

No. 609,294.

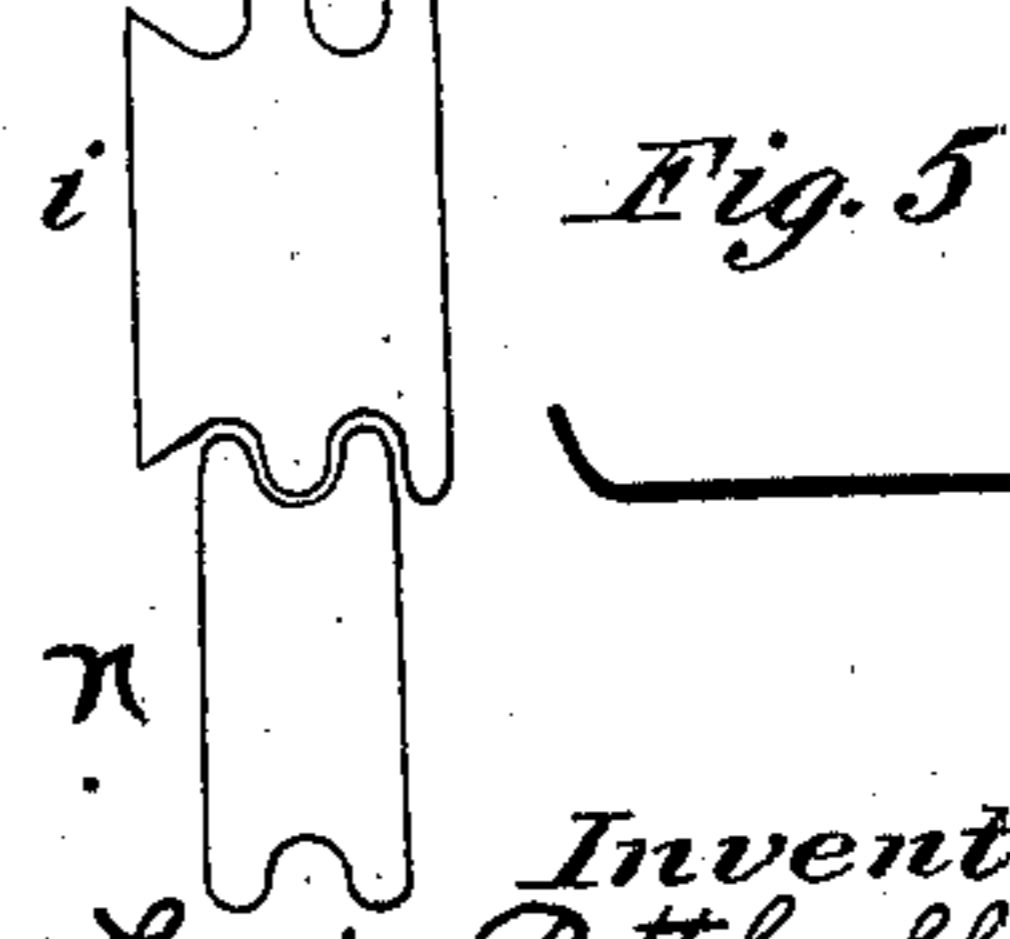
