

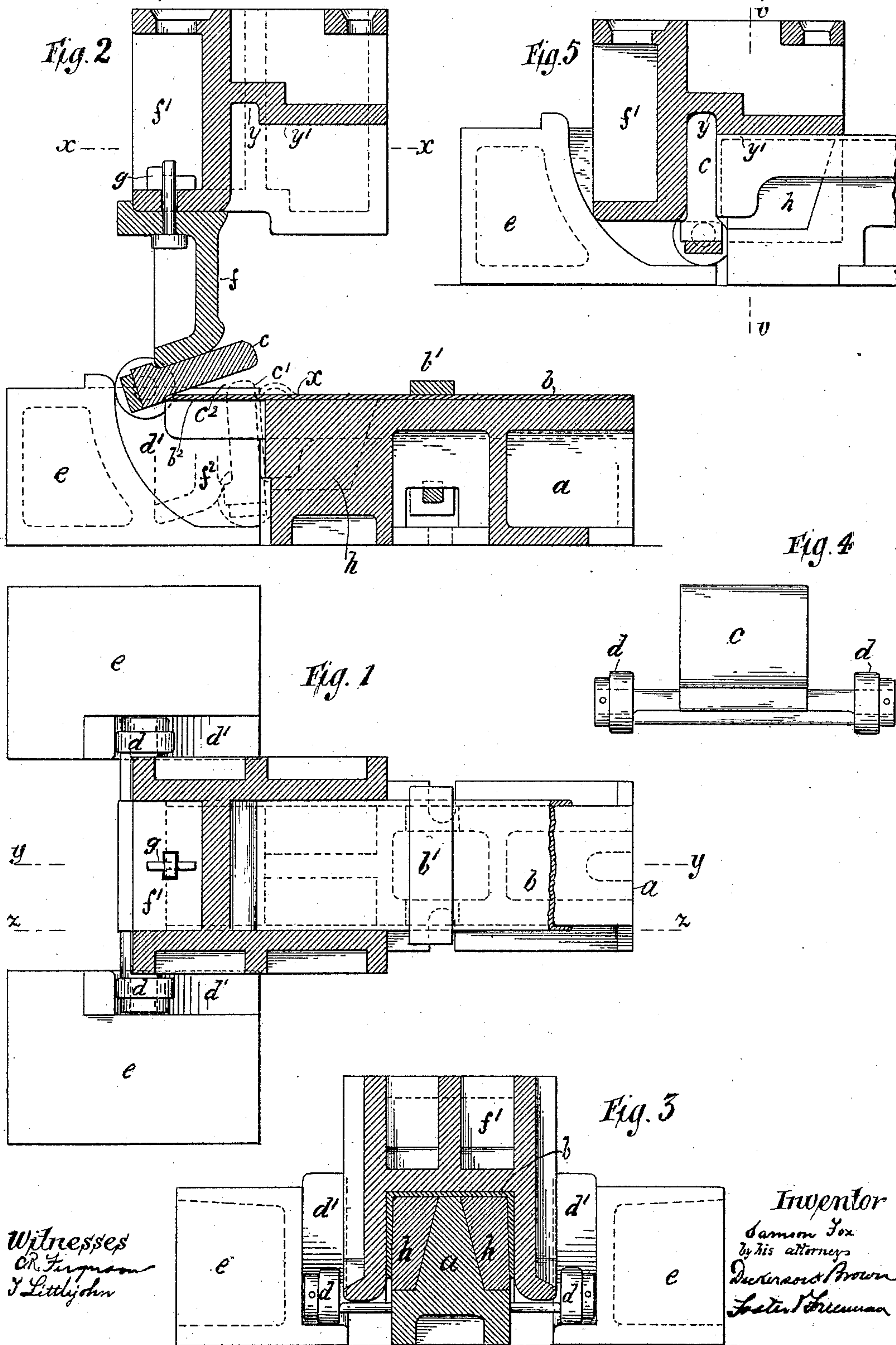
(No Model.)

S. FOX.

APPARATUS FOR BENDING AND FORGING STEEL.

No. 448,814.

Patented Mar. 24, 1891.



Witnesses
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UNITED STATES PATENT OFFICE.

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APPARATUS FOR BENDING AND FORGING STEEL.

SPECIFICATION forming part of Letters Patent No. 448,814, dated March 24, 1891.

Application filed December 4, 1890. Serial No. 373,595. (No model.)

To all whom it may concern:

Be it known that I, SAMSON FOX, of Leeds, England, have invented a new and useful Improvement in Apparatus for Bending and Forging Steel, of which the following is a full, true, and exact description, reference being had to the accompanying drawings.

