

J. M. STONE.
Gear-Cutting Machines.

No. 157,650.

Patented Dec. 8, 1874.

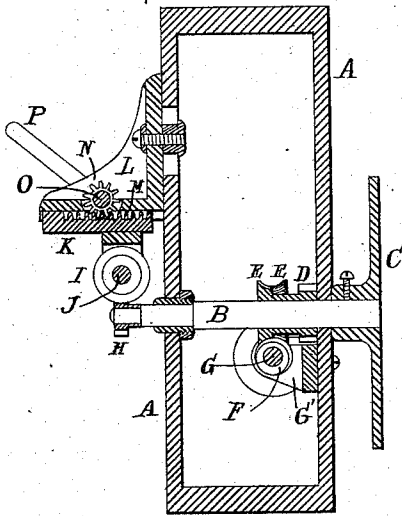


FIG. 4.

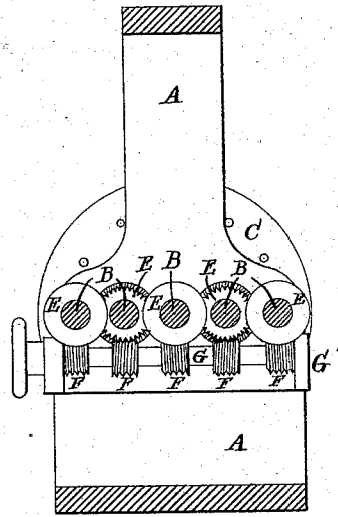


FIG. 2.

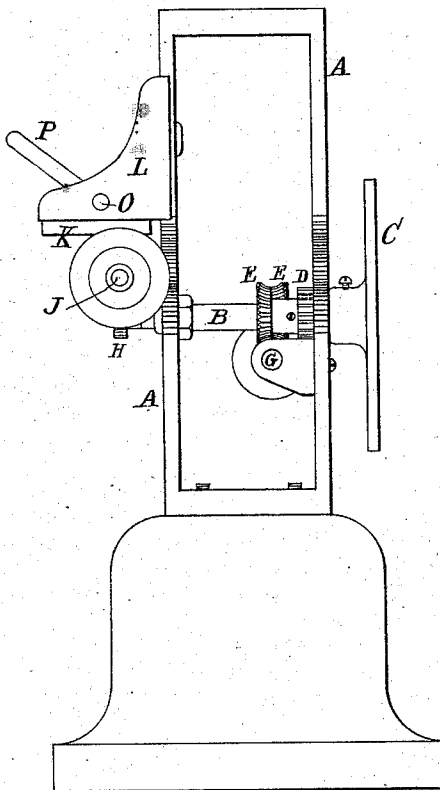


FIG. 3.

WITNESSES

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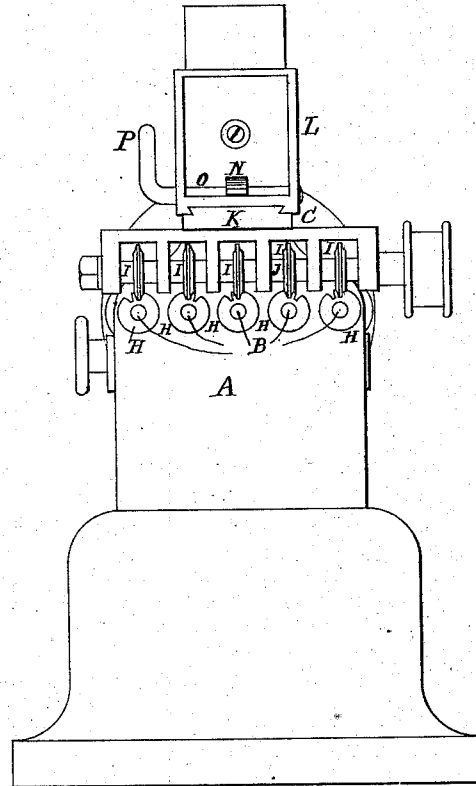


FIG. 1.