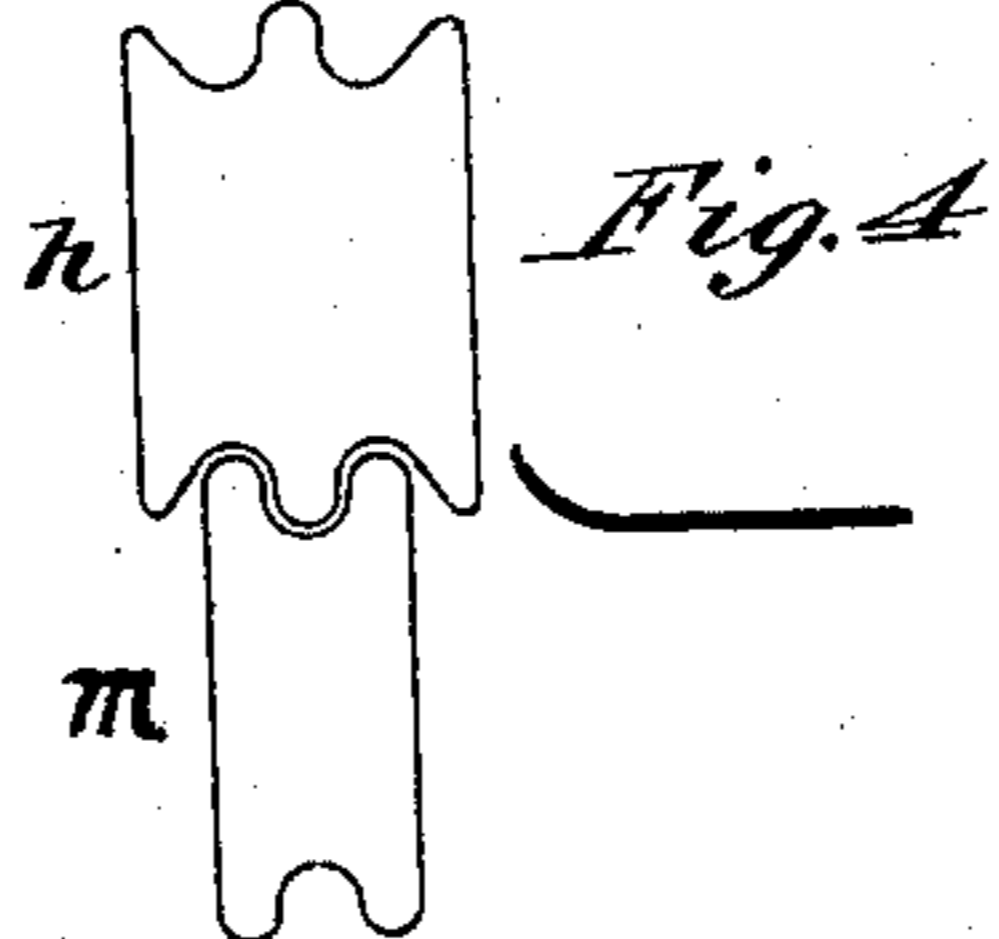
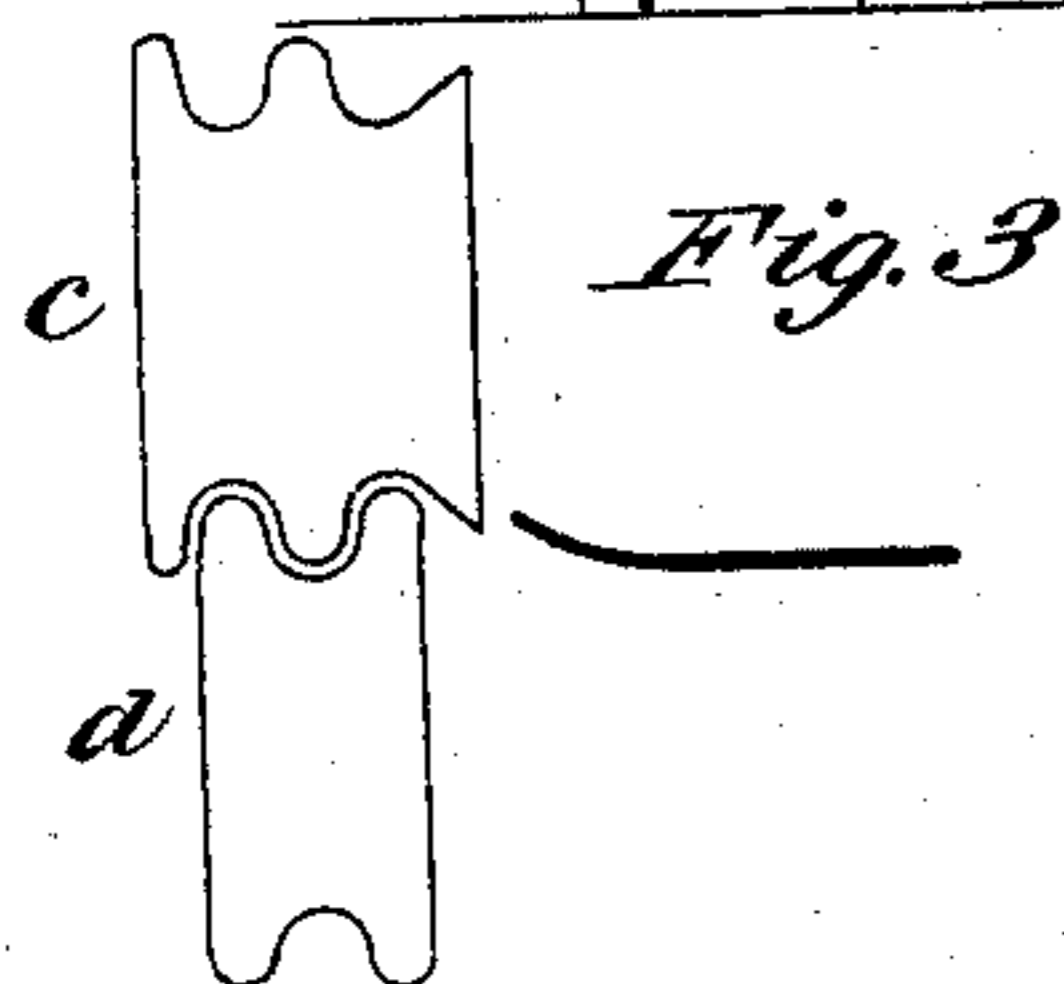
