(No Model.)

F. P. McCOLL.

MACHINE FOR RIDGING SHEET METAL.

No. 566,999. Patented Sept. 1, 1896.

Fig. 1.

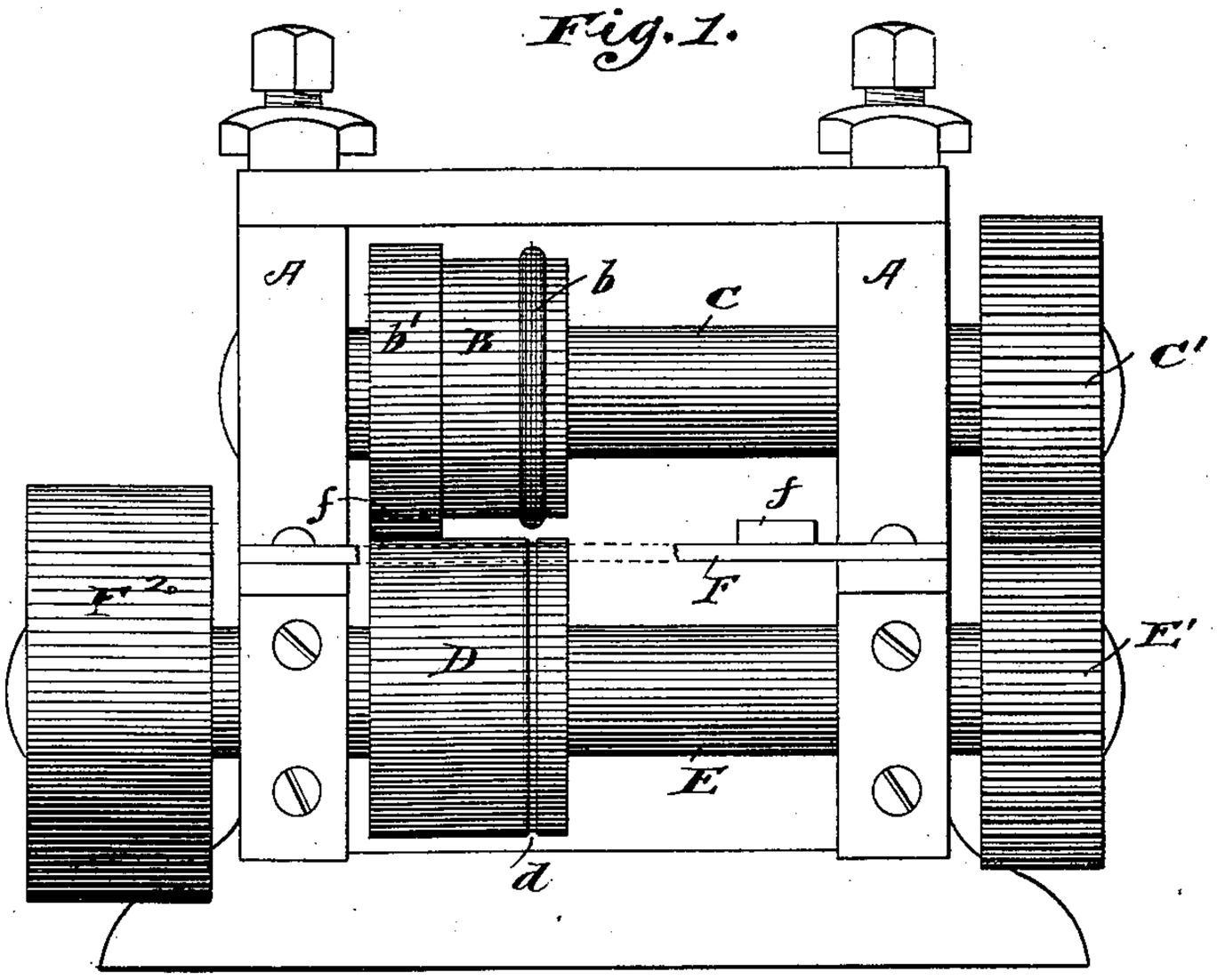


Fig. 2.

