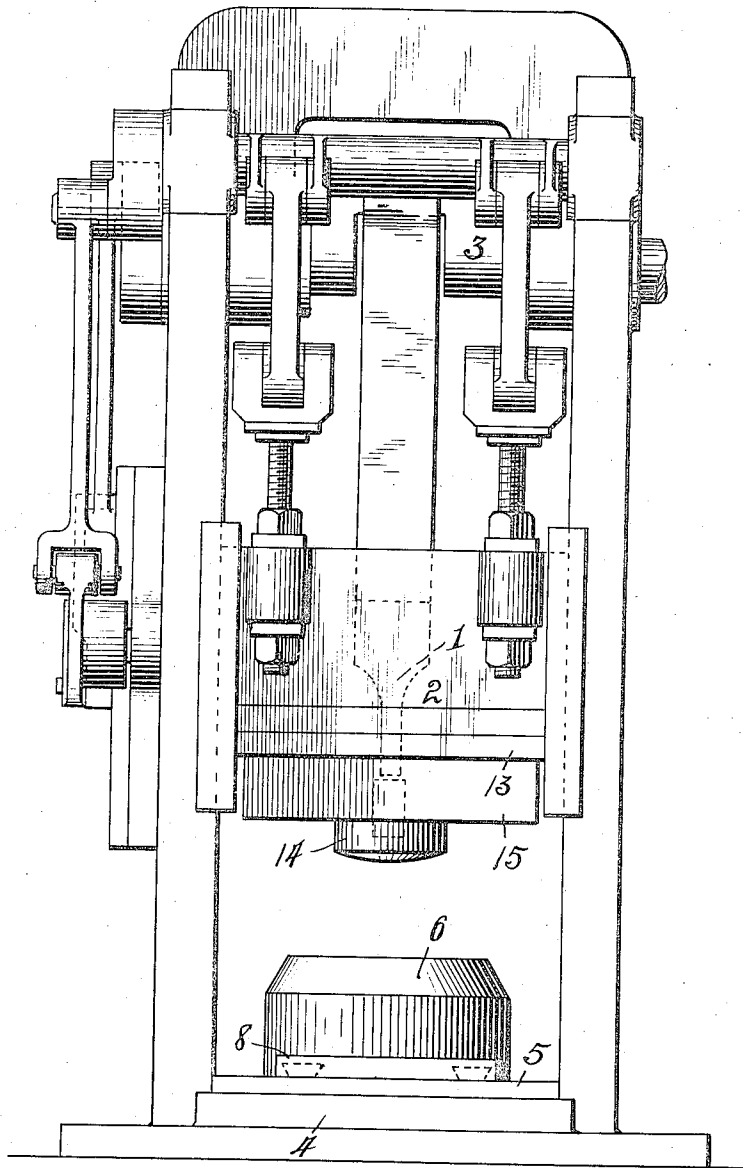


L. BAUROTH.
SHEET METAL WORKING MACHINE.
APPLICATION FILED JUNE 14, 1912.

1,060,663.

Patented May 6, 1913.

2 SHEETS—SHEET 1.



Witnesses:

C. H. Wells.
E. E. Thomas.

Fig. 1

Inventor:
Leonhard Bauroth,
By Owen & Owen,
His attys.

L. BAUROTH.
SHEET METAL WORKING MACHINE.
APPLICATION FILED JUNE 14, 1912.

1,060,663.

Patented May 6, 1913.

2 SHEETS—SHEET 2.

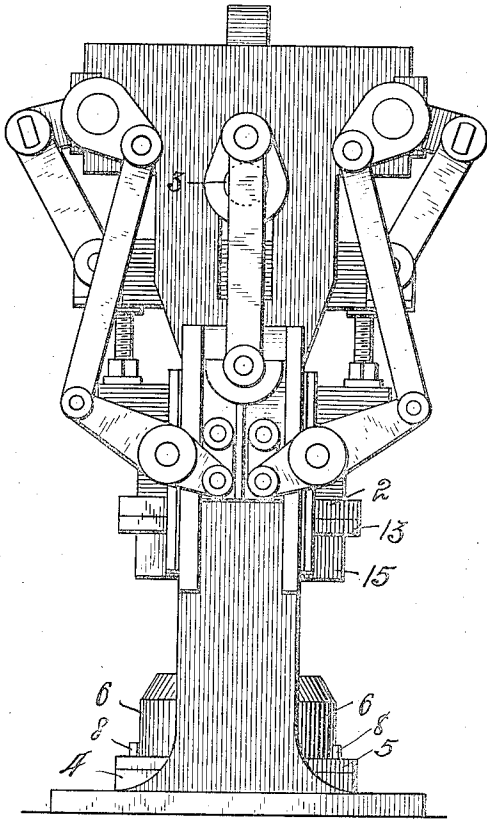


Fig. 2.