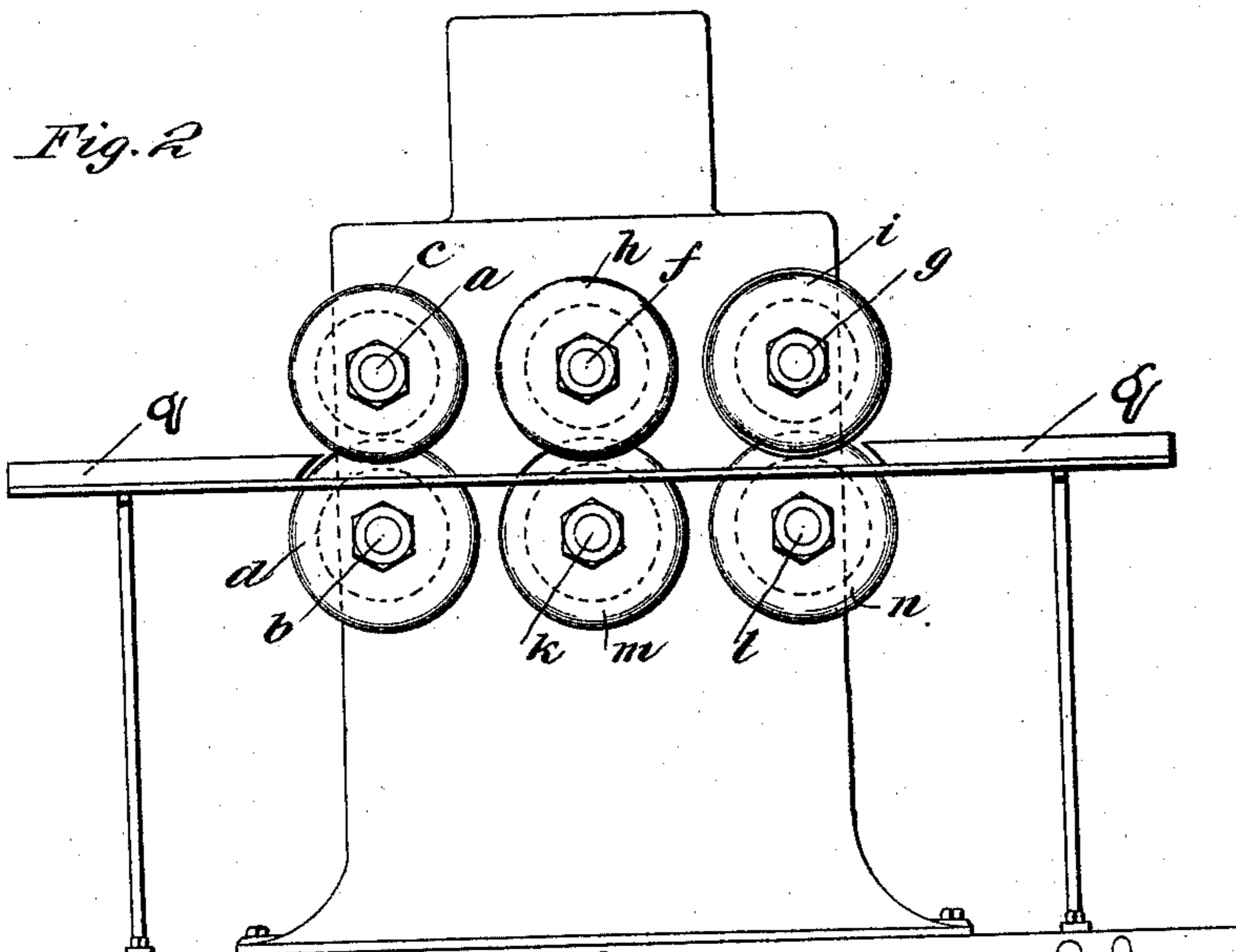
