

W. CHISHOLM.
Forks and Devices for Making the Same.
No. 216,021. Patented June 3, 1879.

Fig. 1.

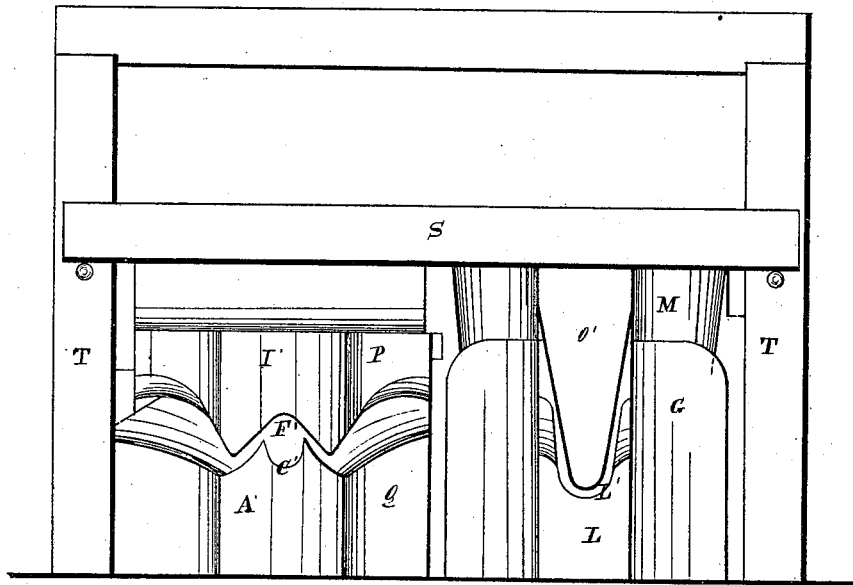
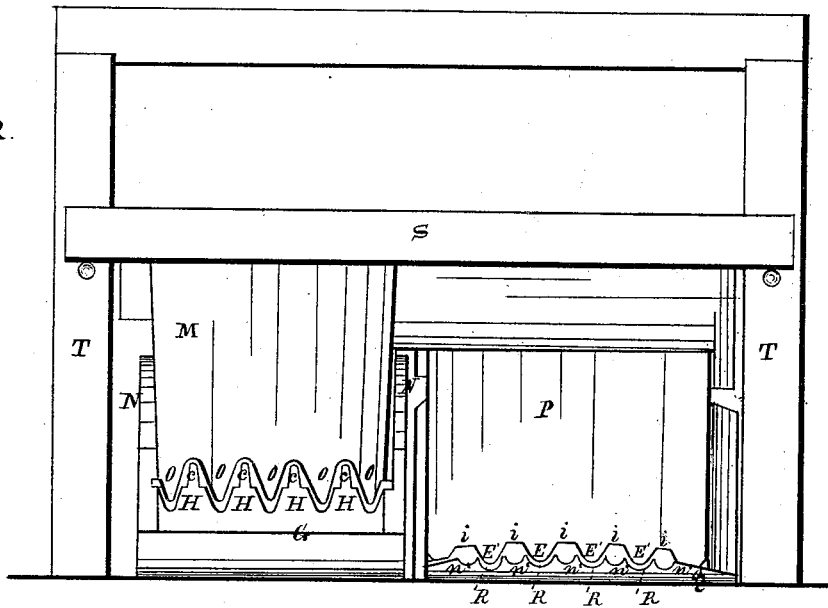


Fig. 2.



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Fig. 3.

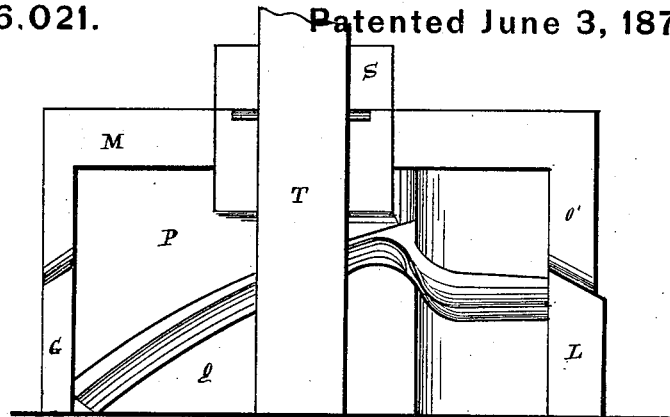


Fig. 4.