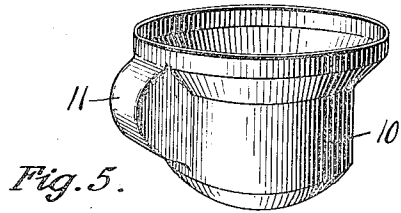


Fig. 5.

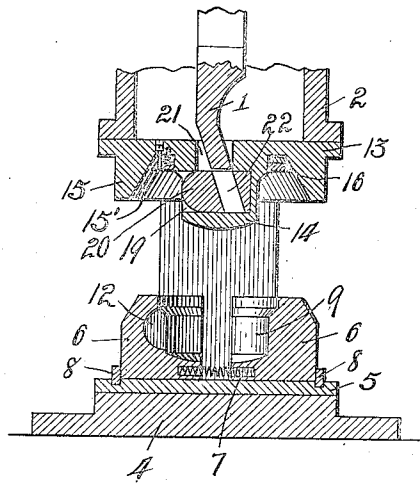


Fig. 3.

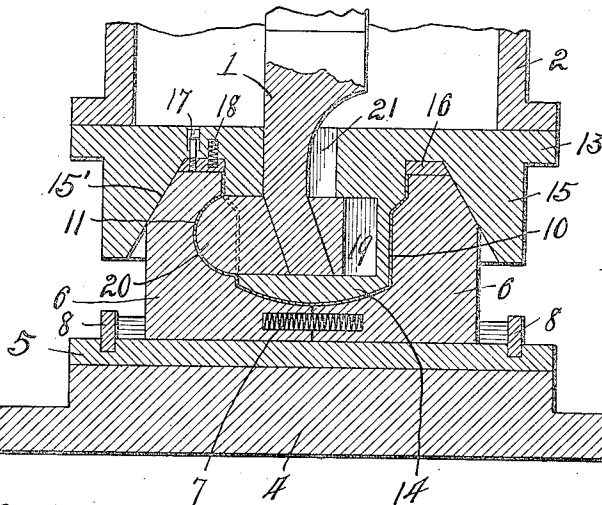


Fig. 4.

Witnesses:

C. H. Bills.
E. E. Thomas.

Inventor:

Lonhard Bauroth
By Owen & Owen,
His attys.

UNITED STATES PATENT OFFICE.

LEONHARD BAUROTH, OF TOLEDO, OHIO, ASSIGNOR TO CHARLES H. WACKER, OF CHICAGO, ILLINOIS.

SHEET-METAL-WORKING MACHINE.

1,060,663.

Specification of Letters Patent.

Patented May 6, 1913.

Application filed June 14, 1912. Serial No. 703,700.

To all whom it may concern:

Be it known that I, LEONHARD BAUROTH, a citizen of the United States, and a resident of Toledo, in the county of Lucas and State of Ohio, have invented a certain new and useful Sheet-Metal-Working Machine; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the characters of reference marked thereon, which form a part of this specification.

My invention relates particularly to means for the drawing or shaping of sheet metal articles, but is not restricted to such use as it can be used in any connection for which it may be adapted or appropriate.

In the manufacture of head-lights of the type commonly used on automobiles it has been customary to make the shell proper thereof, and the turret forming the air-chamber on the top of the shell, in separate pieces and then to weld, solder or otherwise suitably connect such parts.

The primary object of my invention is the provision of means for drawing or shaping the shell and air-chamber turret of articles of this character from a single piece of sheet metal, whereby to simplify and cheapen the cost of manufacture thereof and overcome difficulties incident to the present methods of making such shells.

The invention is fully described in the following specification, and while, in its broader aspect, it is capable of embodiment in numerous forms, a preferred embodiment thereof is illustrated in the accompanying drawings, in which,—

Figure 1 is a front elevation of a drawing-press equipped with the invention. Fig. 2 is a side elevation thereof. Fig. 3 is a central vertical section of the parts embodying the invention in normal inoperative positions. Fig. 4 is a similar enlarged section thereof, with the parts acting on an article and in the positions which they assume when the working stroke of the plunger is completed, and Fig. 5 is a perspective view of a shaped article.

Referring to the drawings, 1 designates the plunger and 2 the blank-holder carrying-head of a drawing press of any suitable

construction, which parts have suitable connection, in the present instance, with the driving-shaft 3 of the press to produce a differential reciprocation of the blank-holder and plunger, whereby the blank-holder precedes the plunger in its engagement of the work and then pauses or dwells while the plunger acts upon the work and recedes from within the same, after which the two ascend together to permit a removal of the work, as is well understood in the art.

