(No Model.) 2 Sheets—Sheet 1.

J. ROBERTSON.

MANUFACTURE OF SHEET METAL.

No. 386,160. Patented July 17, 1888.

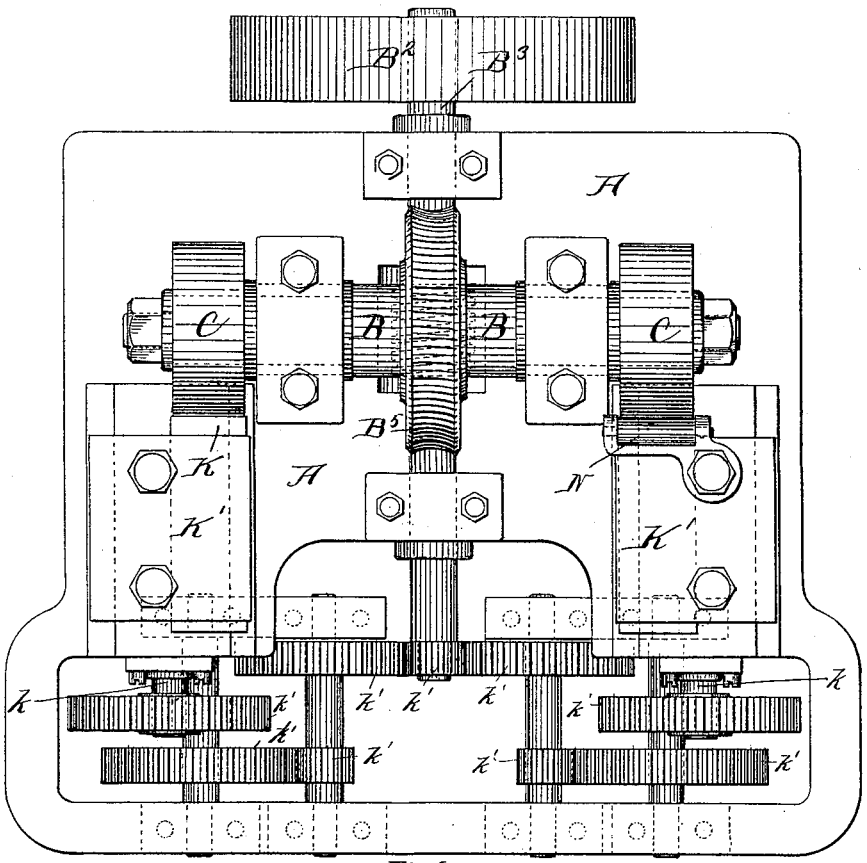

Fig. 1

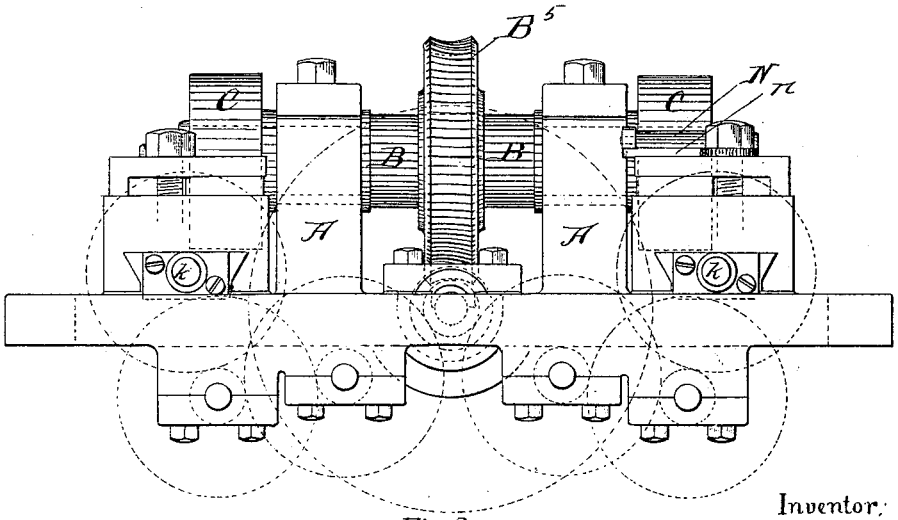

Fig. 2.