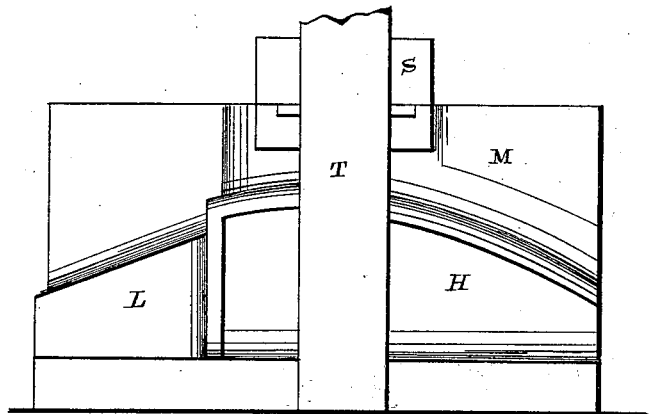
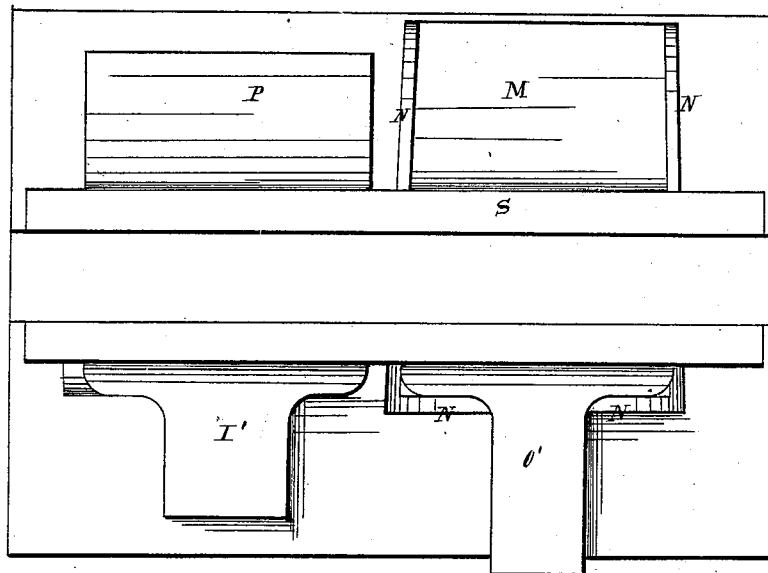


Fig. 5.



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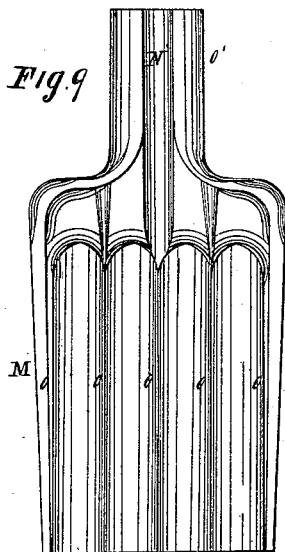
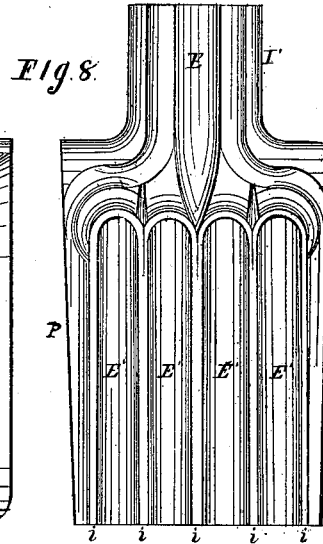
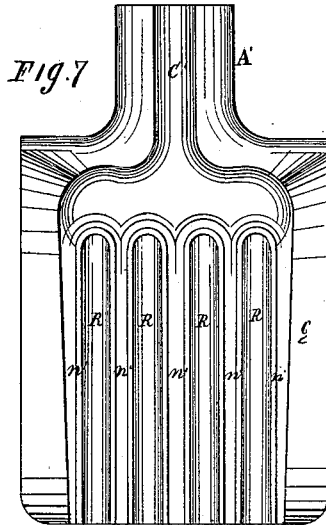
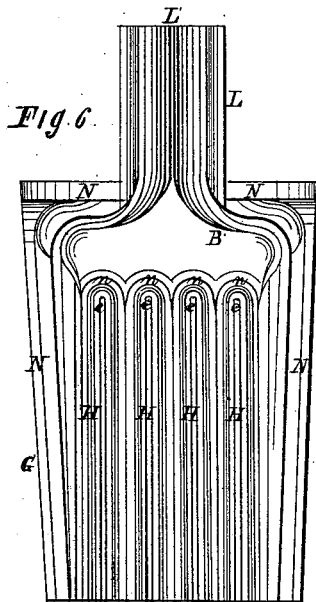


Fig. 10.

