No. 857,983. PATENTED JUNE 25, 1907.

B. S. COWLES.

PROCESS FOR BENDING CAST IRON.

APPLICATION FILED JULY 25, 1905.

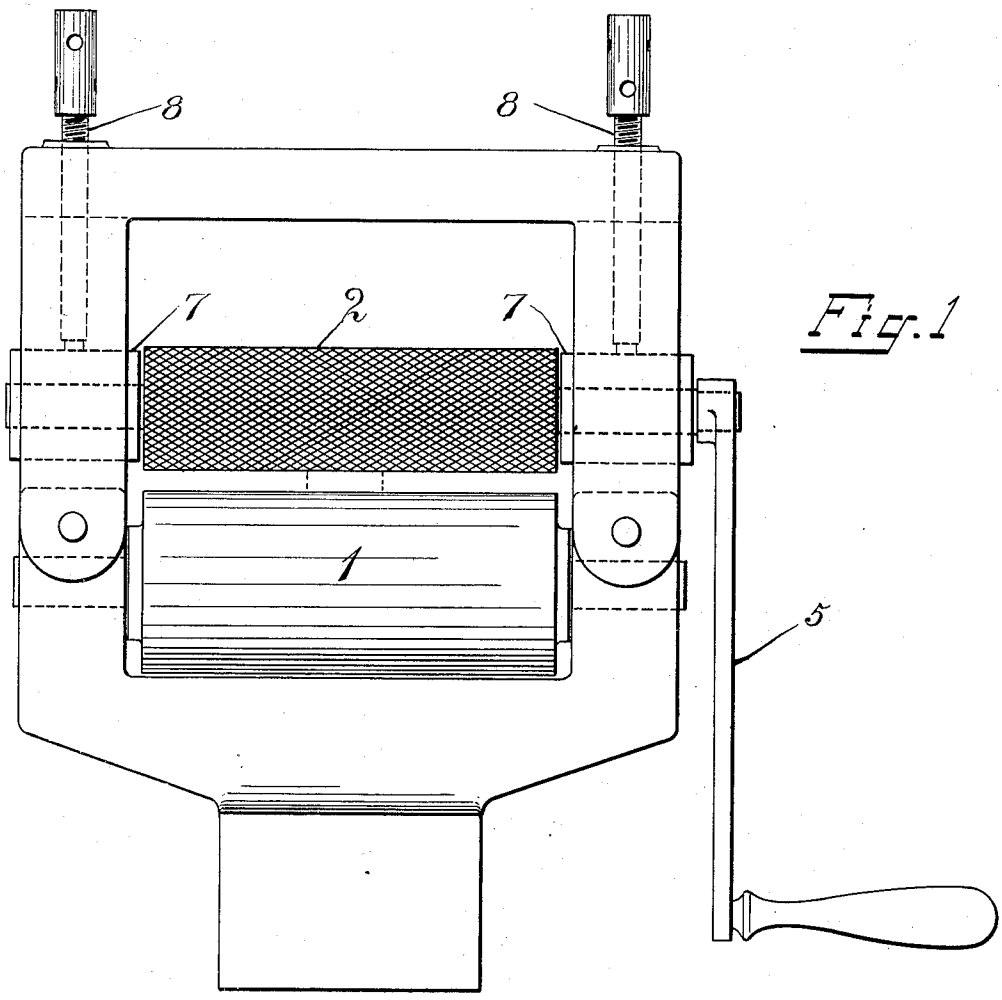

Fig. 1

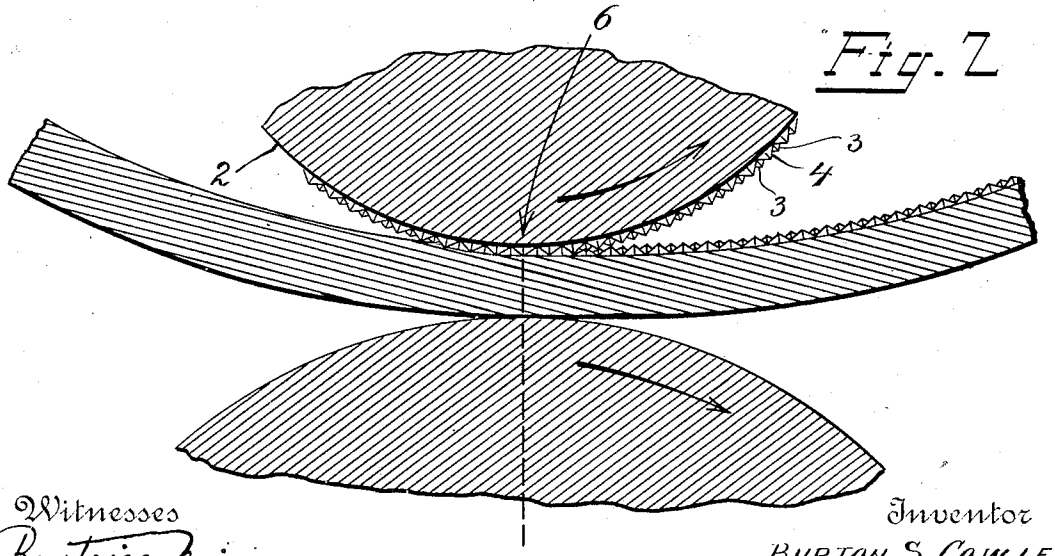

Fig. 2

Witnesses
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UNITED STATES PATENT OFFICE.

