J. F. STARR, Jr.

SHEET METAL SEAMING MACHINE.

No. 190,987. Patented May 22, 1877.

Fig. 1.

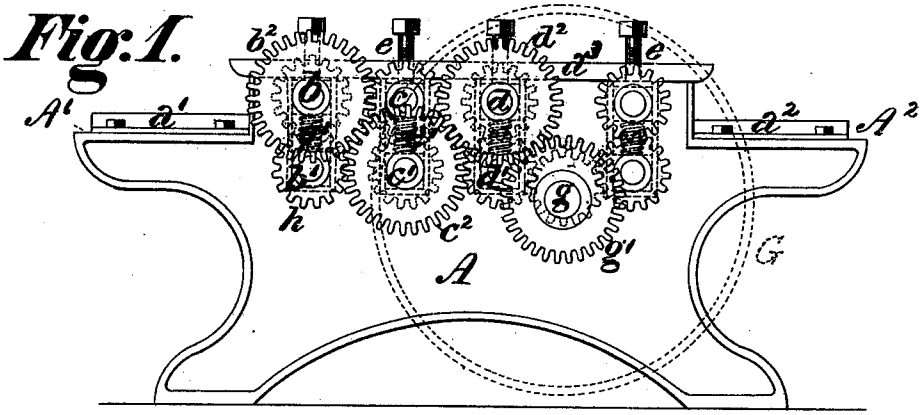


Fig. 2.

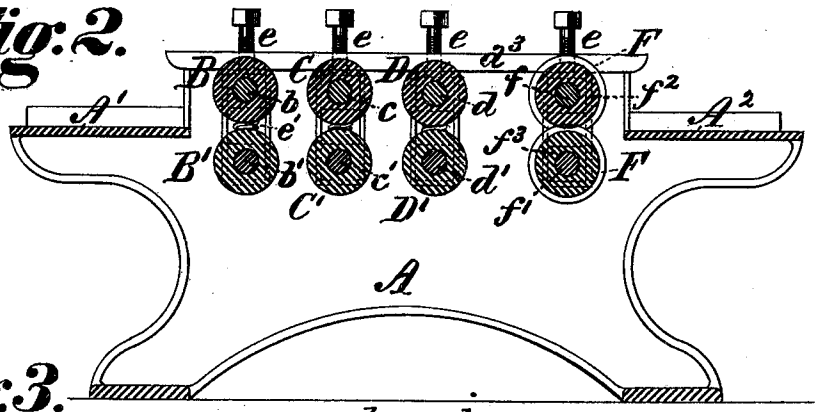
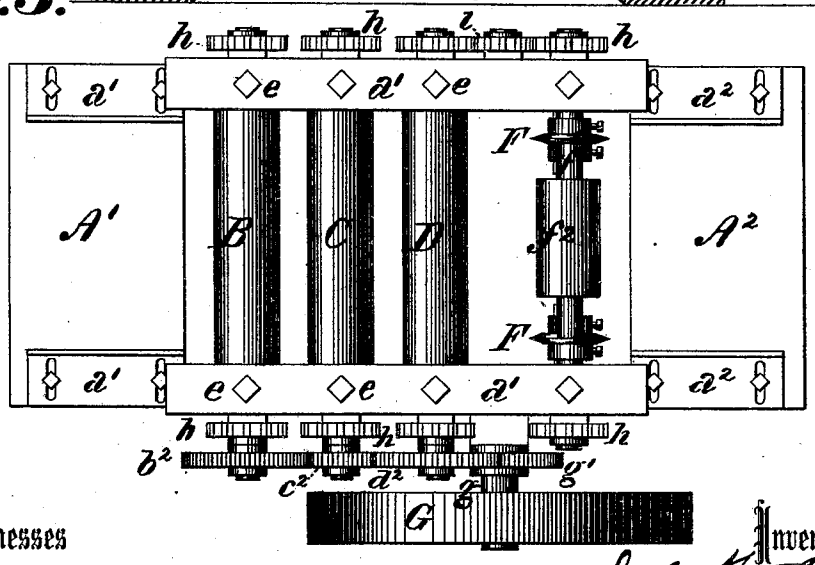


Fig. 3.



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UNITED STATES PATENT OFFICE.

JOHN F. STARR, JR., OF CAMDEN, NEW JERSEY.

IMPROVEMENT IN SHEET-METAL-SEAMING MACHINES.

Specification forming part of Letters Patent No. **190,987**, dated May 22, 1877; application filed March 21, 1877.

To all whom it may concern:

Be it known that I, JOHN F. STARR, Jr., of the city and county of Camden, in the State of New Jersey, have invented certain new and useful Improvements in Machines for Seaming Sheet Metal, of which the following is a specification:

The object of my invention is to obviate the delays and imperfections of hand-seaming plates of sheet metal, by the provision of mechanism by which the operation of seaming will be speedily and economically performed without injury to the sheets, and in a regular and uniform manner.

To this end my improvements consist in the use of a series of press-rolls inparting successively-increasing pressures, and in combining therewith adjustable boxes, receiving and delivery tables, side gages, and cutters, all as hereinafter more fully set forth.

