

March 17, 1942.

C. G. DEUBEL

2,276,376

CLICKER DIE STOCK

Filed Jan. 27, 1941

Fig. 1.

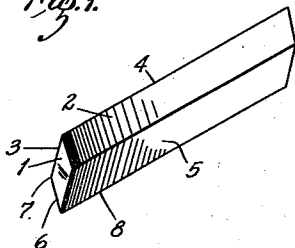


Fig. 2.

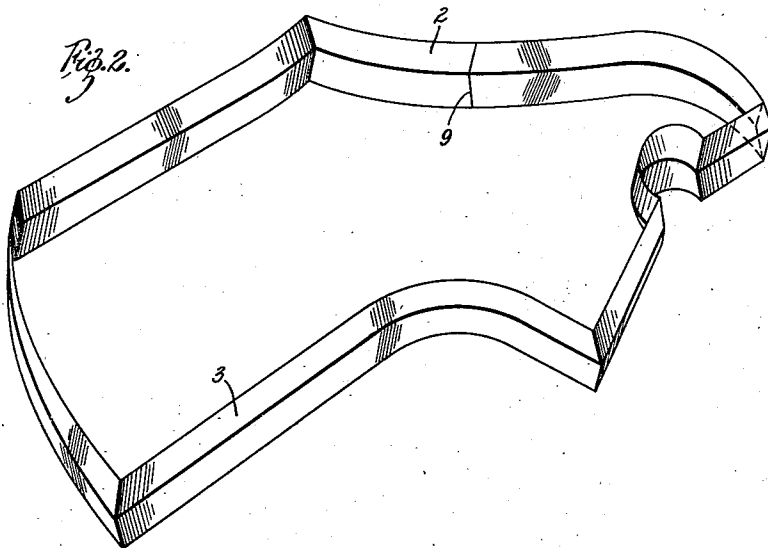


Fig. 3.

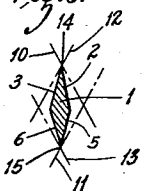


Fig. 4.

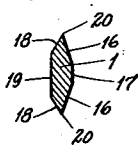


Fig. 5.

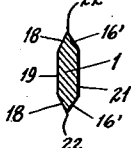


Fig. 6.

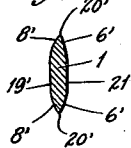


Fig. 7.

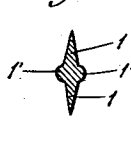


Fig. 8.



Fig. 9.

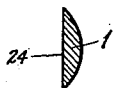


Fig. 10.

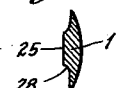
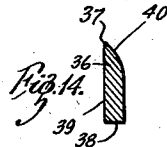


Fig. 11.



Fig. 12.



INVENTOR:

CARL G. DEUBEL,

BY John D. Rippey,

HIS ATTORNEY.

UNITED STATES PATENT OFFICE

2,276,376

CLICKER DIE STOCK

Carl G. Deubel, Colonial Park, Pa., assignor to
Progressive Service Company, St. Louis, Mo.,
a corporation of Missouri

Application January 27, 1941, Serial No. 376,154

3 Claims. (Cl. 75—126)

This invention relates to clicker die stock.

An object of the invention is to provide an improved clicker die stock composed of an improved cold drawn or cold rolled alloy steel strip capable of being welded without excessive air-hardening and possessing a greater degree of durability and improved qualities and characteristics than are possessed by clicker die stocks of different composition heretofore used. This clicker die stock is essentially preshaped with an outer wall curving or inclining from both edges and with an inner wall including portions intersecting the margins of the outer wall to form opposed cutting edges, which portions preferably diverge inwardly or vertically from the marginal portions of the outer wall; so that, after the die stock is formed in the shape of a clicker die about a pattern used by the maker, and after the ends of the stock have been welded together without excessive air-hardening, and while the stock is on or about the pattern, the die may be ground or otherwise treated to remove the high or protruded portions at its welded ends and ground or processed to the same height as the original die stock, after which the die is hardened and tempered, and then straightened and sharpened, to provide opposite knife edges by grinding on a wheel or the like, or otherwise treating, the inner and outer edges of the respective margins of the die. Thereafter, the edges may be resharpened to form extremely sharp edges by hand operation or other means.