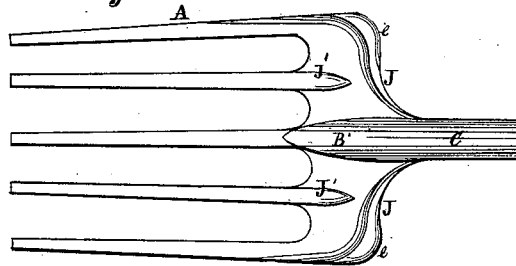
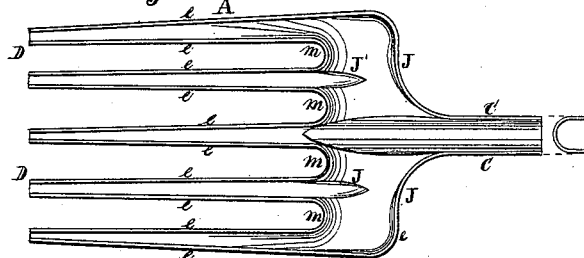


Fig. 11.



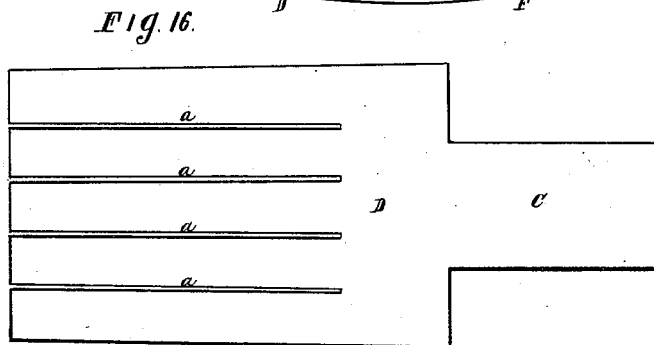
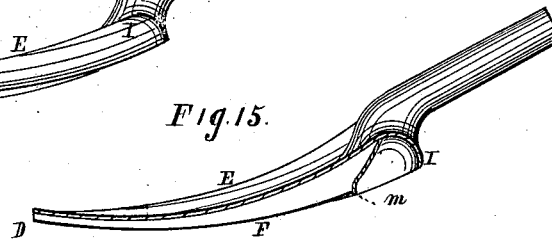
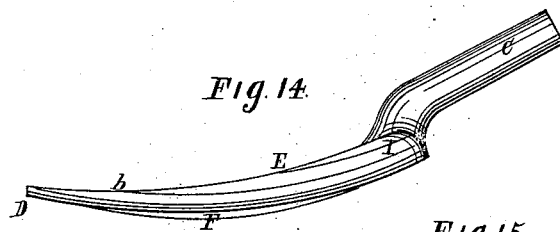
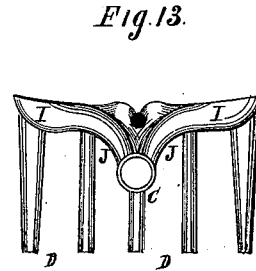
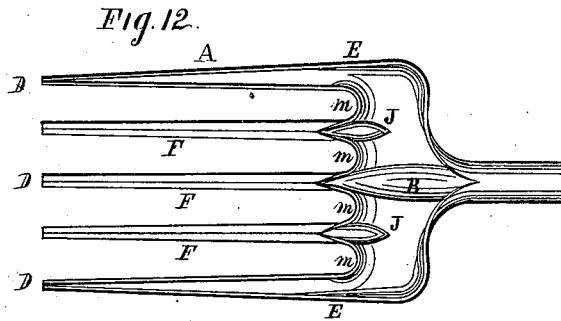
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IMPROVEMENT IN FORKS AND DEVICES FOR MAKING THE SAME.

Specification forming part of Letters Patent No. **216,021**, dated June 3, 1879; application filed March 17, 1879.

To all whom it may concern:

Be it known that I, WILLIAM CHISHOLM, of Cleveland, in the county of Cuyahoga and State of Ohio, have invented a certain new and Improved Fork and Devices for Making the Same; and I do hereby declare that the following is a full, clear, and complete description thereof.

This invention relates to improvements in forks of that variety used for handling coke, coal, &c., but may also be used for handling other coarse articles or material for which a fork is generally used.