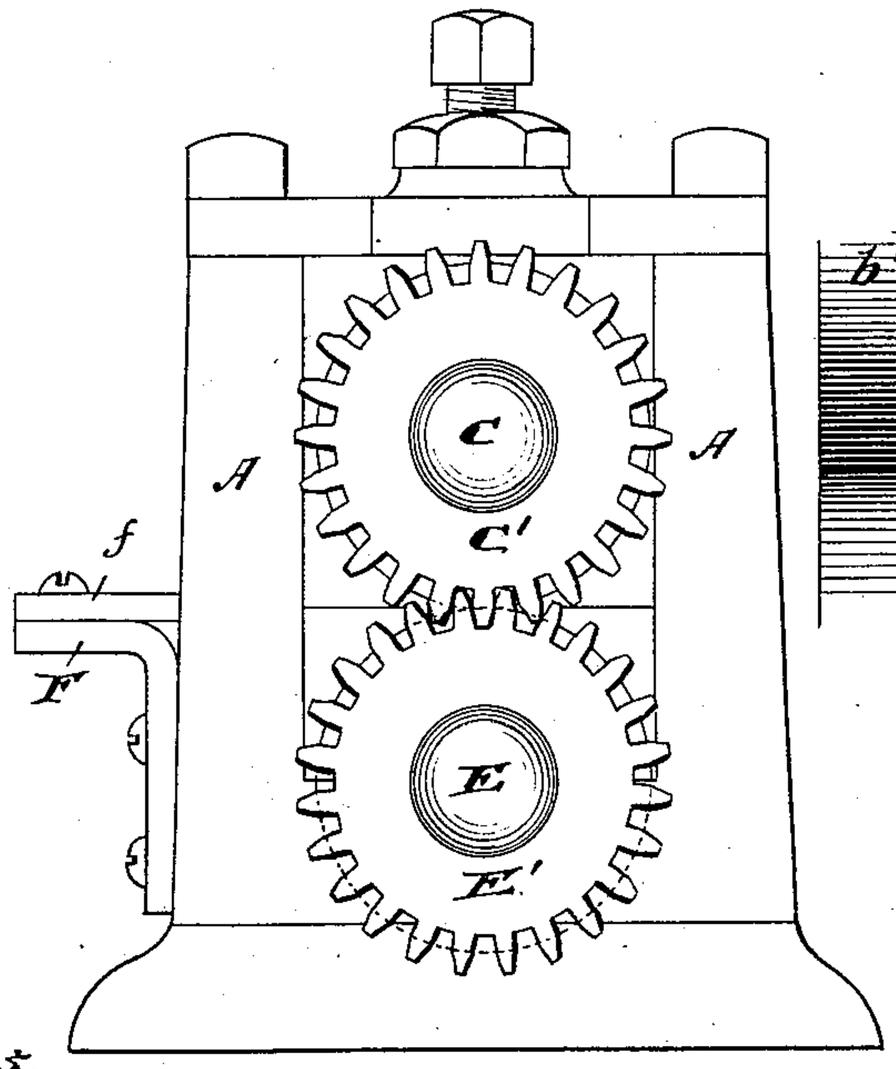
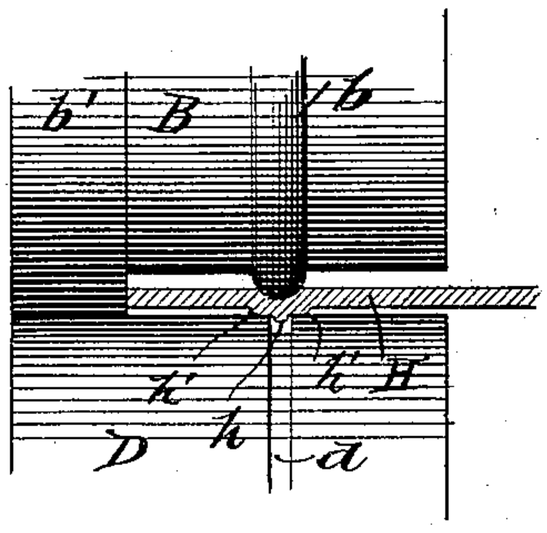


Fig. 3.