INVENTOR

Joseph M. Stone

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JOSEPH M. STONE, OF NORTH ANDOVER, MASSACHUSETTS.

IMPROVEMENT IN GEAR-CUTTING MACHINES.

Specification forming part of Letters Patent No. **157,650**, dated December 8, 1874; application filed November 12, 1874.

To all whom it may concern:

Be it known that I, JOSEPH M. STONE, of North Andover, in the county of Essex and State of Massachusetts, have invented certain Improvements in Gear-Cutting Machines, of which the following is a specification:

My invention relates to certain modifications of a gear-cutting machine by which several similar gears can be cut at once and in the same time that one would be cut in machines as usually constructed; and it consists in the use in such machines of a series of mandrels or their equivalent, upon which the several gear-blanks are placed to be cut, and a corresponding series of cutters to cut the said blank upon each mandrel, and a train of gearing by which all of the mandrels are in connection with one index-plate, so that all the gear-blanks will be operated upon at the same time and by the same movements, with other details of construction that will be more particularly described.

In the drawings, Figure 1 is a front elevation of the machine. Fig. 2 is a vertical section of the same through the center of Fig. 1. Fig. 3 is a side elevation of the machine, and Fig. 4 is a vertical section of the same through the center of the index-plate.

A is the frame of the machine, arranged to receive a series of mandrels, B, to work in a horizontal position, as shown. C is the index-plate, made with several series of holes in concentric circles, in the usual way, and fixed upon the central mandrel B, and provided with the usual subordinate devices, which are not shown. D D, &c., are a series of spur-gears fixed upon the several mandrels and meshing into each other, so that all the mandrels are made to revolve at once, but the alternate ones turn in opposite directions. E E, &c., are a series of worm-gears, also mounted upon the mandrels, and set alternately in two planes, so that they overlap each other, as shown in Fig. 2. The purpose of this mode of arrangement is to enable the diameters of the gears to be made greater than they could be if they were all placed in the same plane. These gears are provided with teeth of a suitable form to work in a series of worms, F F, &c., upon the shaft G, as seen in Figs. 2 and 4, the axis of which is intermediate to the two planes of the gears E. The worms F are made with alternately right and left pitch, so as to give alternately different directions to the rev-

olutions of the mandrels, to coincide with the gears D.

The blanks H to be cut are placed upon the mandrels B in the usual way. I I, &c., are a series of revolving cutters of the usual construction, all mounted upon one shaft, J, and severally placed in the proper positions in relation to the blanks on the mandrels, as seen in Fig. 1.

This shaft J is mounted in the cutter-stock K, which slides parallel to the axis of the mandrels on the head-stock L, in suitable guides, as shown, and is moved back and forth by the rack M and pinion N upon the shaft O, by means of the hand-lever P upon the end of the shaft N, outside of the head-stock L.

The mechanism is shown as arranged with the mandrels horizontal, but it may be made to operate with them placed vertically in a well-known manner, with the same combinations of subordinate mechanism as that shown.

Where small gears are to be cut, the worms F and the gears E need not be used, and in that case the worm-shaft G, with the bracket G', in which it hangs, would be dropped, so that the worms would be out of gear, and the mandrels would be moved by the spur-gears D alone, which, in cutting gears of small diameter, would give a sufficiently accurate movement to the mandrels for all practical needs, and it takes much less time to set them than when this is done by the worm-gears, although not so accurately.

By this construction a greater or less number of mandrels and cutters may be used and the product of the machine correspondingly increased, while but one index and one system of driving and operating mechanism is required.

What I claim is—

1. The series of mandrels for holding the blanks to be cut simultaneously, in combination with one index and its subsidiary devices, and suitable mechanism for connecting said mandrels with the index, substantially as described.

2. The series of worms made with right and left screws, as described, in combination with the series of mandrels connected by the gears, substantially as described.

Executed November 7, 1874.

Witnesses: JOSEPH M. STONE.
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