The improvement alluded to consists in making the fork of sheet metal and the prongs thereof tubular or hollow, the junction with the corrugated head of the fork being strengthened by a flange or web extending along the head from one prong to the other, and forming an integral part of the fork structure. To this end a piece of sheet metal, termed "a blank," is submitted to the action of dies, hereinafter described. By the action of a first pair of dies the blank is partially formed into the required shape by giving to the prongs a longitudinal curvature for the hang of the fork and a transverse curvature to form the tubular character of the prongs, while at the same time is formed the corrugated head of the fork and partially the socket in which to insert a handle for using it.

The blank thus partially converted into a fork is subjected to the action of a second pair of dies, by which the two sides or edges of each of the prongs are closed together, forming a hollow or tubular prong. At the same time the two edges of the shank are closed together, forming and completing the socket for the purpose specified.

The first pair of dies alluded to consists of an upper and lower one. The face of the lower die corresponds to the upper side of the fork, whereas the upper die corresponds to the lower or back of the fork; also, the second pair of dies holds the same corresponding relation to the fork. By the consecutive operation of the two pairs of dies the blank above referred to is formed into a fork, as aforesaid.

A more full and complete description of the fork and of the construction and operation of the dies is substantially as follows, reference

being had to the accompanying drawings, making a part of this specification, in which—

Figure 1 represents a front view of the two pairs of dies above alluded to. Fig. 2 is a rear view of the same. Figs. 3 and 4 are side views. Fig. 5 is a plan view. Fig. 6 is a view of the face of the lower die of the first pair of dies. Fig. 7 is a view of the face of the lower die of the second pair of dies. Fig. 8 is a view of the face of the upper die of the second pair of dies. Fig. 9 is a face view of the upper die of the first pair of dies. Fig. 10 represents an upper side view of a fork on leaving the first pair of dies. Fig. 11 is a view of the back of the fork, Fig. 10. Fig. 12 is an upper side or back view of the fork on leaving the second pair of dies. Fig. 13 is an end view of the fork, taken looking toward the shoulder and socket. Fig. 14 is a side view. Fig. 15 is a sectional view. Fig. 16 is a view of a blank from which the fork is made.

Like letters of reference refer to like parts in the several views.

For convenience a description of the fork will first be given. As above stated, the fork is made of sheet or plate metal.

In the drawings, A represents a fork, of which Fig. 10 shows the upper side when finished, and Fig. 12 the under side or back of the same. B is the shoulder or head of the fork, and C the socket for the handle, and D the prongs.

It will be observed that the side prongs, E, are much thicker and wider than the middle prongs, F, and that they stand above the middle prongs at their junction with the shoulder, whereas the points of all the prongs are in the same plane, thereby making the palm of the fork dishing, so that it may have a holding capacity similar to a scoop-shovel.

A further description of the fork will presently be given. The fork above described is made from a blank, as shown in Fig. 16, and consists of a plate of metal, in which are made slits *a*, corresponding in length and number to the spaces between the prongs of the fork. B is the part of the blank of which to form the head, and C that for the shank or socket of the fork. Said blank is formed or shaped into the fork above described by the dies alluded

to, of which G and M, Figs. 1 and 2, represent the first pair used upon the blank. The face of the lower die, G, curves longitudinally, corresponding to the curve *b*, Fig. 14, of the fork. On the face of said die are longitudinal corrugations H, Figs. 2 and 6, corresponding in length and width to the spaces between the prongs of the fork.

Lengthwise on the back of each of the corrugations is a rib, *c*, Figs. 2 and 6, the head end of which extends to the ends of the corrugations, and conforms to the rounded ends thereof, around which the curve at the head end of the spaces between the prongs of the fork is formed.

B' is the head part of the die, corresponding to the head B of the fork, and consists of a depression equal in depth to the width of the flange I, Fig. 13, extending along the upper edge of the shoulder of the fork and also of the neck J to the socket or shank C, above alluded to. This part of the die is provided with projections or swells to form the swells or corrugations on the head of the fork.

Projecting back from the head of the die is a block, L, in which is a semicircular groove, L', Figs. 1 and 6, corresponding to one-half of the diameter of the socket, in which said socket is partially formed by the co-operation of the part O', Fig. 1, of the upper die.

The lower die is partially inclosed by a rim, N, Fig. 6, between which the upper die is closely but loosely fitted.

