockets by thumb-screws 23. The screw 10 of the implement is then actuated to spread the lever arms 19 far enough apart to permit the lever arms to straddle the work, with the button 33 engaging the apex of the dent on one side of the metal and with the blocks 32 of the cross-arm 31 engaging the other side of the metal adjacent to the base of the dent on opposite sides thereof. The screw is then actuated to bring the arms together and this movement is continued until the dent is more or less flattened out. After this, the convex rollers 25 are substituted for the cross-arm 31 and button 33 and passed back and forth over the damaged part until the metal is rolled out substantially smooth. The concave rollers 28 may also be used, when desirable, on account of the curvature of the metal to be rolled. When it is desired to remove bends, creases or slight humps or protuberances, the roll-

ers may be used alone, the cross-arm and button being unnecessary for this purpose. In practice, each pair of concave and convex rollers comprises a metal roller which is placed on the rough side of the metal and a wooden roller which is placed on the enamel side of the metal to prevent scratching the same.

When using the rollers, the reach of the implement may be increased slightly by inserting the lugs 27 which project from the side of the yoke members 24 into the sockets, thus positioning the rollers forward of the ends of the lever arms instead of directly below the sockets as shown in Fig. 1.

When it is desired to straighten flanges or straighten the metal on opposite sides of a rib or corrugation, the narrow rollers 29 shown in Fig. 8 are used. These rollers are placed in the yokes 24 and the desired spacing is obtained by using the spacing washers 30.

The implement shown in the drawings permits of considerable modification without departing from the invention; therefore I do not wish to be limited to the exact form of implement shown and described.

What I claim is:

1. An implement for smoothing sheet metal comprising a threaded collar, a screw working in said collar, a follower-arm arranged crosswise of said screw and having a swivel connection with one end thereof and said screw having a handle at its other end, said follower-arm having slots in its opposite ends arranged parallel with the longitudinal axis of said screw, spaced rollers in said slots and lever arms arranged parallel with said screw on opposite sides thereof, said lever arms being inclined toward each other at one end and pivotally connected to said threaded collar, having alined sockets in the other ends, tools removably mounted in said sockets, said tools comprising yokes having rollers journaled therein, said rollers being positioned on the inside of said arms and arranged with their axes parallel, the inclined portion of said lever arms extending through the slots in said follower-arm and being arranged between the spaced rollers thereof whereby actuation of said screw causes the rollers to engage the inclined portions of said lever arms to open and close the same.

2. An implement for smoothing sheet metal comprising a nut, a screw adapted to work in said nut, a handle on the outer end of the screw, lever arms arranged on opposite sides of said screw and having their inner end portions converging and pivoted to the nut, means carried by said screw adapted to engage said lever arms, whereby actuation of said screw will cause said means to move over the converging portions of the lever arms to open and close the same, and smoothing devices carried on said outer ends of the lever arms, said handle being in longitudinal alinement with the line of pull on the screw during movement of the implement over metal to be smoothed whereby to facilitate such operation.

Signed at St. Louis, Missouri, this 26th day of July, 1919.

ERNEST G. RAFF.