In the accompanying drawings, Figure 1 is a side view, in elevation, of a machine for seaming sheet metal, embodying my improvements; Fig. 2, a vertical longitudinal central section, and Fig. 3 a plan or top view of the same.

The machine is mounted in vertical housings A, to the upper portions of which are secured at each end respectively a horizontal receiving-table, A^1, and a similar delivery-table, A^2. Two or more pairs of horizontal shafts, each shaft carrying a press-roll, are mounted in bearings in the housings, between the receiving and delivery tables, the shafts of each pair being arranged vertically, one above the other, and in such relation to the tables as that a line drawn from one table to the other shall be about tangential to the lower rolls. In this instance I employ three pairs of press-rolls, B B′ C C′ D D′, secured, respectively, upon shafts b b^1, c c^1, and d d^1. The boxes or bearings of the several shafts rest in vertical openings in the housings, and the boxes of the upper shaft of each pair are adjustable by means of set-screws e engaging nuts in the cap-plates a^3 of the housings and acting against the tension of springs e' interposed between the upper and lower boxes. The shafts are so adjusted as that the distances between the rolls of the several pairs shall diminish relatively in the direction of the passage of the sheets between them from the receiving to the delivery table, so as to impart relatively-increasing pressures to the folded edges constituting the seam.

Side guides a^1 are secured upon the receiving-table and similar guides a^2 upon the delivery-table, each being adjustable by bolts passing through slots, or by other suitable devices, so as to be regulated to the width of the sheets operated upon, and to insure the feeding of the turned edges truly in line with the rolls.

For the purpose of trimming the sheets to a uniform width, I provide cutters F, which are secured upon shafts f f^1, mounting in bearings in the housings, one above the other, and adjustable by set-screws, in a similar manner to the bearings of the press-rolls. The cutters are adjustable laterally upon their shafts by moving on screw-threads thereon, or by set-screws and keys, so as to reduce the sheets to any desired width, and feed-rolls f^2 f^3, each of which may be continuous, as shown, or divided into sections, are secured upon the cutter-shafts to assist in moving the sheets and to maintain them in proper relation to the cutters.

I have, in this instance, shown the cutting mechanism as placed at the discharge end of the machine, which arrangement answers well in operating upon heavy metal; but inasmuch as the cutters are obliged to pass through the finished seam, which opposes considerable resistance to their action, I prefer, in general, to locate the cutters in advance of the press-rolls, so that the operation of trimming shall precede or be coincident with the commencement of the application of pressure to the seam. It is obvious that in such case the feed-rolls of the cutter-shafts must be so set relatively as to apply no greater pressure to the edges of the seam than that which will be imparted by the first pair of press-rolls.

Motion is imparted to the roll and cutter shafts from a driving-shaft, g, to which power may be applied through a pulley, G, or by a crank. A spur-gear, g', on the driving-shaft meshes with a similar gear, d^2, on the upper roll-shaft d, and this, in turn, with a gear, c^2, on the lower roll-shaft c^1, meshing with another gear, b^2, on the upper roll-shaft b. The

rolls of each pair are geared together by pinions *h*, and preferably at each of their ends, and the cutter-shafts *f f*^{1} are similarly geared together and driven by an intermediate pinion, *i*, meshing with the pinions of the lower feed-shaft *f*^{1} and the lower roll-shaft *d*^{1}.

In the operation of the machine, the shafts being adjusted so that the distances between the rolls of the several pairs shall diminish relatively toward the delivery-table, the side guides of the receiving-table are set to correspond with the width of the sheets to be seamed, and the meeting-edges of the latter having been turned over and hooked together, the sheets are passed to the first pair of press-rolls, by which an initial pressure is imparted to the seam uniformly from end to end, and in the passage of the sheet between the succeeding rolls an increased pressure is imparted at each pair, and a smooth and finished seam is formed thereby.

It is seen that the sheets are passed from one pair of rolls to another without intermediate divergence. After leaving the last pair of rolls the sheets pass between the cutters, by which they are trimmed to the desired width, and are maintained in proper line with the cutters during the operation by the side guides of the delivery-table. As before stated, the operation of trimming is in general preferably performed before that of pressing.

By the use of my improvements the operation of seaming is performed with far greater celerity and accuracy than by the old process of hammering down the edges by hand, and this without the bending or buckling of the sheets, which is generally an accompaniment of the latter process.

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

1. The combination, in a machine for seaming sheet metal, of a receiving-table and two or more pairs of press-rolls, whereby the sheets to be seamed are passed directly from one pair of rolls to the next, the rolls of each pair being placed relatively closer together in the direction of the feed of the sheets, substantially as set forth.

2. The combination, in a machine for seaming sheet metal, of a receiving-table, side guides adjustable transversely thereon, and a series of press-rolls, through which the sheets to be seamed are directly passed, substantially as set forth.

3. The combination, in a machine for seaming sheet metal, of a series of press-rolls, through which the sheets to be seamed are directly passed, and cutters adjustable transversely upon rotating shafts, substantially as set forth.

4. The combination, in a machine for seaming sheet metal, of rotating cutters, adjustable transversely upon their shafts, and a receiving or discharge table provided with adjustable side guides, substantially as set forth.

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Witnesses:
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