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MACHINE FOR RIDGING SHEET METAL.

SPECIFICATION forming part of Letters Patent No. 566,999, dated September 1, 1896.

Application filed April 3, 1896. Serial No. 586,040. (No model.)

To all whom it may concern:

Be it known that I, FRANCIS P. McCOLL, of Brooklyn, in the county of Kings and State of New York, have invented certain new and useful Improvements in Machines for Ridging Sheet Metal, of which the following is a specification.

My invention relates to machines for ridging sheet metal to be used in the manufacture of cans, boxes, and other packages designed to contain articles of food.

My invention relates especially, when applied to such cans or receptacles, to the formation of a strengthening-ridge in such a way as to facilitate the tearing out of a strip from the body or from the cover of such a can or receptacle by means of a winding-key or other device, although it may be put to many other uses. There have been many and various contrivances and methods devised for the purpose of providing ready and effectual methods of opening such packages. The best of such efforts have been produced on the basic principle of a weakening line or incision made in the body of the sheet metal from which such receptacles have been manufactured, and many patents have been granted for these inventions. These weakening-lines have proved to be uncertain and unsatisfactory. Grooving-disks or cutting edges have been applied through suitable mechanical constructions to the surfaces of the sheets from which such receptacles have been made, such disks or dies being male and female, the one fitting into the other, space enough being required between their working surfaces for the passage of the sheet between them, but the weakening lines or grooves have always been made on that side of the sheet where the tool that made them was applied. These excoriations, grooves, incisions, slits, and the like have proved inefficient for the purpose intended, and in almost all cases have done more damage to the material of which the finished package is composed than the predetermined opening-lines have been found beneficial. The basic iron forming the sheets has been laid bare by the abrasions caused by the working edges or surfaces of the tools of these machines, inducing external corrosion from moisture, the atmosphere, vapors, and the like, and internal from the contents of the packages themselves.

In the accompanying drawings, Figure 1 is a front elevation of the machine; Fig. 2, an end view thereof, and Fig. 3 a broken detail showing the action of the machine upon a sheet.

In the drawings, A represents a framework in which bearings are provided for the shafts C and E of a pair of rolls B and D. The shaft E is driven by any suitable means, as, for example, a belt over the pulley E^2, and imparts motion through the gear E′ and the gear C′ to the shaft C. The roll B is provided with a peripheral bead *b* and with a collar *b*′. The surface of the collar *b*′ runs in contact with the periphery of the roll D, and the bead *b* is by this means held out of contact with the fellow roll. The roll D has a peripheral groove or fissure *d* located opposite the bead *b*. The bead and fissure may be of any suitable or desired shape in cross-section.

As shown in Fig. 1, the bead is rounded and the fissure has vertical sides rounded at the opening and a straight bottom. The bead is, however, wider than the fissure, for a purpose to be hereinafter described. A suitable table F and gage-blocks *f* may be arranged in convenient and proper position, the blocks serving to guide the strips and the table to receive them after they clear the rolls. The shaft C preferably has its bearings adjustable with reference to the shaft E, so as to adapt the machine to be set for different kinds of stock and to adjust it to the desired relation to properly perform its work.

Fig. 3 is an enlarged view intended to illustrate one form which may be given to the bead and fissure, but it will be understood that the cross-sectional form of these parts may be varied at will.

