G. C. PHARO.

LEVER.

APPLICATION FILED FEB. 26, 1918. RENEWED OCT. 25, 1918.

1,306,119. Patented June 10, 1919.

FIG. 1.



FIG. 2.

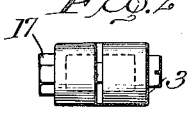


FIG. 5.

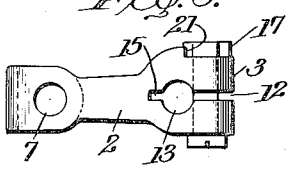


FIG. 3.

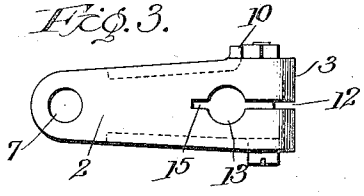


FIG. 4.

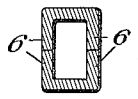


FIG. 6.

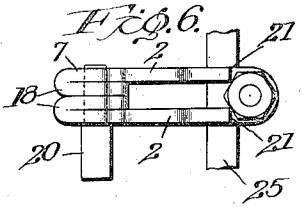


FIG. 7.

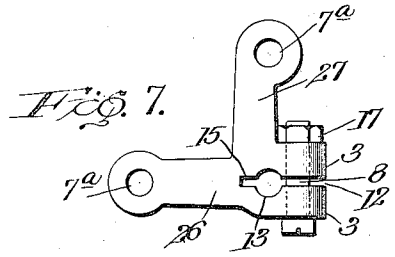


FIG. 8.

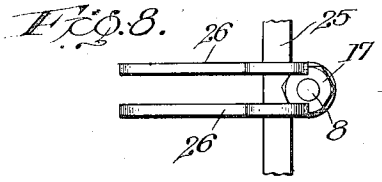


FIG. 10.

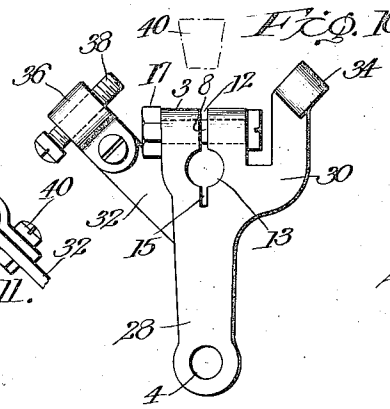


FIG. 11.

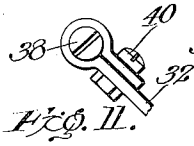


FIG. 12.

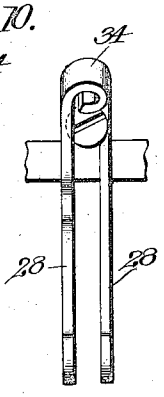


FIG. 9.

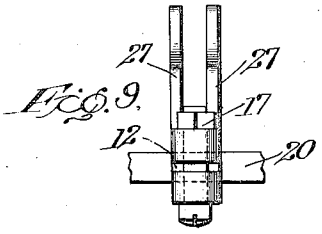


FIG. 13.

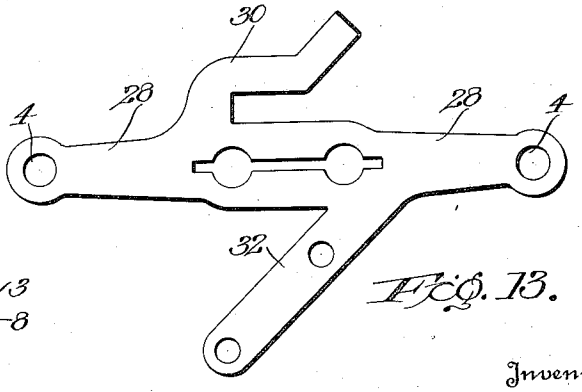


FIG. 14.