BURTON S. COWLES, OF PLAINVILLE, CONNECTICUT, ASSIGNOR, BY MESNE ASSIGNMENTS, TO THE NATIONAL ENGINEERING CO., OF NEW HAVEN, CONNECTICUT, A CORPORATION.

PROCESS FOR BENDING CAST-IRON.

No. 857,983. Specification of Letters Patent. Patented June 25, 1907.

Application filed July 25, 1905. Serial No. 271,155.

To all whom it may concern:

Be it known that I, BURTON S. COWLES, a citizen of the United States, residing at Plainville, Connecticut, have invented certain new and useful Improvements in Processes for Bending Cast-Iron, of which the following is a clear, full, and exact description.

My invention relates to a process of bending cast iron, and my object is to provide a process by which, for example cold gray cast iron, may be given a permanent bend without breaking.

My invention will be set forth in the claims.

The drawing shows a preferred form of machine for carrying out my process, in which

Figure 1 is a side elevation and Fig. 2 an enlarged section through the rolls.

It has been generally supposed heretofore that cold gray cast iron could not be given a permanent bend without breaking, as the same is fragile, but I have discovered that this may be done by suitably manipulating it, and I have carried out this process by treating pieces of cold gray cast iron, by which they were given a permanent bend out of their original cast shape without removing any of the metal.

In carrying out the process I support the cast iron upon a suitable support or fulcrum, such for example as the smooth faced roll 1 of the drawings, and apply pressure so closely adjacent to the point of support as to give a permanent bend to the iron without breaking. This bending pressure is exerted, as seen in Fig. 2, by projections 3, 4, etc. upon the face of the roll 2, and by rotating the roll 2 by means of the crank 5 the rod is passed through the rolls. At the point where the rolls approach closest together, as at 6 in Fig. 2, the rod is held firmly pressed between the rolls, and as the projections 3, 4, etc. meet the rod they bend it downward. Obviously as the upper roll is rotated the compression at the point 6, as well as the bending pressures exerted by the projections, move along the strip of iron without any of the pressures being relieved.

In a machine which I have used successfully in carrying out my process, the diameter of the smooth faced roll 1 was about two inches, the diameter of the roll 2 one inch, and the roll 2 was milled or knurled so as to be covered with diamond-shaped pyramidal projections about 190 to the square inch. The roll 2 is mounted in sliding journal blocks 7, 7, upon which press the screws 8, 8, so as to exert the desired pressure. I have, with perfect success, given a permanent bend to gray cast iron piston rings of one-quarter inch cross sectional width, and also to heavier rings.

The steps of the operation would seem to be as follows:—The metal is clamped at a point between two rolls indicated by the arrow 6 in Fig. 2. In advance of this point the tips of the projections 3, 4, &c., of the knurled roll comes in contact with the surface of the bar and forces it downward before it reaches the supporting roll, thus giving it a slight bend, and holding said bend until it moves along to point 6 where said projections become embedded in the surface expanding it, and holding it while the pressure condenses the metal around said projections thus fixing the bend as permanent. In other words, the bending, expanding and condensing of the metal at any particular point have taken place at the time said part passes point 6.

What I claim is:

1. The process of bending cast iron, consisting in supporting the iron upon a suitable fulcrum under pressure and applying downward pressure to one side of the iron at a plurality of points transverse to the line of movement of the iron and closely adjacent to the point of support, thereby expanding said surface without changing the length of the opposite side, substantially as described.

2. The process of bending cast iron, consisting in continuously passing the piece to be bent between two rolls, one of which is knurled, the metal having no other support, and successively applying pressure on one face thereof at separate points on a line parallel with the axis of said rolls and closely adjacent to line of support, thereby elongating said face without changing the finish or length of the opposite face.

3. The process of bending cold gray cast iron, consisting in supporting the piece to be bent upon a fulcrum and simultaneously applying downward pressure thereon at a plurality of points on two parallel lines adjacent

to the fulcrum, thereby bending the piece and fixing said bend by swaging, or expanding, said side while maintaining the opposite side unchanged as to condition, finish and length.

4. The process of bending cold gray cast iron, consisting in supporting the piece on a fulcrum and applying downward pressure on one face thereof at a plurality of points adjacent to said fulcrum, thereby bending said piece and fixing said bend, by elongating said face without changing the condition, finish or length of the opposite face, substantially as described.

Signed at New Haven, Conn., this 21st day of July 1905.

BURTON S. COWLES.

Witnesses:
S. E. MERRIAM,
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