My improved die stock is a novel alloy steel composed of different elements mixed together within certain critical range limits and different from the usual straight carbon steel heretofore generally used.

Several forms of the die stock, and a clicker die made of one of such forms, are illustrated in the annexed drawing, in which—

Fig. 1 is a perspective view of a section of one form of my improved preshaped stock enlarged to illustrate features thereof, and capable of use for making a double-edged clicker die having a height of approximately nine-sixteenths of an inch, more or less.

Fig. 2 is a perspective view of a die formed from the preshaped die stock after the die has been sharpened and straightened subsequent to the hardening and tempering thereof.

Figs. 3 to 12, inclusive, are cross-sectional views of dies or die stocks composed of alloy steel made in accordance with my present invention.

This application is a continuation, in part, of

my prior application Serial No. 210,360, filed May 27, 1938.

The cold drawn or cold rolled alloy steel stock must be held within certain ranges and certain tolerances. The alloy steel, which is cold drawn or cold rolled to form a strip having a width preferably nine-sixteenths of an inch, or any width desired, comprises a body of any cross-sectional shape illustrated, or other cross-sectional shape having opposed cutting edges and made of an alloy composed of:

		Per cent
Carbon	0.40	to 0.55
Manganese	0.50	to 0.65
Silicon	0.03	to 0.10
Chromium	0.60	to 0.75
Molybdenum	0.15	to 0.20
Phosphorous	0.01	to 0.02
Sulfur	0.015	to 0.02
Iron		Remainder

The die stock shown in Figs. 1, 2 and 3 comprises an alloy steel strip composed of the elements mentioned within the critical ranges stated, and having two diverging walls 2 and 3 forming an edge 4 having a width tolerance ranging approximately between .030" to .000". The walls 2 and 3 are intersected by two diverging walls 5 and 6 forming therewith corners 7, and also forming at the margin of the stock an edge 8 having a width tolerance ranging approximately between .030" and .000", the same as the edge 4. This alloy steel strip is preformed of cold drawn or cold rolled alloy steel, is capable of being welded without excessive air-hardening, and provides the symmetrical stock shown and described, in which the walls 2 and 3 diverge at approximately the same angle as the angle of divergence of the walls 5 and 6, and are of approximately equal width.

I have obtained this preferred cold drawn or cold rolled alloy steel at reasonable cost and held to a very close thickness with respect to the edges 4 and 8, and also with respect to the thickness of the stock along the median portion thereof. This strip of alloy steel which may be cold drawn or cold rolled, when pre-shaped in this manner, may be easily bent about a pattern to form the die, and the abutting ends 9 may be welded without excessive air-hardening. Because my improved alloy may be welded without excessive air-hardening, no substantial deterioration or damage is caused to the alloy by the welding operation. Thereafter, the high portions of the weld may be ground or filed down so as to

conform to the approximate dimensions of the original die stock, including the thickness of the edges 4 and 8.

Next, the die is hardened and tempered, and thereafter straightened by grinding or otherwise treating its opposite edges. Then, both edges are sharpened to knife edge on a wheel or the like, the inner margins being ground approximately on the angular lines 10 and 11, and the outer margins being ground approximately on the angular lines 12 and 13. After being thus treated and sharpened, both sharp edges 14 and 15 are re-sharpened by a manual operation to extremely sharp edges so that they will readily cut through the leather or the material to be cut out by this improved die.

This die, made of this improved material and stock, like the die disclosed in my prior Patent No. 2,090,325, dated August 17, 1937, is reversible so that, after one edge has been used, the die may be reversed and the opposite edge used to cut a complementary pattern. So, this die may be used to cut or form opposed or complementary parts of a shoe upper or the like and, therefore, serves the three functions of cutting duplicate forms, of being reversible to use both edges in cutting matching or complementary parts of a shoe upper or the like, and of greater durability than dies made of straight carbon steel. To these three functions may be added the advantages that this improved die stock is composed of alloy steel capable of being welded without excessive or damaging air-hardening. To attain these new and useful advantages, effects and results, the alloy must be held within the critical ranges stated.

