ART OF COPPERSMITHING.

A PRACTICAL TREATISE ON WORKING SHEET COPPER INTO ALL FORMS.

By

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DEDICATED

TO THE MEMORY *of my Father, to whose early instruction much of the following work is due: and to the Boys of the Copper Trade, in the hope that it may assist them to acquire proficiency in the art of Copper Working.*

TO THE READER.

When a boy between the age of nine and fifteen years, struggling along with my father, trying to be what was then called a Tinman and Brazier, I was compelled by circumstances to encounter many stumbling blocks and overcome many obstacles in the way of education. It will be noticed in the opening pages of this work that the writer was but a mere child when, like thousands of other children, he commenced to handle tools, *not toys.* As my childish mind began to develop and inquire into the whys and wherefores of things about me, I also began to look for a source of information, beyond the shop, to assist me to fill the position it seemed I was destined to occupy with a hope of some degree of distinction (for most children have aspirations). My search was incessant, and not altogether in vain, because among the vast amount of chaff searched I found occasionally a golden grain, which was laid up in the storehouse of my mind.

I jotted down instinctively in my memory each practical lesson learned in the shop, which was my only record. After using every means at my command to obtain the education necessary, wrestling in the little spare time allotted to me in the evening with such books as came in my way, storing my mind indefinitely for several years with whatever seemed likely to be useful, I went to London. Here I ransacked every old book stall I could find, hoping to find some guide to the copper trade ; but all in vain. I never discovered a line to

help me. I then resolved to exert every effort to acquire the necessary ability, so that when a favorable opportunity should offer I could give my experience for the benefit of boys placed in the same unfortunate position as myself.

And while the aspirations of my youth died away amid the busy turmoil of mechanical life, and smoldered for years (with an occasional burst of warmth), the thoughts were still cherished, and I began without any preparation, save my memory, to give the helpless boys of the trade reliable instruction in things they should know in starting out to acquire the "Art of Coppersmithing." I did my best to tell from my own experience, in the most lucid manner, that which is being called for in everyday life, in three separate branches of the copper trade, supposing with each lesson there was a good boy at my side. I am pleased with the result of my first effort, which was in a measure impromptu. It will not, however, make Coppersmiths of any one without effort and application, but I trust it will be a help to all who have need of assistance, and be an incentive to boys to exercise whatever talents they may possess for their own benefit and that of others less fortunate.

Before closing my few introductory remarks I desire to tender thanks to THE METAL WORKER for the opportunity afforded me for the consummation of my work.

JOHN FULLER, SR.

Seneca, Kansas.

FIRST YEAR'S EXPERIENCE.

On Monday, February 7, 1842, in the town of Dorking, at 6 o'clock in the morning, could have been seen a little boy, fairly intelligent and rather larger in stature than his tender years would seem to indicate, who lacked just 46 days to complete his ninth year. This little fellow was trudging along by the side of his father toward an old brazier's shop to take his initial step amid life's busy turmoil. Having arrived there in due time and admission gained, a light was the first thing in order, which was obtained from an old tinder-box with a brimstone match, the light being transferred to an old-fashioned whale-oil lamp (Fig. 5), which burned after being lit with a reddish-yellow flame. On looking around the boy saw that about everything seemed black and forbidding, cold and cheerless; the soot of half a century previous was still clinging to those dreary-looking walls. The next anxiety was to get a fire, which was made from a pile of cinders at hand in the corner of the forge. This fire seemed to offer a ray of hope to the little fellow, who clung to the chain of the bellows and kept the cinders bright enough to be able to see just where he was. After two and one-half long, weary hours the bell rang and the boy trudged home to get his breakfast; and what a release it seemed to get away, if but for 30 minutes, from this gloomy-looking place and revel in the sunshine while walking home and back! As the hour of 9 approached he was wending his way thither again, and from 9 until 1 o'clock blew the fire, ran errands and helped his father, when the joyful bell rang for dinner, for which an hour was allowed, returning at 2 o'clock and working until 5, then going to tea for half an hour and back to work again until 7 o'clock, at which time the most welcome sound of the whole day said, "Leave until 6 the next morning." Never did child go to bed more cheerfully or sleep more soundly than did that little hero of nine summers, and never did the time seem to fly more swiftly as the gentle word summoned him to his duties each succeeding morning.