My invention has reference to machinery or apparatus for bending or forming the ends of channel iron or steel, T and angle iron, or steel, &c., to any desired angle or curve, and may be used with advantage in the bending or forming of the ends of bars necessary in the construction of under frames of rolling-stock for railway and other vehicles without the use of separate angle-pieces at the points of connection of one bar or member of the under frame with another and for strengthening the joint.

In the accompanying sheet of illustrative drawings, Figures 1, 2, 3, 4, and 5 are views of apparatus designed for use in connection with a hydraulic press or other suitable pressing-machine for the purpose of bending the ends of channel iron or steel bars at one operation.

Fig. 1 is a sectional plan at xx , Fig. 2. Fig. 2 is a part sectional elevation on line yy , Fig. 1, showing the apparatus illustrated in Fig. 1 as it appears before the bending operation is commenced, subsequent positions of some of the parts being indicated in dotted lines. Fig. 3 is a cross-section at vv , Fig. 5, illustrating the positions the parts occupy after the bending operation has been completed. Fig. 4 is a plan of the traveling bender. Fig. 5 is a part sectional elevation on the line zz , Fig. 1, showing the operation of completing the channel-beam.

a is a mandrel or block secured to the bottom plate of the hydraulic or other pressing-machine.

b is a bar (in this case a channel-bar) under treatment; b' , a metal strip adapted to hold the bar securely in position during the bending operation.

c is a traveling bender. It is in the form of a slab or block mounted on a loose carriage, the wheels d of which are adapted to run in curved recesses d' in blocks e , which are secured to the table of the pressing-machine.

f is a presser. It is attached by bolt and cotter g to a finishing die-block f' .

h h are loose tapered pieces to enable the central part of the mandrel to be withdrawn after the operation is complete and to allow for the contraction of the metal.

The channel-bar b , Figs. 1 and 2, after being heated to the required temperature at the end to be operated upon, is placed upon the mandrel a , the heated end of the said channel-bar projecting beyond the end of the mandrel, as shown in dotted lines at b^2 , Fig. 2. The traveling bender-carriage c , Fig. 2, is then placed in the upper position shown in Fig. 2, and the finishing die-block f' , being actuated by hydraulic or other means, causes the presser f to press upon the bender c , the wheels d of which travel in the curved recesses d' . As the operation proceeds the bender c bends the end of the channel-bar under treatment to an angle slightly less than a right angle, the operation forcing a surplus quantity of metal to the corner, as indicated by dotted lines at x in Fig. 2, the parts c and f being then in the positions indicated by dotted lines at c^2 f^2 in Fig. 2. The parts f' f are then raised, the cotter g and bolt are withdrawn, the presser f is removed, and the finishing die-block f' is caused to move downward until that which is now the top of the bender (whose position is indicated by dotted lines at c^2) enters the recess y . In this way the bender is forced to assume the vertical position in which it is shown at c , Fig. 5, the face y' of the block f' at the same time pressing and distributing the surplus metal of the bent bar that is indicated in dotted lines at x , and finishing the bend off to a right angle.

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

1. In an apparatus for bending the ends of channel iron or steel, the combination, with the pressing member and die, of an independent bender traveling in guides and operating to force down the end of the beam, substantially as described.

2. The combination, in an apparatus for bending the ends of channel iron or steel, of a mandrel, a traveling bender, a presser, and a finishing die-block, substantially as described.

3. The combination, in a machine for bending channel iron or steel, of the stationary die for receiving the channel iron or steel, a press operating a traveling bender for bending the end of the channel-beam, and a spreading wedge-die located within the beam for the purpose of insuring the rectangular shape of the beam, substantially as described.
4. The combination, in a pressing-machine, of the die *b*, the bender *c*, and the presser *f*, substantially as described.
5. The combination, in a pressing-machine, of the die *b*, the bender *c*, the removable presser *f*, and the finishing-die to which it is attached, substantially as described.
6. The combination of the die *b*, presser *f*, and the bender *c*, traveling in curved guides, substantially as shown and described.
7. The bender *c*, provided with wheels *d d*, traveling in curved guides, in combination with the presser and die, substantially as described.
8. The process of forming closed channel-beams, which consists of preliminarily bending the end of the beam, thereby causing the spreading of the metal at the sides and top of the beam in position, and in, secondly, reducing the end to a rectangular box shape by a separate die, substantially as described.
- In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

SAMSON FOX.

Witnesses:

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