Mounted upon the bed 4 of the press is the matrix or female die of the mechanism embodying my invention, which is shown, in the present instance, as comprising the base-plate 5 and the two parts 6, 6, which are dovetailed or otherwise suitably mounted upon the plate 5 for opposed reciprocatory movements, and are normally held in spaced relation by an expansion spring 7 mounted in registering sockets in the inner base portions of the die parts. The outward movements of the die parts are limited by stop-members 8, 8 anchored to the base-plates. The die-parts when in closed position cooperate to form a cavity 9 of suitable shape to receive a partially formed cup shaped or hollow article, such for instance, as the article 10, shown in Fig. 5, preparatory to having a side wall thereof drawn outwardly to form the lateral protuberant portion thereon, which portion, in the case of a head-light shell, forms the turret or air-chamber thereof. One of the die parts 6, 6 is provided in the side wall of its cavity 9 with a minor cavity or socket 12 with which a die part hereinafter referred to cooperates to form the protuberant portion 11 of any suitable shape on the article.

The blank-holder 13, which is carried by the head 2 for vertical reciprocatory movements above the matrix parts 6, 6, has its bottom formed with a protuberant or male part 14, which is complementary to and adapted to fit into the shell 10, when in the matrix, and hold it firmly therein, as shown in Fig. 4. The blank-holder is also provided on its bottom outside the part 14 with a downwardly projecting flange 15, which, in the present instance, is of annular form and has its inner side tapered, as shown at 15', to adapt opposing portions thereof to coact with the registering outer top edges of the matrix sections to impart closing move-

ments thereto when the blank-holder is lowered into engagement therewith, as shown. The blank-holder may also be provided, between the parts 14 and 15 thereof, with a yielding pressure ring 16, which, if the work blank has its edge flanged over the top edge of the matrix, as is some times the case, co-operates therewith in yieldingly gripping the same. Such ring is carried for limited vertical movements relative to the blank-holder by a plurality of screws 17, and is yieldingly held in spaced relation to the holder by a set of compression-springs 18.

The part 14 of the blank-holder has a transverse socket 19 therein, which opens on one side thereof in position to register with the cavity or socket 12 of the matrix when the part 14 is in work holding position. A male-die 20 is mounted within the socket 19 for reciprocatory movements therein transversely of the part 14, and has its outer end fashioned to adapt it, when projected, to enter the matrix cavity or socket 12 and co-operate therewith to form the protuberant part 11 on the work blank. The reciprocatory movements of the die 20 are controlled by movements of the plunger 1 relative to the blank-holder, such plunger having its lower end working through an opening 21 in the central top portion of the blank-holder 13 and into a registering opening or passage 22 in the die, with the part thereof which enters the die opening inclined or angled relative to the plane of reciprocatory movements of the plunger, as is also the die opening, to cause a projection of the die from the blank-holder part 14 upon a descent of the plunger therein and a retraction of the die within the part 14 upon an upward movement of the plunger relative to the die.

In the use of my invention, an article 10 to be acted on is placed in the matrix, the parts thereof being separated, as shown in Fig. 3, and the press then set in motion to lower and raise the blank-holding and drawing parts. Upon a descent of such parts the differential movements imparted thereto cause the flange 15 of the blank-holder to act upon and close the matrix parts about the work and the part 14 thereof to enter the work and co-operate with the matrix to firmly hold the work, after which the blank-holder dwells or pauses a sufficient length of time for the plunger to descend into and then ascend from within the die 20, the blank-holder and plunger then ascending together to inoperative position. As the angled lower end of the plunger descends into the correspondingly angled die opening, the die is forced outwardly relative to the blank-holder part 14 and acts on the work to draw a registering portion thereof into the matrix cavity 12 to form the protuberant portion 11 on the work. The die is then retracted to inoperative position by

the upward movement of the plunger. Upon a release of the work by the blank-holder the matrix parts separate to permit a removal therefrom of the work.

It is to be understood that this invention is not limited to any specific mechanism for imparting the requisite differential movements to the blank-holder and plunger, and also that the parts forming the features of the invention are not limited to any specific form, arrangement or construction except in so far as such limitations are specified in the claims.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent, is,—

1. A shaping mechanism having in combination a work-holding matrix, means for holding an article firmly in said matrix and having a relatively movable die part, and means for acting on said part to move it outward relative to said article-holding means to co-operate with the matrix in forming a protuberant part on a side of the article and then to retract such part.

2. An article-shaping mechanism having in combination a work-holding matrix provided with an interior side cavity, means for co-operating with the matrix to firmly hold work therein, a die carried by said means for transverse reciprocatory movements, and a member movable to act on said die to force it into said matrix cavity and then to retract it.