The first week was at length finished, and on Saturday work was left off an hour earlier; but the last employed were the last paid, and

thus the boy was the last to be paid, which was done with as much ceremony as if he were the most important man. After paying him his 3 shillings wages the good man seemed moved by pity, for he spoke the only kind word that had seemed to greet the boy's ear (excepting from his father) during the week, and so the first week of the infant's toil closed. Peter L. Saubergue always proved a good and kind master, and our boy learned to love him as time went on. Here let us pause a moment to consider if it ought to have been then or is now necessary for the welfare of the race that little children of such tender years should be made captive and brought to labor while thousands of able-bodied men are idle around them waiting for work.

At the end of six months this boy had got to be quite handy and was kept busily engaged breaking coke, sal ammoniac and borax, charging joints and drying them ready for the fire, thinning edges and other little jobs. Then as each batch of cooking utensils was brought to be repaired and retinned he was taught to burn off the

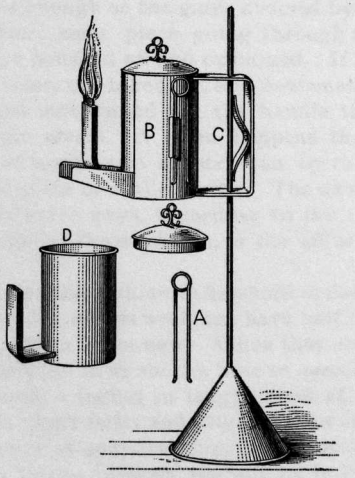

Fig. 5.—Old-Fashioned Whale-Oil Lamp.

grease, apply the acids and scour them ready for the process of re-tinning. Then, again, all the hammers were required to be kept clean and bright, also all other polished tools, all of them being carefully greased with raw goose-grease, which duty had to be performed every day before leaving work, because if a hammer should get cloudy it entailed much labor repolishing on the buff-board to restore it suitable for use. The boy labored along at this seeming drudgery, which many boys are apt to shun and exert every effort to evade, to their own detriment, for wrapped up in this so-called drudgery are some of the most important features of every trade.

BEER MULLERS.

Copper beer mullers, or warming pots, will next engage our attention. These are nice little jobs for a boy, progressive in their character, and give, after the first three years of drudgery, some relief to the monotony of scouring, breaking coke, and other so-called boy's work, the continued repetition of which has often been the means of breaking the spirit and blighting the hopes of many a good promising lad, who has been kept dragging along, year after year, wasting precious time at work that should have been shared between man and boy, and which could have been done without loss or detriment, but rather a benefit to both. I would pause to plead for the boys of the coming generation as I have often done for those of the past, craving for them sympathy, when they have been compelled to complain (and justly, too,) of the amount of time which has been sacrificed by them in incessant and unnecessary drudgery, often times, too, with a man who was altogether inferior in perception or mechanical ability to the lad placed under his control. If a lad is once given a place in a shop to learn any trade, he should have a chance to develop at least his own natural ability, even though the kind attention he should receive be withheld.

Beer mullers are made after three general designs, peaked, open and curved. Our first job at these (and they were the first vessels we began and finished complete) was a half dozen ½ pints, three with lips and three without. We will now describe the various operations: A ½ pint (British standard) muller, Fig. 123, measues 2¼ inches at top, 3⅜ inches deep and 3 inches at bottom. To describe the pattern: Let C D F G, Fig. 124, represent the elevation of article, which is shown 3⅝ inches deep, to allow for wire at top and edge at bottom. Through the center draw the center line K B. Extend the lines F D and G C, until they meet the center line as at B. Then B C and B G are the radii of the arcs which contain the pattern. With B as a center, describe the arcs J N and H L indefinitely. Upon the arc J N measure the circumference of the bottom of article, and from these points, as J and N, draw lines to the center B. Then L H J N will be the pattern for the article shown by C D F G. Having obtained the