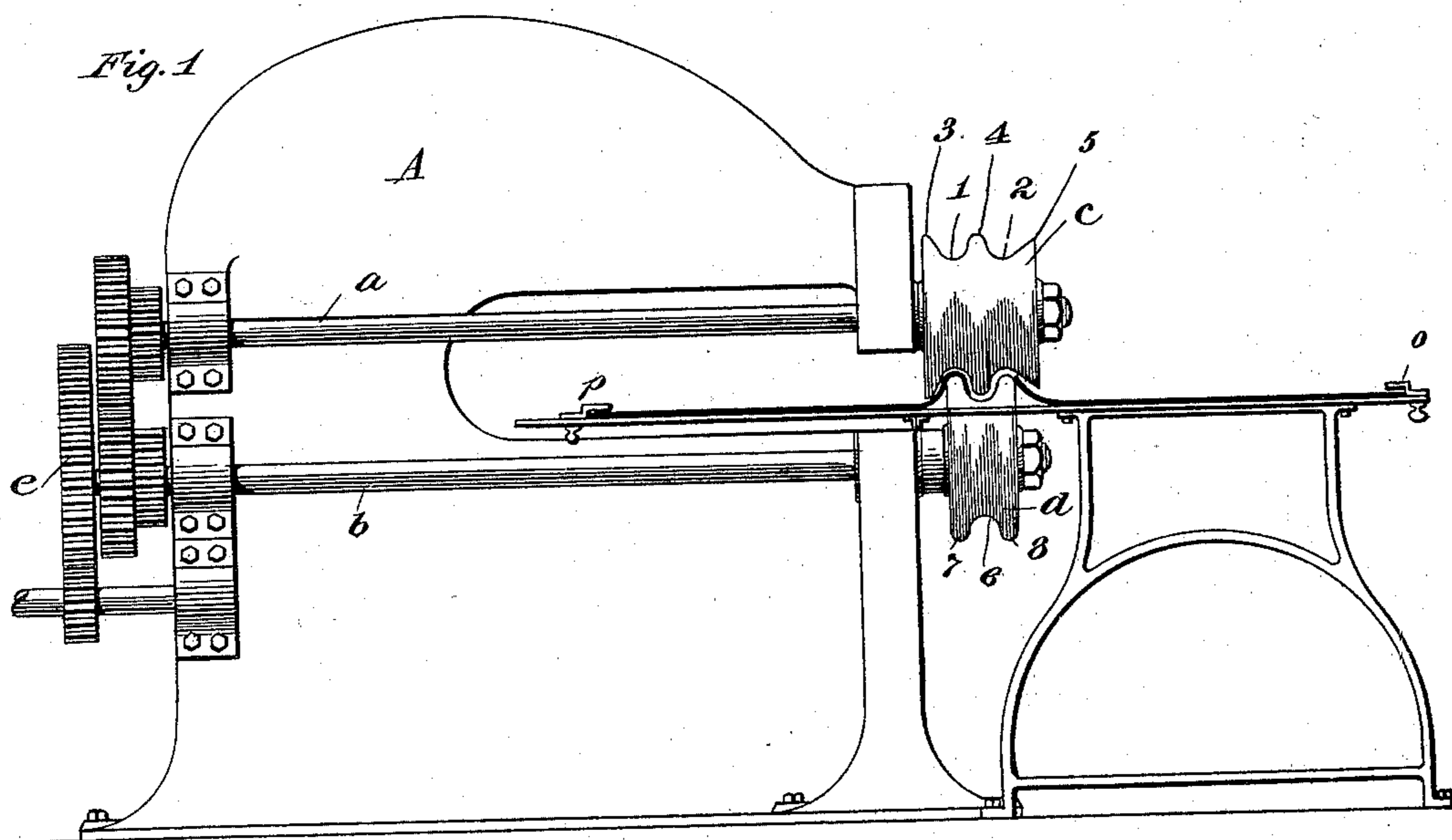
Patented Aug. 16, 1898.