Witnesses:
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Sew. E. Curtis.

Inventor:
John Robertson.
By Munday, Evarts & Adcock.
his Attorneys:

(No Model.) 2 Sheets—Sheet 2.

J. ROBERTSON.

MANUFACTURE OF SHEET METAL.

No. 386,160. Patented July 17, 1888.

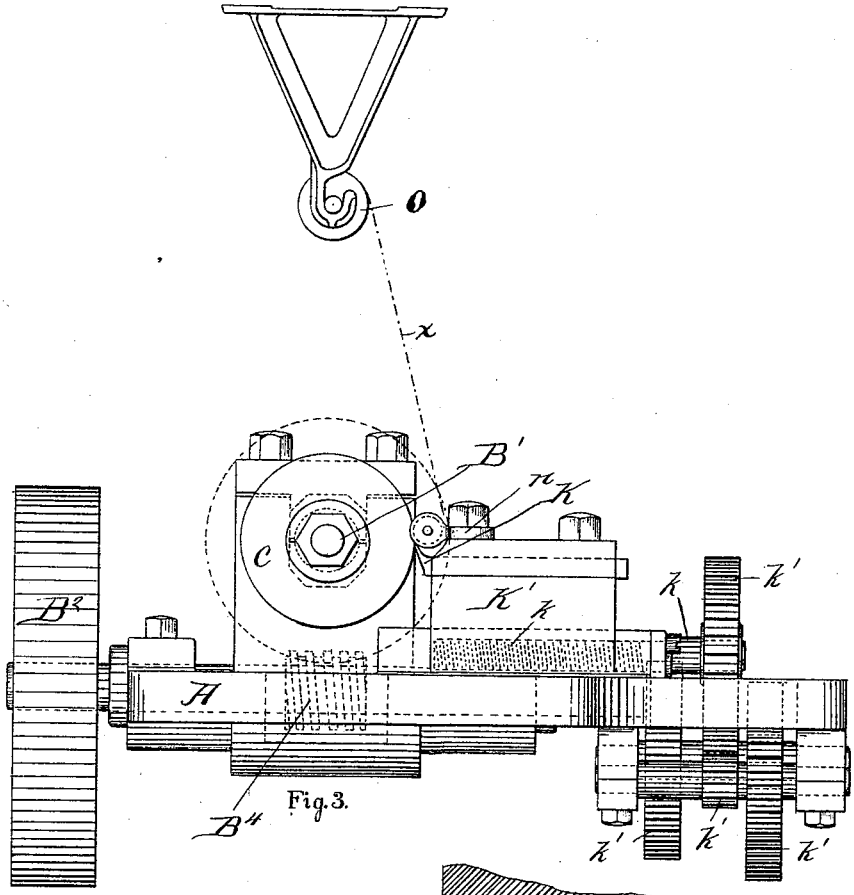

Fig. 3.

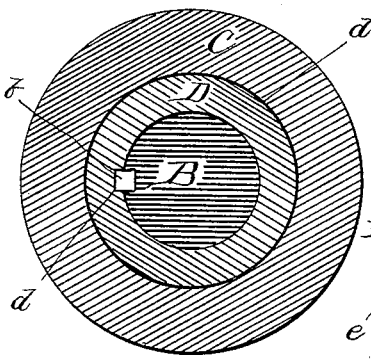

Fig. 5.

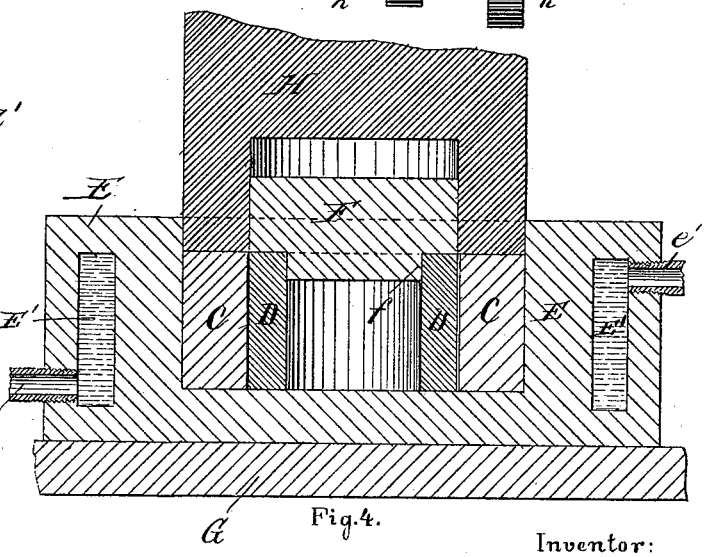

Fig. 4.