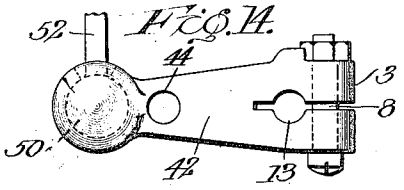
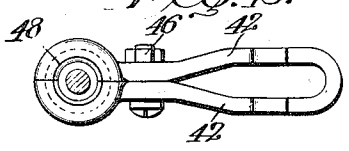


FIG. 15.



Inventor

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By C. A. Mason, Attorney.

UNITED STATES PATENT OFFICE.

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LEVER.

1,306,119. Specification of Letters Patent. Patented June 10, 1919.

Application filed February 26, 1918, Serial No. 219,192. Renewed October 25, 1918. Serial No. 259,717.

To all whom it may concern:

Be it known that I, GORDON C. PHARO, a citizen of the United States of America, residing at Marysville, in the county of Yuba and State of California, have invented a certain new and useful Improvement in Levers, of which the following is a full, clear, and exact description.

This invention relates to levers made of pressed steel, or similar material, for use in controlling automobiles, or other machines.

An important object of the invention is to construct a lever of the character referred to of a single piece of pressed steel, and of such simple form and construction that it may be manufactured at low cost, and by a minimum number of operations as compared with the usual processes employed in the manufacture of similar devices out of cast metal, or forged, and at the same time possess a maximum amount of strength to resist the strains to which such devices are subjected.

With the above and other important objects in view, the invention consists in a lever possessing the structural characteristics, hereinafter more fully explained, and as particularly pointed out in the following claims:

In the accompanying drawings, which illustrate several embodiments of the invention,

Figure 1 is a plan view of one form of lever, constructed in accordance with the principles of the invention;

Fig. 2 is an end view of the same;

Fig. 3 is a side elevation of the device shown in Fig. 1;

Fig. 4 is a transverse section on the line 4—4 of Fig. 1;

Fig. 5 is a view in side elevation of a different form of lever;

Fig. 6 is a plan view of the device shown in Fig. 5, having operating rods inserted in the holes of the lever;

Fig. 7 shows, in side elevation, a bell crank lever embodying the invention;

Fig. 8 is a plan view of the device shown in Fig. 7;

Fig. 9 is an end elevation of the same device;

Fig. 10 is a view, in side elevation, of a form of lever adapted for use in connection with carbureters;

Fig. 11 is a detail view showing one of the arms of the lever of Fig. 10;

Fig. 12 is an end elevation of the device shown in Fig. 10;

Fig. 13 illustrates the blank employed in the construction of the lever illustrated in Fig. 10;

Fig. 14 is a side elevation of a different form of lever, having ball and socket connection with the operating rod, and

Fig. 15 is a plan view of Fig. 14.

Referring first to Figs. 1 to 4, inclusive, the body portion of the lever as illustrated therein comprises a piece of sheet steel which is cut out from a suitable blank, and bent upon itself in substantially U-shape. The two side limbs or members 2, 2 are provided with inturned webs or flanges 6, 6 which meet upon opposite sides of the lever, and form longitudinal divisional lines where they abut against each other, as illustrated in Figs. 1 and 4. These inturned flanges 6, 6 materially strengthen the lever, adding stiffness and rigidity thereto. The flanges 6, 6 are provided with upturned lugs 10 which provide stops to engage the clamping screw nut and prevent its rotation, as will be hereinafter explained.

At the point 3, where the body portion of the lever is bent upon itself, an aperture is formed to receive a clamping bolt 8. The bent portion of the lever is provided with a longitudinal slot 12 which communicates with circular apertures 13 through opposite sides 2 of the lever, and slots 15 are formed in the lever sides and communicate with the apertures 13. The free ends 4, 4 of the lever are provided with alined perforations 7, 7 in which the end of a rod, or other connection with the operating means for the lever may be inserted. The apertures 13 are adapted to receive a fulcrum rod which is inserted therethrough. The clamping bolt 8 is provided with a nut 17, a side of which abuts against the upstanding lugs 10 so that when a screw driver is applied to the slot in the head of the bolt, the latter may be turned, thereby drawing the nut firmly against its seat and, through the instrumentality of the slot 12, clamping the end portion 3 of the lever tightly against the fulcrum rod. The clamping action referred to is caused by forcing the semi-circular halves of the apertures 13 inwardly against opposite sides of the fulcrum rod, as will be obvious.