On the face of said upper die, and lengthwise therewith, are angular corrugations O, Fig. 9, an end view of which is shown in Fig. 2. Said corrugations are five in number and fit the spaces between the corrugations on the face of the lower die, G, on placing the two dies together—that is to say, the lower die is of the configuration of the face or upper side of the prongs of the fork, the head, and the shank or socket thereof, whereas the upper section of the dies conforms to the under side of the fork, as shown in Fig. 11, and therefore it has a conformative relation to the lower die, between which two sections of the die the blank, Fig. 16, is formed into a fork, as shown in Figs. 10 and 11, representing the upper and lower sides of an unfinished fork. The dies may be so formed as to make forks of more or less number of prongs than herein shown.

The co-operation of the dies to effect this change in the blank is substantially thus: The blank is laid upon the lower die, G, so that the rib *c* of the die will be inclosed by the slits *a* of the blank, thereby placing the metal between said slits over the spaces between the corrugations H of the lower section of the die. At the same time the head part B of the blank will cover the corresponding part of the die, and the part C of the blank will cover the groove in the block L for the shank or socket. Upon the blank thus laid upon the lower die the upper one falls, thereby pressing it into the lower die, and of the shape as shown in Figs. 10 and 11. It will be observed

in Fig. 11 that the metal of the blank is struck up, forming a flange, *e*, on the outer edge of the outside prongs, which flange continues along over the outside end of the head and extends along the top of the head to the shank, forming a continuous flange from the side of the prongs to the socket.

The edges of the inner prongs are struck up in like manner, and also the flange which curves around along the head from one prong to the other, as seen in said Fig. 11, and also shown in Figs. 13 and 15.

The flange struck up around the curve *m* at the junction of the prongs with the head gives great firmness and strength to the prongs in their connection with the head, at which point the greatest strain is exerted upon the prongs while the fork is being used. The flange places the metal in the best possible condition and distribution for strength in proportion to the amount of metal employed; and the flange at this particular point in the fork, on account of its being a continuation of the flanges along the sides of the central prongs and the inner sides of the outer prongs, gives to the article a strength and durability which forks of this class do not have when constructed in the ordinary way. The head of the fork, from having corrugations or swells J' in direction of the prongs, by the extension of the prongs into the head, also of the socket, renders the head firm and rigid, so that it will not break or bend by any ordinary usage, it being strengthened by the said corrugations without an increase of material.

While the article, excepting the socket, may be made up in one piece, as shown, the shank for the handle can be constructed separately, and then attached to the fork by any suitable means.

The side prongs of the fork, it will be seen, are larger than the middle ones, and their junction with the shoulder or head B, being re-enforced by the deep flange *e* extending around the end and upper part of the head in a wide flange, I, not only strengthens the connection of the prongs with the shoulder or junction of the fork with the head, but also adds strength and rigidness to the metal comprising the said head, which is also further re-enforced, and made all the more rigid by the corrugations formed on the head by the extension thereon of the curve of the prongs and socket; also, the flange I, extending along the top and rear part of the head to the socket, makes the junction of the socket therewith more firm and durable, and at the same time affords a broad surface on which to place the foot in the event it will be necessary to force the fork into the material to be moved.

The flange *m* around the curve between the junction of the prongs with the head B is formed by the enlargement or swell *n*, Fig. 6, terminating in the swells or corrugations of the head. Said swells, being above the bottom of the corrugations, prevent the metal at that particular place from being depressed by

the action of the upper die to the same degree as the metal between the corrugations; hence the edge of the metal is left in the form of a flange, an unbroken continuation of the sides of the several prongs forming a continuity of the flanged sides of the prongs and curve between them; so, also, there is a continuity of metal comprising the outer sides of the side prongs extending around the head to the shank. The projection O' of the upper die, M, corresponds to the projection L of the lower die, between which two projections the shank is formed, as seen in Fig. 11.

As before said, the fork, as shown in Figs. 10 and 11, is in an unfinished condition. In order to complete the fork the two edges *ee*, Fig. 11, of the prongs are to be closed together, as shown in Fig. 12, and also the edges C C, Fig. 11, of the socket are to be brought together, as seen in Fig. 12, to complete the socket for the handle. To this end is the purpose of the second pair of dies, P and Q, Figs. 7 and 8, of which P is the upper section, and Q the lower one, of the dies. Lengthwise the face of the lower section, Q, is a series of grooves, R. In the back of the ridges between the said grooves is a narrow groove, *n'*, Fig. 7, adapted to receive the prongs of the fork when laid face downward upon the die.