The stock for reversible dies may be made in different forms. As in Fig. 4, the walls 16 incline from a vertical wall 17 to intersection with diverging walls 18 intersecting a relatively wide vertical wall 19. This relationship of the walls 16, 17, 18 and 19 provides a relatively wide thickened body 1 of which the wall 17 is relatively narrow and the wall 19 is relatively wide, leaving the walls 16 wider than the walls 18. Therefore, when the edges of this strip are sharpened by grinding along lines or planes such as the lines or planes 10, 11, 12 and 13, sharp cutting edges 20 are formed.

In the form shown in Fig. 5, the construction is the same as that shown in Fig. 4, with the exception that the wall 21 corresponding to the wall 17 of Fig. 4 is of greater vertical width than the wall 17, thereby causing the walls 16' to diverge from the walls 18 at approximately equal inclinations from the vertical. The edges 22 may be sharpened in the manner described in reference to Fig. 3.

In Fig. 6, the walls 19' and 21' are continued by curved walls 6' and 8' to intersection with margins which may be treated as in Fig. 3 to form sharp edges 20'.

The formation shown in Fig. 7 is the same as that shown in Fig. 3, and similar reference numerals are applied thereto, with the exception that ribs 1' are formed between the walls 2 and 5 and the walls 3 and 6. The remainder of the structure is the same as that illustrated in Fig. 3, and like reference numerals are applied thereto.

Other cross-sectional forms of reversible dies made of my improved die stock material are shown in Figs. 8 to 12, inclusive, of the drawing, from which varied forms of the invention may be easily comprehended, with the explanation that the walls 23, 24, 25, 26, and 27 are preferably at the inner sides of the dies; and the inner formations 28 (Fig. 10) and 29 (Fig. 12) provide manually engageable portions for placing and removing the dies, as does the formation 30 on the outer side of the die shown in Fig. 11.

Fig. 13 shows a strip 31 of die stock having a single cutting edge 32 along one edge and having its opposite edge 33 flat to support the die. This is analogous to many of the forms shown in the preceding views, with the exception that the die is formed with a single cutting edge, a flat supporting edge, and two flat side walls 34 and 35. This is a variation of the stock shown in Figs. 4, 5 and 6.

Fig. 14 shows a die or die stock 36 constituting a variation of many of the remaining forms of die stock shown. This die stock is formed with a single sharp cutting edge 37, a flat supporting edge 38, a flat inner wall 39, and a curved wall 40 at its upper margin intersecting the wall 39 to form the sharp cutting edge 37. This is a variation of those forms having curved outer walls.

Thus, dies made of die stock within the scope of the invention are capable of equivalent variations as to form to attain the final effective results. Skilled die makers may easily conceive of different forms of the stock embodied in the finally formed dies.

I contemplate such variations as may come within the scope of the invention, and what I claim and desire to obtain by Letters Patent is:

1. An alloy steel capable of being welded without excessive air-hardening and including approximately the following constituents in the proportions stated: carbon, 0.40% to 0.55%; manganese, 0.50% to 0.65%; silicon, 0.03% to 0.10%; chromium, 0.60% to 0.75%; molybdenum, 0.15% to 0.20%; phosphorous, 0.01% to 0.02%; sulfur, 0.015% to 0.02%; and the remainder iron.

2. A bendable alloy steel strip capable of being welded together at contacting points without excessive air-hardening and then sharpened along one edge, composed of carbon, 0.40% to 0.55%; manganese, 0.50% to 0.65%; silicon, 0.03% to 0.10%; chromium, 0.60% to 0.75%; molybdenum, 0.15% to 0.20%; phosphorous, 0.01% to 0.02%; sulfur, 0.015% to 0.02%; and the remainder iron.

3. As an article of manufacture, clicker die stock of substantially finished clicker die cross-sectional dimensions formed of a cold drawn or rolled alloy steel strip composed of carbon, 0.40% to 0.55%; manganese, 0.50% to 0.65%; silicon, 0.03% to 0.10%; chromium, 0.60% to 0.75%; molybdenum, 0.15% to 0.20%; phosphorous, 0.01% to 0.02%; sulfur, 0.015% to 0.02%; and the remainder iron, the said strip being unimpaired in quality when cooled in air from a high temperature and capable of being welded together at contacting points without excessive air-hardening.

CARL G. DEUBEL.