3. An article-shaping mechanism having a matrix, means movable to co-operate with the matrix to hold an article therein, said means having a part for fitting into the matrix, a die carried by such part for transverse reciprocatory movements relative thereto, and a plunger movable relative to said means and adapted when moved in one direction to impart work-shaping movements to the die and when moved in the other direction to retract the die from work-shaping position.

4. An article-shaping mechanism having a matrix provided on its interior with a laterally projecting cavity, a blank-holder having a part for fitting into an article blank carried by the matrix, means carried by said part for co-operating with said matrix cavity to form a lateral protuberant part on the blank, and reciprocatory means operable to impart work-shaping and retracting movements to the means carried by said part.

5. A mechanism of the class described having a work-holding matrix, a member for co-operating with said matrix to hold work therein, said member having a part for fitting into the work, a die carried by said part for lateral reciprocal movements relative thereto, and means movable at an angle to the work-shaping movements of said die and adapted to act on said die to move the

same to cooperate with the matrix to form a lateral protuberant part on the work and then to retract it within its carrying part.

6. A mechanism of the class described having a matrix, a blank-holder for cooperating with the matrix to hold work therein and having a part for fitting into the work, a die carried by said part for transverse reciprocatory movements relative thereto, and a plunger having a portion reciprocally movable through a portion of the blank-holder and said die, with the part thereof which works through the die angled to act on the die to impart work-shaping movements thereto when the plunger is reciprocated.

7. A mechanism of the class described having a sectional matrix the parts of which are relatively movable, means operable to move the matrix sections to closed position and having a part for fitting within work in the matrix and holding such work, work-shaping means carried by such part, and means operable to move said work-shaping means to cooperate with the matrix to form a laterally protuberant part on the work and then to retract the shaping means to inoperative position.

8. A mechanism of the class described having a sectional matrix the parts of which are relatively movable, a blank-holder operable to act on the matrix parts to move them to closed position and to hold work therein, a die carried by the blank-holder, and means movable relative to the blank-holder for acting on said die to move it to cooperate with the matrix to form a lateral protuberant part on the work and then to move the die to inoperative position.

9. In combination, a matrix having relatively movable parts, a blank-holder having wedge portions for acting on the matrix parts to move the same to closed position and a part for fitting into work carried by the matrix, a work-shaping member carried by said blank-holder part and movable to cooperate with the matrix to form a laterally protuberant part on the work, and means reciprocally movable at an angle to the work-shaping movements of said work-shaping member and adapted to act to impart reciprocatory movements thereto.

10. In combination, a matrix having relatively movable yieldingly spaced parts, a blank-holder operable to effect a closing of the matrix parts and to hold work therein, a die carried by the blank-holder for transverse movements within the matrix and having an inclined passage provided transversely through a part thereof, and reciprocatory means having an inclined part for working into said die passage to impart reciprocatory movements thereto to cause it to cooperate with the matrix to form a lateral protuberant part on the work.

11. In combination, a matrix having its interior side wall provided with a cavity, a blank-holder for holding work within the matrix, a die carried by the blank-holder and movable to force a part of the work into said matrix cavity, said die having a passage therein which is inclined relative to the direction of its work-shaping movements, and a reciprocatory member having a part inclined and working in said die passage to cooperate therewith to impart reciprocatory movements thereto.

12. In combination, a matrix, a blank-holder and a plunger, said blank-holder and plunger being differentially movable and the former having a part for fitting into work carried by the matrix, and a work-shaping member carried by the blank-holder and movable by the plunger to cooperate with the matrix to form a lateral protuberant part on the work.

13. In combination, a matrix, a blank-holder and a plunger, said blank-holder and plunger being differentially movable and the blank-holder standing at dwell in work-holding position during a portion of the movement of the plunger, a die carried by the blank-holder and movable by the plunger during the dwell of the blank-holder to cooperate with the matrix to form a lateral protuberant part on the work.

14. In combination, a matrix, a blank-holder and a plunger, said blank-holder and plunger having differential movements and the blank-holder having a part for fitting into work carried by the matrix and adapted to stand at dwell in work-holding position during a portion of the movement of the plunger, a die carried for transverse reciprocatory movements by the part of the blank-holder fitting into the matrix, said plunger and die having interengaging inclined portions which cooperate to reciprocate the die when the blank-holder is at dwell to impart work-shaping and retracting movements to the die.

In testimony whereof, I have hereunto signed my name to this specification in the presence of two subscribing witnesses.

LEONHARD BAUROTH.

Witnesses:

C. W. OWEN,
S. T. KLOTZ.