Witnesses:

R. W. Munday

Lew. C. Curtis

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UNITED STATES PATENT OFFICE.

JOHN ROBERTSON, OF BROOKLYN, NEW YORK.

MANUFACTURE OF SHEET METAL.

SPECIFICATION forming part of Letters Patent No. 386,160, dated July 17, 1888.

Application filed March 24, 1888. Serial No. 268,370. (No model.)

To all whom it may concern:

Be it known that I, JOHN ROBERTSON, a citizen of the United States, residing in Brooklyn, in the county of Kings and State of New York, have invented a new and useful Improvement in the Art of Manufacturing Sheet Metal, of which the following is a specification.

My invention relates to the manufacture of sheet-solder, sheet-lead, sheet-tin, or other soft sheet metals.

The method heretofore usually employed for reducing soft sheet metals to thin sheets consists, essentially, in rolling and rerolling the metal by passing the mass very many times through the rolls.

The object of my invention is to provide a more simple, cheap, and expeditious method of reducing or converting a mass of soft metal into a thin sheet of any desired thickness, which may be practiced by less expensive plants of machinery, and whereby the sheet metal may be produced in continuous strips of any desired length.

I have discovered, and herein my invention consists, that continuous strips of sheet metal of any desired thickness from one one-thousandth of an inch or less to one-eighth of an inch or more may be rapidly and cheaply produced by first casting the metal in a cylindrical block, then densifying by suitable pressure the block of cast metal, and finally cutting or turning the continuous strip of sheet metal from its peripheral surface. The pressure to densify the cast-metal block may be applied by any suitable means, but preferably by a hydraulic ram or press. The densifying pressure is also preferably applied before the molten metal poured into the mold becomes fully set or hardened. This densification of the metal block by pressure serves to make the sheet metal of a more uniform and even texture, and to guard against liability of imperfections in the sheet by reason of blow-holes or other imperfections in the cast block from which it is cut.

In practicing my invention any suitable machine, tool, or device may be employed for cutting the strip of sheet metal from the cast block—as, for example, an ordinary turning-lathe, the cast-metal block being secured upon the spindle of the lathe, while the slide-rest carrying the knife or cutting-tool is arranged to feed or advance slowly and continuously against the metal block, and thus cut a continuous strip of metal therefrom. The cast-metal block may be secured upon the revolving spindle of the machine by any suitable means which may suggest itself to the skilled mechanic. To do good work it is, however, essential that it be rigidly secured; and to this particular end I cast the metal block in the form of a ring around and upon a hard-metal block having a tinned outer peripheral surface, or a surface otherwise prepared, so that when the molten metal is poured into the mold around this tinned hard-metal block the same will be fused or metallically united therewith, and thus attached thereto with perfect rigidity. The tinned hard-metal block is preferably also in the form of a ring for convenience of securing the same upon the spindle of the cutting-machine.

While my invention may obviously be practiced with various suitable forms of apparatus, I have shown in the accompanying drawings, forming a part of this specification, for the better understanding of my invention, the form of machine or apparatus which I prefer to employ and which I believe to be the best form of apparatus now known to me for practicing the process.

In said drawings, Figure 1 is a plan view of the cutting-machine. Fig. 2 is an end view of the same. Fig. 3 is a side elevation. Fig. 4 is a vertical section of a mold for casting the soft-metal block, showing also the head of the hydraulic ram for compressing the block while it is still in the mold; and Fig. 5 is an enlarged cross-section showing the metal block secured on the spindle of the cutting-machine.

In said drawings, A represents the frame of the cutting-machine, which may be of any suitable construction.