In operation a sheet of tin is fed in between the rolls, which are driven in any convenient way and adjusted in such relation to each other that the bead shall not enter the fissure or groove, but will bear upon the sheet, offsetting or displacing the metal, which, freely entering the groove, will appear as a ridge on the opposite side of the sheet from that with

which the bead makes contact. The sides of the bead will bear upon the metal and crowd it laterally, thus compressing, solidifying, or condensing the metal in lines parallel and adjacent to the base of the ridge, while the fissure presents a clearance into which the metal beneath the apex of the bead may pass without substantial compression. When the sheet has passed between the rolls, it will have a ridge appearing as a projection on the side of the sheet opposite to that on which the bead acts, and the transverse thickness of the ridge portion will remain the same as that of the body of the sheet when the parts are constructed and arranged as shown, while the material of the sheet adjacent to the base of the ridge is subjected to such pressure as will condense, solidify, or otherwise structurally change it, which structural change is conveniently expressed by the word "temper."

The effect of the machine upon the sheet of metal may be understood by reference to Fig 3, wherein H represents the body of the sheet, and *h* the ridge. It will be observed that the metal of the sheet is offset or shouldered, as at *h'*, these shoulders being produced by the crowding away laterally of the metal from the sides of the bead, and the roller D forming an unyielding surface it results that the sheet is reduced in thickness adjacent to the base of the ridge, while the metal which forms the ridge finds free access to the fissure and assumes a new form without compression. This ridge forming and solidifying action of my machine is altogether different from the action of the ordinary beading or grooving machine, wherein the bead enters the opening in the groove and forces the metal into it. It will be observed that in my machine the bead does not project into the plane of the opening of the fissure, but, on the contrary, that there is a clearance between the two. The amount of clearance may vary considerably. The bead must be set close enough so as to offset the sheet to form the ridge and to solidify or compress the material on one or both sides thereof, but it it is not and should not in practice be set sufficiently close to incise or cut the metal or result in the abrasion of the coating of the metal sheet.

Sheets of various thicknesses can be ridged without readjustment of the rolls, and a machine of this character may be used for ridging various grades of tin. By employing the collar or shoulder *b'* upon the cylinder B a fixed distance between the bead and fissure is maintained, and consequently the ridge will be of uniform height or projection, and the portions of the sheet adjacent to the base of the ridge will be uniformly condensed or solidified.

Structural changes may be made in the machine, and some of the features herein described may be dispensed with, without departing from the spirit and scope of my invention; as, for example, instead of a roller-die reciprocating or pressure dies may be employed, and the means of mounting and driving the rolls and the devices for adjusting and maintaining them in adjustment may be changed or equivalent devices substituted for them.

I claim—

1. A machine for ridging sheet metal, comprising two surfaces, one of which has a fissure and the other a projection or bead opposite the fissure and of greater width than the fissure and means for applying pressure to one of the die-surfaces and thereby to a sheet interposed between them, whereby to offset the metal of the sheet into the fissure to produce a ridge and to condense or solidify the body of the sheet adjacent to the base of the ridge, substantially as described.

2. A machine for ridging sheet metal having two adjacent surfaces contiguous to each other in their functional operation, one of said surfaces having a fissure and the other a bead of greater transverse width than the fissure and means for compressing the sheet between the surfaces whereby a ridge is produced, substantially as described.

3. A machine for ridging sheet metal, comprising in combination two rolls, one of which has a peripheral bead and the other a fissure of less width than the bead and said rolls being separated from each other so as to leave a clearance between the bead and the adjacent fissure, substantially as described.

4. A machine for ridging sheet metal, comprising in combination two rolls, one of which has a peripheral enlargement or collar adapted to contact with the surface of the other roll and a peripheral bead out of contact with the fellow roll and the fellow roll having a peripheral fissure adjacent to the bead, substantially as described.

5. A machine for ridging sheet metal, comprising in combination a roll having a peripheral fissure therein and a roll adjustable to and from the first-mentioned roll and having a peripheral enlargement or collar rolling in contact therewith and a bead opposite the fissure but out of contact with the surface of the roll containing said fissure, substantially as described.

FRANCIS P. McCOLL.

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