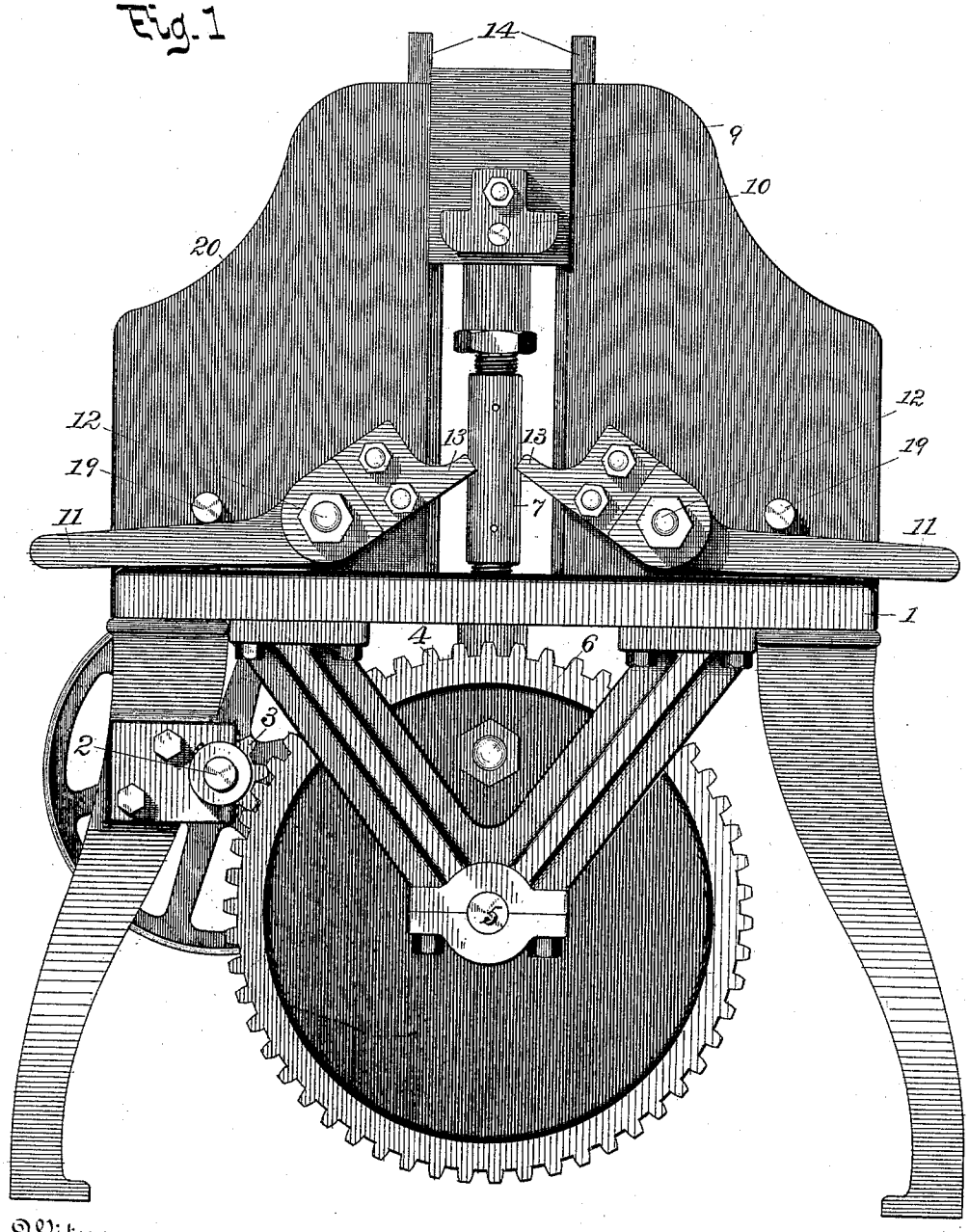
(No Model.) 4 Sheets—Sheet 1.

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METAL BENDING MACHINE.

No. 395,723. Patented Jan. 8, 1889.