In the use of this lever, the rod end, or other connection inserted in the apertures at

the forked end of the lever transmits motion to the lever body, which in turn rocks the fulcrum rod which is operatively connected with the part which it is desired to actuate through the instrumentality of the lever. By reason of the fact that the strain is applied substantially in the plane of the edges of the side portions 2, 2 of the lever the latter is especially designed to resist great strains and is very strong. On occasions where the resistance to be overcome by turning the fulcrum rod is unusual, said rod may be provided with a key or feather which will be fitted to the slot 15, thus imposing a greater resistance to turning movement of the lever relatively to the fulcrum rod.

In the construction illustrated in Figs. 5 and 6, the lever arms 2, 2 are bent over at their free ends as shown at 18, 18 to form reinforcing portions. The holes receive the rod end connection 20, are, in this modification, made through the body portion of the sides 2, 2 and through the bent over end parts 18, as indicated in Fig. 6. The bent over portions 18 of the sides of the lever materially reinforce and strengthen the lever ends, as will be obvious. The opposite end of the lever in this construction embodies the return bend 3, and is provided also with the alined apertures 13, having the slots 12, and 15, communicating with said apertures, the same as in the form of the device illustrated in Figs. 1 to 4. As shown in Fig. 5, a shoulder 21, is formed on each of the sides 2, in position to engage with two faces of the nut 17 which is threaded to the clamping bolt 8. The action of this clamping bolt and nut is precisely the same as that of similar parts in Figs. 1 to 4 in that they serve to clamp the lever to the fulcrum rod 25.

In Figs. 7, 8 and 9, the invention is shown as embodied in a bell crank lever in which the arms 26, 27 thereof are provided at the ends with perforations 7^a, 7^a to receive the rod ends, or other suitable connections. This lever is, as in the two forms previously described, bent upon itself to form a way for the reception of a clamping bolt 8, provided with a nut 17, and constructed to clamp the lever upon a fulcrum rod 25 which is received in the apertures 13, 13 formed through opposite halves of the lever.

In the construction illustrated in Figs. 10, 11, 12 and 13, the principles of the invention are shown as applied to a lever for use on a carbureter throttle valve. This lever comprises two arms, 28, 28 which are bent over into parallelism, as shown in Fig. 12, and are provided at their outer ends with alined perforations for actuating connections. The lever is also provided with an arm 30 having its end recurved to form an abutment 34, and another arm 32, the end of which is bent over upon the body of the arm and clamped there by a suitable clamp screw 40. The loop 36 thereby formed is provided with a thread which is engaged by an adjusting screw 38, and the screw 38 and abutment 34 are arranged for alternate engagement with a suitable stop 40. The sides of this lever, are, as in the other constructions described, provided with alined apertures 13, having the slots 15 and 12 at opposite sides thereof to form a split end of the lever, and a clamping screw 8, with its nut 17, are arranged at the bent end of the lever for clamping the walls of the aperture 13 against a fulcrum rod, as 25. The set screw 38 provides means which may be adjusted to suit the conditions under which the motor is operating, and acts to limit the rotation of the lever suitably to adjust the closed position of the throttle valve.

In Figs. 14 and 15, the two sides of the pressed steel lever 42, 42 are bent over at 3 to receive the clamping bolts 8, and are provided with the apertures 13 to be clamped to a fulcrum rod, as in the other forms described. The ends of the sides 42 are provided with perforations 44, which receive a clamping bolt 46 for holding the sides of the lever in close engagement at their free ends. Said ends of this lever are formed as a socket 48 to receive the ball end 50 of an actuating rod 52. This connection provides for operating the lever by a rod which is not in perfect alinement with the axis of the shaft or rod which constitutes the fulcrum of the lever and is clamped in the apertures 13 thereof.