Fig. 123.—*Half-Pint Beer Muller.*

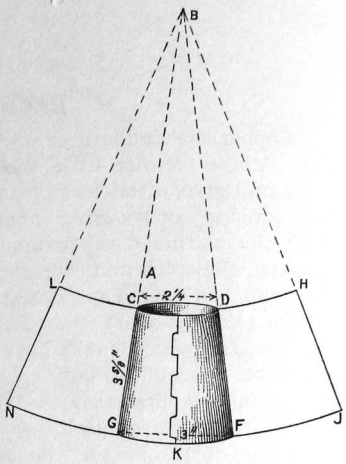

Fig. 124.—*Pattern for Muller.*

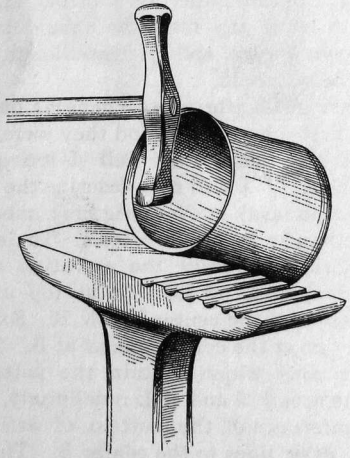

Fig. 125.—*Turning Over Edge for Wire.*

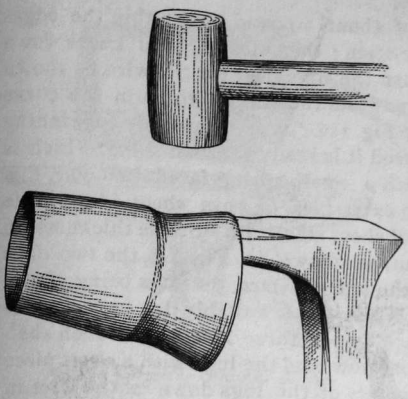

Fig. 126.—*Forming Concave Side of Muller.*

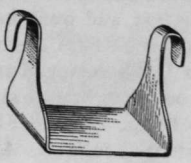

Fig. 129.—*Hammer Face Formed.*

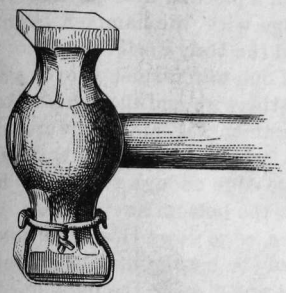

Fig. 127. *Spring-Faced Planishing Hammer.*

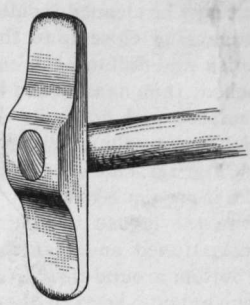

Fig. 130.—*Creasing Hammer.*

Fig. 128.—*Pattern for Hammer Face.*

pattern, it is to be cut out of about 6-pound plate; thin the edges cramp and form, and braze the seam; then clean off and knock down the joint, and anneal. Now turn the edge over for the wire, as shown in Fig. 125, and work in a course from the bottom to form the curve or bell at the base, as shown in Fig. 126. It is then ready for tinning inside. When tinned and scoured it is ready for planishing, which is done on a bright side stake, with a small spring-faced hammer, Fig. 127—that is, a hammer with an extra face of thin sheet steel, made and fitted as follows: A piece of sheet steel, of a suitable thickness, in this case about 20 gauge, is cut, as shown in Fig. 128, the two ends turned up as in Fig. 129, to fit the hammer-face, the lugs being placed in a line with the handle. When fitted suitably lay between the hammer-face and the spring-face two or three layers of French shalloon, which answers as a cushion; now bind the lugs with a stout piece of binding wire, and turn the points of the lugs down on the wire in such a way that they will tend to draw the spring-face close up and tight to the hammer. After polishing, it is ready for use. The job must now be cleaned inside and out with a piece of nice soft rag, then commencing close up to the wiring edge with the hammer, begin to planish and follow each course around the body until the bottom is reached; then again clean it inside and out, and planish it over again to smooth and finish it. Now put in the wire and then the bottom, which is done thus: With a creasing hammer, Fig. 130, on the creasing iron, Fig. 131, sink the edge around the bottom edge, being careful to make it regular and true. Then lift the edge enough to lay the bottom in the crease as shown in Fig. 132, the bottom having been previously tinned and planished, bring the edge down close and solder the bottom around inside, or if preferred the bottom may be soldered on the outside, keeping the soldering-iron as close to the outside edge as possible, that the work may be neatly done. When this is done form the lip on an extinguisher stake as shown in Fig. 133 by placing the cup on the beak, and with a hatchet-shaped mallet sink the wire on each side of the stake, a little at a time, until the lip is formed. Then with the wooden set, see Fig. 133, made of boxwood and smooth like the pane of a hammer, shape the V of the lip on the point of the stake, letting the point extend a third down the body, or they may be left without the V, the wiring only being bent. Make the handle, Fig. 134, 4 inches long from 30-pound plate, the edges being made round and burnished, and the surface planished smooth; after bend-