Fig. 1



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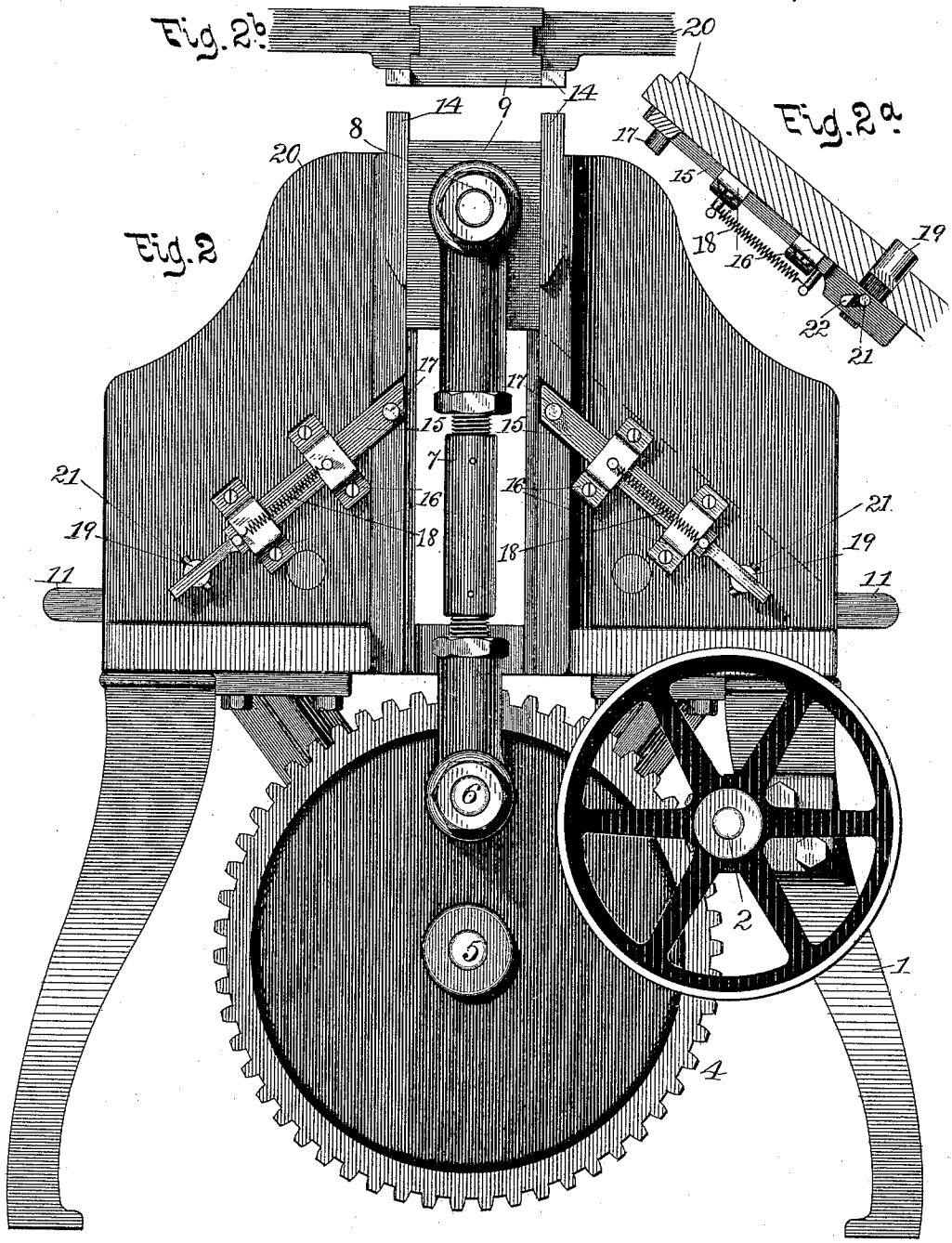
METAL BENDING MACHINE.