An end view of the die and grooves is shown in Fig. 2. The lower die is also provided with a projection, A', in which is a groove, C', adapted to receive the upper side of the unfinished shank or socket of the fork, and in which it lies when the fork is placed upon the face of the die for being operated upon by the upper or companion die. The lower die is also adapted to receive the shoulder or head of the fork.

The edge *e* of the prongs of the fork, and also the edges C C of the socket when the fork is laid upon the die, are above the face of the die, so that they may be in contact with the face of the upper die when falling upon the lower one for finishing the fork.

The prongs of the fork, on account of being placed in the grooves *n'* and the die adapted to receive the shoulder and socket, cannot become displaced, but are held securely while being subjected to the action of the upper die. The face of the said upper die is provided with corrugations E', Fig. 8. Said corrugations correspond to the grooves R of the lower die, the bottom *i* of said corrugations E' (the sides of which are slanting inwardly, as seen in Fig. 2) conforming to the smaller grooves, *n'*. The relation of the two dies when placed together is shown in Fig. 2.

The practical operation of the dies for the purpose specified is as follows: The unfinished fork is laid upon the lower die face downward, and so that the prongs will lie in the small grooves *n'* and the shank in the groove C', as above said. On descent of the upper die the corrugations E' thereof, for being wider than the spaces between the prongs of the fork, crowd the

edges *ee* of the prongs toward each other, causing them to touch, as seen in Fig. 12, and at the same time the groove F' of the projection I' forces the edges C C of the shank together, as shown in said Fig. 12, thereby completing the socket and closing together the sides of the prongs by one operation. The points of the outer prongs only are closed, the rest part of their length being left open, as shown in said Fig. 12; but they may, however, be further closed along their length, as before mentioned, as are the middle prongs, if so desired, by fitting the die for this purpose. It is preferred, however, to leave them open, as shown in the drawings.

The middle prongs may also be left open, as are the side prongs, leaving them U-shaped and not tubular or closed.

The fork made of plate metal as above described—*i. e.*, with hollow prongs and their junction with a corrugated head re-enforced by the flange *m*, and also the outer prongs, shoulder, and neck re-enforced by a supporting-flange—makes the fork not only stronger than ordinary forks in use, but lighter, and therefore less tiresome to handle.

The two upper dies are secured to a beam or cross-head, S, adapted to work vertically in the standards T. The two dies therefore work together in relation to their respective lower dies for the purpose specified. The two sets of dies, however, may be worked separately.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. In a sheet-metal fork, an improvement consisting of tubular or hollow prongs, connected with and forming an integral part of the head of said fork, and provided with a shank or socket for the handle, for the purpose set forth.

2. A fork constructed from one piece of sheet metal, consisting of tubular or hollow prongs, a socket for the handle, corrugated head, and re-enforcing flange extending from around the socket along the rear upper part of the head to the side tines, along which it continues to the point forming the outer side or flange of the tine or prong, substantially as described, and for the purpose set forth.

3. In a sheet-metal fork having tubular tines and made from one piece of metal, the head thereof having corrugations or swells from its junction with the tines and on the lower side of the head between the tines, a curved flange extending around from the side of one prong to the other, substantially in the manner as described.

4. A fork made of sheet metal and consisting of tubular tines and corrugated head, provided with a curved flange on the lower side between the tines at their junction with the head, and extending around from the side of one tine to the other, a socket for the handle, having a re-enforcing flange extending from around the said socket along the rear upper part of the head to the side tines, along

which it proceeds to the point forming the outer side or flange of the side tines, substantially as and for the purpose specified.

5. In the manufacture of forks from sheet metal, a pair of dies, the lower one of which is adapted to form the upper side of a fork, to that end having on its face longitudinal curvilinear corrugations H, provided with ribs with corresponding longitudinal and transverse curvilinear grooves between said corrugations, and having a corrugated form in which to shape the head of the said fork, and projecting therefrom a grooved block in which to partially shape a socket for the handle arranged to co-operate with the upper die, the face of which is conformative to the lower die, and in concert therewith forms the under side of a fork, substantially as described.

6. In the manufacture of forks from sheet metal, a pair of finishing-dies, the lower one of which having on its face longitudinal and transverse curving grooves *n'*, and having a corrugated form adapted to receive the corrugated head of a partially-formed fork, and a grooved block adapted to the unfinished shank of the said fork co-operating with a corresponding conformative upper die for closing together the edges of the prongs of the fork and the edges of the shank or socket thereof, substantially as set forth.

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Witnesses:

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M. CONVERSE.