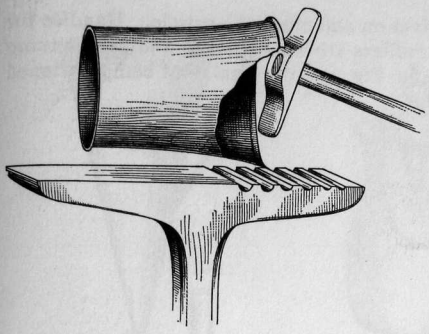

Fig. 131.—Forming Crease in Bottom.

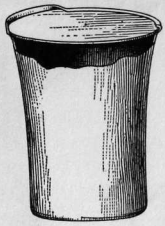

Fig. 132.—Laying Bottom in Crease.

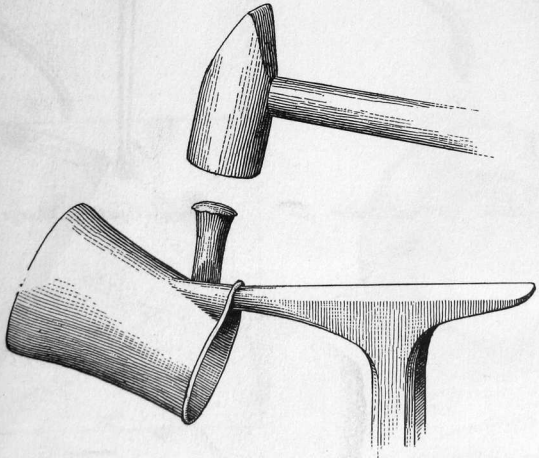

Fig. 133.—Forming Lip on Muller.

ing into shape as shown, rivet on and clean the article. Handles for the three largest sizes of mullers are made hollow and bent, having a flap brazed on as shown in Fig. 135, the small end being flattened and filed to the desired shape.

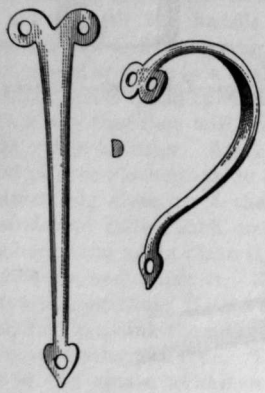

Fig. 134.—Handle for Small Muller.

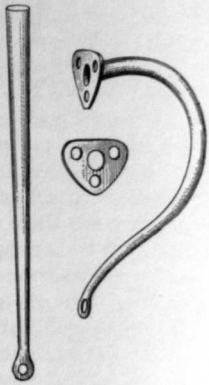

Fig. 135.—Handle for Large Muller.

Fig. 136. Old Style of Muller.

Fig. 137.—Covered Muller.

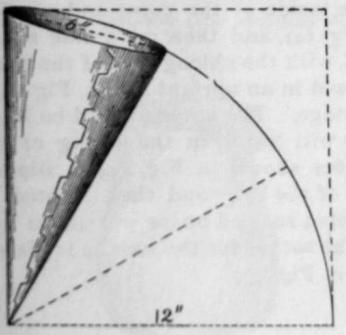

Fig. 138.—Pattern for Peaked Muller.