L. POTTHOFF.

MACHINE FOR CORRUGATING METAL.

(Application filed Feb. 18, 1898.)

(No Model.)



Witnesses:

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UNITED STATES PATENT OFFICE.

LOUIS POTTHOFF, OF NEW YORK, N. Y.

MACHINE FOR CORRUGATING METAL.

SPECIFICATION forming part of Letters Patent No. 609,294, dated August 16, 1898.

Application filed February 18, 1898. Serial No. 670,781. (No model.)

To all whom it may concern:

Be it known that I, LOUIS POTTHOFF, a citizen of the United States, residing at New York, (Flushing,) in the county of Queens and State of New York, have invented certain new and useful Improvements in Machines for Corrugating Metal, of which the following is a full, clear, and exact specification.

10 This invention relates to machines for corrugating and bending metal; and its object is to construct a machine which will form deep corrugations in the metal without breaking, stretching, or splitting it and will form such
15 corrugations rapidly, thus increasing the capacity of the machine. In machines of this class heretofore constructed the metal to be corrugated has been passed through rolls to form the corrugations, the corrugations being
20 indented in the metal by the rolls. This method, however, has been found to be defective in that if the metal be thick or the corrugations to be formed be deep the metal will be split, stretched, or cracked, and the
25 corrugations formed thereby make the metal very weak. I propose to obviate these objections by a machine in which the corrugations shall be formed by bending the metal instead of indenting it. In my machine I propose to
30 form the corrugations by first bending one edge of the metal slightly and then increasing this bend until the full corrugations have been formed.

The invention will be more fully described hereinafter with reference to the accompanying drawings, in which—

Figure 1 is a side view of a corrugating-machine constructed according to my invention. Fig. 2 is an end view of the same, showing the
40 rollers; and Figs. 3, 4, and 5 are detail views of the rolls.

Referring to the drawings by letters and figures, A represents the frame of the machine, in which are mounted two shafts *a* and *b*, upon
45 one of which is mounted the upper roll *c* and upon the other is mounted the lower roll *d*. A suitable gearing *e* rotates both shafts *a* and *b* at once and is arranged for any desired speed.

Referring to Fig. 2, which is an end view,
50 *f* and *g* are shafts on a line with shaft *a* and carrying rolls *h* and *i*, and *k* and *l* are shafts on a line with shaft *b* and carrying rolls *m* and

n. The upper rolls preferably have two annular depressions 1 and 2 and three flanges 3, 4, and 5 and the lower rolls one annular
55 depression 6 and two flanges 7 and 8, as illustrated in Fig. 1. This, however, is a matter which may be regulated at will, according to the machine desired. The rolls *c*, *h*, and *i* and *d*, *m*, and *n* are arranged in the same line,
60 one behind the other, as illustrated in Fig. 2.

According to my invention I propose that when the metal is passed through the machine the first roll shall slightly bend the edge, the next roll bend it a little further,
65 and the third roll bend it to the full bend, thus starting the corrugation. Therefore the outer flange 5 of roll *c* has a slight pitch, which engages the edge of the metal and slightly turns it. The same flange of roll *h*
70 has a little sharper pitch, and the same flange of roll *i* has a pitch corresponding to the full bend of the desired corrugation. This is illustrated in detail in Figs. 3, 4, and 5, Fig. 3 representing rolls *c* and *d*, Fig. 4 rolls *h* and
75 *m*, and Fig. 5 rolls *i* and *n*. The flange 4 and depression 6 in all the rolls have the same pitch—that is, the full depth of the corrugation desired. On the opposite sides of the
80 rolls the increase of pitch is the same as above described, but inversely—that is, flange 3 of roll *i* has a slight pitch, the same flange of roll *h* a sharper pitch, and the same flange of roll *c* the full depth of the corrugation.

o and *p* represent movable guides on opposite sides of the rolls adapted to engage the
85 edge of the sheet of metal to be worked and to be moved in toward the rolls as the work advances.

q represents a straight guide-strip opposite
90 the full depression of the rolls adapted to guide the work after it has been started.