B is the revolving spindle, upon which the cast-metal block C is secured through the medium of the iron or hard-metal ring D, having a longitudinal slot, *d*, which fits corresponding webs or keys, *b*, on the spindle B. Nuts B′ on the threaded ends of the spindles secure the hard-metal rings D in place. The hard-metal block or ring D is provided with a tinned outer periphery, *d′*.

E is the mold in which the annular metal

block C is cast, the tinned hard-metal ring D serving as the core or central portion of the mold.

F is a plug having a turned end, *f*, to fit inside the ring D, the outer periphery of the plug fitting flush with the outer periphery of the ring D.

G represents the platen or bed-plate of a hydraulic press upon which the mold E is placed, and H represents the head of the hydraulic press or ram, the end of the same being made annular, corresponding to the annular block D. The mold E is provided with an annular water-space, E′, having inlet and outlet water-pipes *e* and *e′* for the purpose of more quickly cooling the molten metal poured into the mold to form the block C.

When the molten metal is poured into the mold, it will become fused or metallically united with the metal ring D by reason of the tinned or prepared peripheral surface *d′* of the hard-metal ring D, so that the metal block C will be firmly and rigidly secured to the ring D, the same as if the ring and metal block were all one piece. Before the casting C becomes fully set the head H of the hydraulic press should be forced down and the metal block firmly compressed and densified, so as to remove all imperfections in the cast block. The cast block C being thus fused or welded to the ring D, it, in connection with the ring, is taken from the mold and secured upon the spindle B of the cutting-machine.

The cutting-machine spindle B is driven by a driving-pulley, B^2, on the shaft B^3, having a worm, B^4, which meshes with a worm-gear, B^5, on the spindle B.

I preferably secure a metal block, D, upon each end of the revolving spindle B, as indicated in the drawings, and thus produce two sheet-metal strips at once. The knives or cutting-tools K are mounted upon slide rests K′, which are fed forward slowly and continuously by the feed-screws *k*, which are driven from the main shaft B^3 through a suitable train of reducing-gears, *k′*. It will of course be understood that the knife K feeds forward or advances toward the block D at each revolution thereof to adjust the thickness of the sheet-metal strip being produced. The knife K should be mounted to press radially against the metal block C, and it should be accurately mounted parallel to the axis of the revolving block.

Mounted on the slide-rest K′, just above the knife K, is a guide-roller, N, around which the metal strip *x* cut from the block C is led or guided to the winding-up spool O. This guide-roller is journaled on a suitable bracket, *n*. The winding-up spool O may be driven in any suitable manner—as, for example, by a slip-belt and pulley.

If desired, after the continuous sheet-metal strip is cut from the cast-metal block, it may be passed between a pair of finishing-rolls to give a more perfect and even surface to both sides of the sheet.

I claim—

1. The process or improvement in the art of manufacturing sheet metal, consisting in first casting the metal into a block; second, densifying the cast block by pressure; third, cutting a continuous strip of sheet metal therefrom, and, finally, rolling the cut strip between rolls to finish its surfaces, substantially as specified.

2. The process of manufacturing sheet metal, consisting in first casting the metal into a block; second, densifying the cast block by pressure, and, third, cutting a continuous strip or ribbon of sheet metal from the block, substantially as specified.

3. The process consisting in first casting a soft-metal block; second, densifying the cast block by pressure, and, finally, cutting a strip of sheet metal therefrom.

4. The process of manufacturing sheet metal, consisting in first casting the metal into a block, cutting a continuous strip of sheet metal therefrom, and finally rolling the cut strip to finish it, substantially as specified.

5. The process consisting in first properly tinning or preparing the surface of a hard-metal ring and then casting a soft-metal block upon and around the same, so that it will fuse or metallically unite therewith, and then compressing the soft-metal block to solidify it before it becomes fully set, substantially as specified.

6. The process of casting on a hard-metal ring properly tinned a circular block of solder in a metal mold encircled by water and compressing the block to solidify it before the solder is fully set, substantially as specified.

JOHN ROBERTSON.

Witnesses:
JAMES HARDIE,
WILLIAM MCKENZIE.