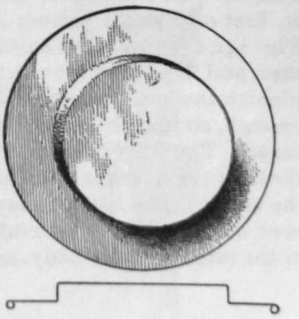

Fig. 139.—Pitched Cover.

The peaked Muller, Fig. 136, is an old design, and was made in two sizes—namely, pint and quart, while the covered mullers of the shape illustrated in Fig. 137 were made in five sizes, from ½ pint to 2 quart—that is, ½ pint, pint, quart, 3 pint and 2 quart.

The peaked muller, Fig. 136, is made in two ways; in the one the side is brazed together; in the other it is grooved; if the side is brazed the work is similar to that already described. If the side is to be grooved the pattern is tinned, planished, wired and the edges are turned, before being formed into shape, after which the point is flattened and turned over, as shown in Fig. 136. The pattern for a muller of this conical shape to hold 3 pints is shown in Fig. 138, and should measure 6 inches at the brim inside and about 11 long after the point has been flattened and curled.

The covered muller, Fig. 137, was made similar to the one shown in Fig. 123, but with a socket and wood handle, the body curving the other way, as shown, it also had a pitched cover. To pitch a cover is to raise it in the center, Fig. 139, a certain distance, which is roughly done on the block, Fig. 140, having a suitable hole cut in it for this purpose, and with the hammer like the one shown in Fig. 142, having one round face and the other oblong. With the round face sink or beat the copper into the hole in the block, allowing the edge to pucker up all around until the pitch is of sufficient depth, which takes two courses to complete, then raze down the wrinkles with a mallet and smooth with a hammer; next tin the inside of the cover and planish it, first on a small bottom stake, Fig. 141, and then on a side stake, Fig. 142, or some other suitable head, with the oblong face of the hammer, and, lastly, on a bright anvil, held in an upright shank, Fig. 143, planish the outer ring and wire the edge. The cover should be large enough, so that the wire of the body will just fit in the wiring of the cover. The joint or hinge of the cover shown in Fig. 144 is slipped through the notch left in the wiring of the body and then riveted to the cover. The bottom may be doubled seamed on or put in as has been described for open mullers. The socket for the handle is placed in the middle of the body, as shown in Fig. 137.

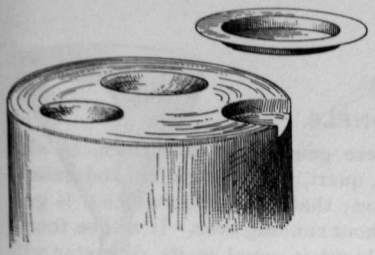

Fig. 140.—*Raising Block.*

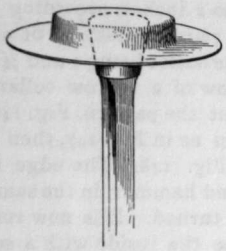

Fig. 141.—*Planishing Cover on Bottom Stake.*

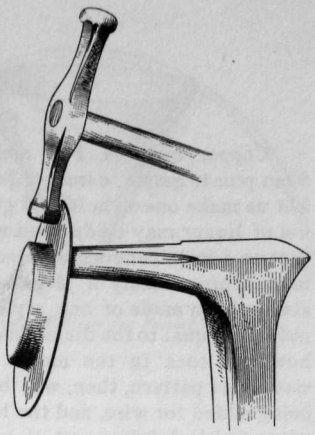

Fig. 142.—*Planishing Cover on Side Stake.*

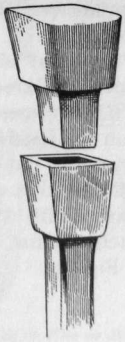

Fig. 143.—*Anvil Held in Upright Shank.*

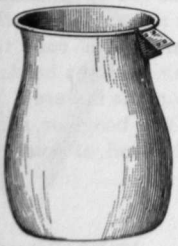

Fig. 144.—*Cover Hinge.*