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Fig. 2b

Fig. 2a

Fig. 2



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Fig. 3

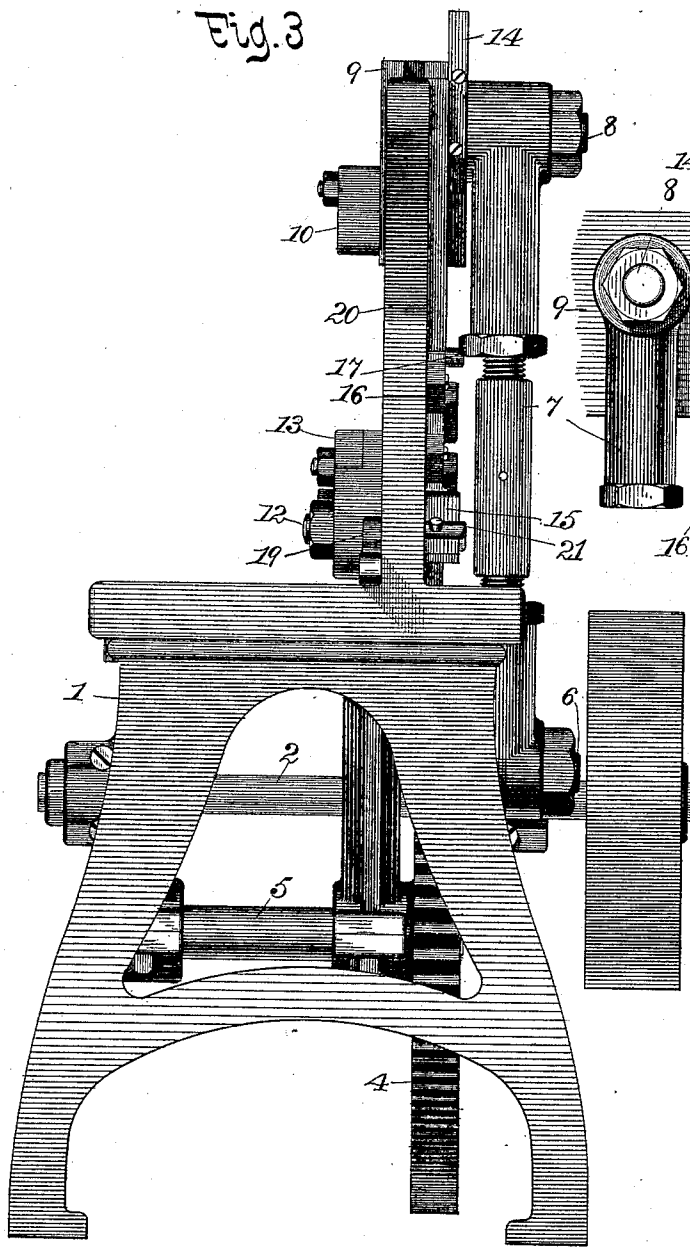
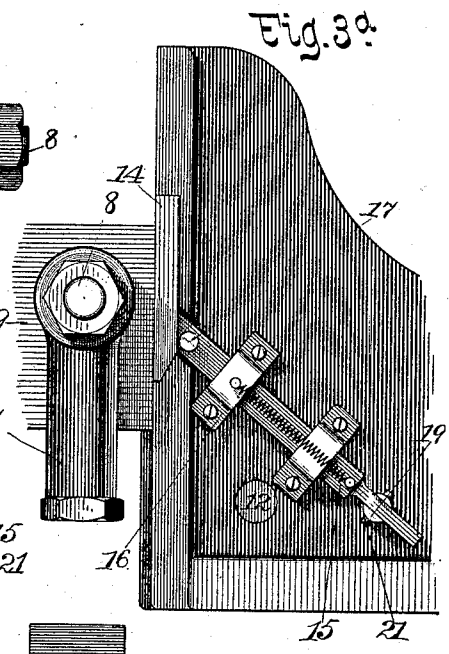


Fig. 3a.



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Fig. 4

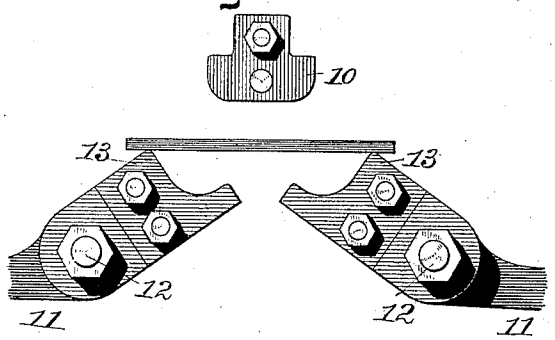


Fig. 5

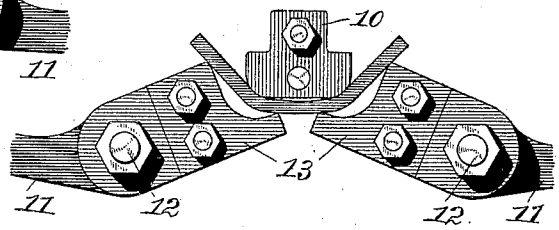


Fig. 6

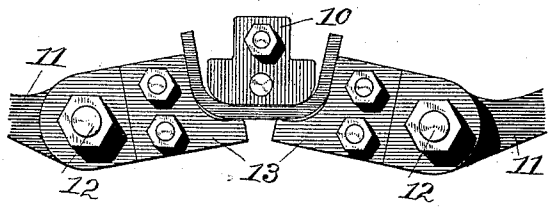
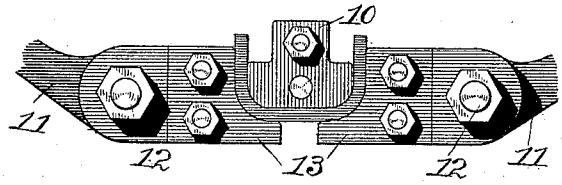


Fig. 7



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UNITED STATES PATENT OFFICE.