The operation of the device above described is substantially as follows: The sheet of metal to be corrugated is placed in the machine so
95 that its edge will rest against the guide *o* and the opposite edge will partly enter between the rolls to the extent of about the first flange. The machine is started and the metal pushed into the rolls. The flange 5 of roll *c*
100 slightly turns up the edge of the metal, giving it about the same bend as illustrated by the heavy line in Fig. 3. The same flange of roll *h* turns up the metal a little more, as

shown by the line in Fig. 4. The last roll *i* rolls the metal to its full bend, as shown in Fig. 5. The sheet of metal is then inverted and placed in the rolls on the opposite side, so that the bent part will pass between flange 7 of roll *n* and depression 1 of roll *i*. This will help guide the metal; but for additional aid in guiding the guide *p* is moved up to the edge of the sheet of metal. The machine is then started in the opposite direction, and flange 3 of roll *i* slightly bends the metal to start the formation of the next groove in the metal. Flange 3 of roll *h* increases the groove, and the same flange of roll *c* forms the first groove. By this time one groove has been formed in the sheet of metal, and it is again inverted and run through the machine on the opposite side of the rolls to form the additional grooves. The central flange 4 and groove 6 have the proper pitch to complete the desired corrugation, and therefore as the metal is being run through the machine to form new grooves the grooves already formed will be passing through the central flanges and grooves and be bent into the complete corrugation.

It will thus be seen that the corrugations are not formed in the metal by indentation, but by bending, and that the bends are gradually made. In this way the metal after being bent will keep its shape and not spread apart, as is the case with all corrugations formed by having the ridges and grooves indented.

The size of the rolls, the number of rolls, whether in rear of each other or side by side, and the distance they are placed apart are all matters of judgment and adjustment and may be varied at pleasure without departing from the scope or spirit of my invention, and I therefore do not confine myself herein to the precise structure here shown and illustrated, but consider all known equivalents and substitutions to be within the same. It is further obvious that the rolls may be so multiplied and disposed that the bends in the metal may be formed successively without reversing the sheet of metal and, in fact, by passing the sheet of metal through the series of rolls but once.

Having thus described my invention, I declare that what I claim as new, and desire to secure by Letters Patent, is—

1. In a machine for corrugating metal, the

combination of a plurality of sets of rolls, each set having a predetermined pitch on each side thereof, and the pitch of each set increasing over that of the first set in opposite directions on opposite sides of the rolls, substantially as described.

2. In a machine for corrugating metal, the combination of an upper and a lower roll, one having a central depression equal to the full pitch of the desired corrugation, and two outer flanges, and the other having a central flange equal to the full pitch of the desired corrugation and corresponding with the depression of the first-named roll and one or more outer depressions to correspond with the outer flanges of the other roll, the outer flanges formed by said last-named depressions having a pitch of less than the full corrugation, substantially as described.

3. In a machine for corrugating metal, the combination of a plurality of sets of upper and lower rolls, the outer flanges of each set having a predetermined pitch which increases in each set until the last set is reached, where the flange has a pitch corresponding to the full bend of the desired corrugation, the increase of pitch of the outer flanges being in opposite directions on the opposite sides of the sets of rolls, substantially as described.

4. In a corrugating-machine, the combination of means for slightly bending one edge of the metal, means for increasing said bend until the full bend of the corrugation is reached, means for slightly bending the unbent portion of the metal in the opposite direction, means for increasing said bend until the full corrugation is formed, and means for repeating said bending operations, substantially as described.

5. In a corrugating-machine, the combination of a set of rolls adapted to bend one edge of the metal to form substantially a half-bend of one corrugation, a second set of rolls adapted to bend the unbent portion of the metal in the opposite direction to complete the corrugation, and means for continuing said bending operations upon the unbent portion of the metal, substantially as described.

In testimony whereof I affix my signature in presence of two witnesses.

LOUIS POTTHOFF.

Witnesses:

GEO. W. HESS,

C. V. EDWARDS.