The lever as herein described, and as shown in the several forms illustrated in the drawings, requires less material to make than a forged lever and no more material than a cast lever. The lever, moreover, may be manufactured at very low cost as no machine work is required in its manufacture other than a punch press which blanks and punches the slots and the holes in the lever and forms the lever in two operations. This device, under test, has been demonstrated to possess that amount of clamping force which will cause it to be clamped to the fulcrum rod as firmly as would be the case with a lever having a drilled hole and milled slot, and the material of which it is constructed may be made to withstand very severe strains.

Changes may be made in the form, construction, or disposition of the several parts of the device without departing from the principles of the invention, assuming that such changes are within the scope of the following claims.

Having thus described my invention what I claim as new and desire to secure by Letters Patent of the United States is:

1. A lever formed of sheet material, and comprising sides formed by bending the material upon itself in a plane transversely

of its edges, and having alined apertures formed in the sides and slots extending from said apertures to the bent end, said bent end being formed to receive clamping means.

2. A lever of sheet material, comprising sides formed by bending the material upon itself in a plane transversely of its edges, and having apertures near its free ends to receive actuating means, and other apertures near its bent over end to receive a fulcrum rod and slots extending outward from said last-mentioned apertures, said bent end portion of the lever being formed to receive clamping means.

3. A lever of sheet metal, comprising sides formed by bending a blank transversely of its edges, thereby providing a clamping bolt hole at the bent end, said sides having perforations near said end to receive a fulcrum rod and slots extending from the perforations to said end, and a clamping bolt extending through said hole and having a nut engaging the adjacent edge of the bent end of the lever.

4. A lever formed of sheet metal, comprising sides formed by bending a blank transversely of its edges, said sides having alined apertures and slots extending from said apertures to the bent end, flanges extending inwardly from said sides and abutting at their edges, and clamping means extending through a hole formed at the bent end of the lever.

5. A lever of sheet metal formed by bending a blank over upon itself to produce sides having at the bent end a way to receive a bolt, said sides having alined holes and slots extending therefrom to the bent end, a rod extending through said holes, and a clamping bolt located in said way and having a nut threaded thereon and resting upon the adjacent edge of the bent portion of the lever.

6. A lever of sheet metal comprising a blank bent over upon itself to provide parallel sides and a way at the bent end to receive a bolt, flanges extending inwardly from said sides and abutting at their edges, lugs on said flanges to engage a nut, said sides having alined apertures and slots extending therefrom to the bent end of the lever, and a clamping bolt in said way having a nut threaded thereon and arranged to engage said lugs.

7. A lever of sheet metal, comprising a blank bent over upon itself to form sides and a bolt way at the bent over end, said sides having apertures to receive a rod and slots extending from said apertures to the bent end, a clamping bolt extending through said way, a nut threaded to said bolt and resting upon the adjacent edge of the bent end, and means on said lever to prevent rotation of the nut.

8. A lever of sheet material, comprising a blank bent over upon itself to form sides and a way at the bent portion, said sides having alined apertures, slots extending therefrom to the bent portion of the blank to permit springing the blank, and other slots extending from said apertures in a different direction adapted to receive a key, and a clamping bolt in said way having a nut resting upon the adjacent edge of the bent over blank.

9. A lever of sheet material, comprising a blank bent upon itself transversely of its edges to provide two adjacent sides, the sides of said blank having apertures at a point near the bent end and slotted from said apertures to said end, a rod in said apertures, and clamping means located within the bent portion of the blank arranged to engage the opposite edges thereof and to bind the apertured end into engagement with said rod.

In testimony whereof I have hereunto set my hand this 25th day of February, A. D. 1918.

GORDON C. PHARO.