SAMUEL VANSTONE, OF PROVIDENCE, RHODE ISLAND.

METAL-BENDING MACHINE.

SPECIFICATION forming part of Letters Patent No. 395,723, dated January 8, 1889.

Application filed May 10, 1888. Serial No. 273,461. (No model.)

To all whom it may concern:

Be it known that I, SAMUEL VANSTONE, a citizen of the United States, residing at Providence, in the county of Providence and State of Rhode Island, have invented a new and useful Metal-Bending Machine, of which the following is a specification.

This invention is a machine for bending metals in a cold state; and its novelty consists in certain peculiarities of construction, fully described and claimed hereinafter.

In the drawings, Figure 1 represents a front view of the machine; Fig. 2, a rear view; Fig. 2ª, a detached view of the locking-bolt mechanism; Fig. 2ᵇ, a top view of the slide-block 9; Fig. 3, an end view of the machine; Fig. 3ª, an operative view showing the cam-piece 14 engaged with the pin 17, Fig. 2ª, of the sliding bar 15. Fig. 4 is a view of the operative parts in their normal positions before the movement of the plunger has commenced; Fig. 5, a view after the first part of the movement of the plunger has been made; Fig. 6, a view after the positive action of the dies has commenced, and Fig. 7 a view after the plunger and dies have completed their movements.

To enable others skilled in the art to make my improved machine, I will now proceed to describe fully the construction of the same.

1, Figs. 1, 2, and 3, represents the frame portion of the machine.

2 represents the driving-shaft, having located thereon the pinion 3 engaging with the gear-wheel 4 on the main shaft 5.

6 represents a crank-pin on the disk or gear wheel 4, and 7 an adjustable connecting-rod attached at its lower end to the crank-pin 6 and at its upper end to the pin 8 of the slide-block 9.

10, Fig. 1, represents a plunger of any proper form, which is rigidly secured to the slide-block in any proper manner.

11 11, Fig. 1, represent lever-arms pivoted at the points 12 12, to the inner ends of which are attached the removable die-blocks 13 13, of special construction, as shown.

14 14, Fig. 2, represent cam-pieces upon the slide-block 9.

15 15 represent rods or bars held in the bearing-blocks 16 16 in such manner as to slide in a longitudinal direction.

17 17 represent pins upon the upper ends of the bars, as shown.

18 represents a contractile spring by means of which the bars 15 15, after having been moved from their normal position, as hereinafter described, are returned thereto.

19, Fig. 2ª, represents a locking-bolt which is capable of longitudinal movement in a proper opening in the frame-plate 20, as shown.

21, Fig. 2ª, represents a pin on the locking-bolt held in a cam-slot, 22, as shown.

The general operation of the actuating parts is as follows: Motion having been communicated to the gear-wheel 4 in any proper manner, the connecting-rod 7, attached to the crank-pin 6, and the pin 8 on the slide-block 9 are caused to communicate a reciprocating movement to the plunger 10 in the manner well understood. The lever-arms 11 11 are held against action during a portion of the movement of the plunger by the bolts 19, and then are released at the proper time by the withdrawal of the locking-bolts 19 19.

The specific operation of the locking-bolts is as follows: By the descent of the slide-block 9 the inclined faces of the cam-piece 14 are caused to strike the pins 17 17 on the bars 15 15 and give the latter longitudinal movement against the resistance of the springs 18 18, as shown in Fig. 3ª. By the longitudinal movement of the bars the cam-slots 22 22, Fig. 2ª, are caused to give movement to the pins 21 21 on the locking-bolts 19 19. By this action the latter are given longitudinal movement through the openings in the frame-plate 20, and this movement causes the withdrawal of the locking-bolts from their contact positions.

The specific action of the plunger, the lever-arms, and locking-bolts is as follows: The metal bar or rod of the proper length in a cold state is placed in position upon the advanced corners of the die portions 13 13 of the lever-arms 11 11, as shown in Fig. 4. In this position of the parts the lever-arms are rigidly held against movement by the locking-bolts 19 19, which project through the frame-plate 20 in position above the arms, as shown in Fig. 1. The plunger is now caused to descend into the position shown in Fig. 5. By this portion of the movement a partial bend is given to the central portion of the metal. When this

position of the plunger has been reached, the locking-bolts are withdrawn and the further descent of the plunger causes the die portions of the lever-arms to act positively upon the metal, as shown in Fig. 6, to complete the bending of the same, as shown in Fig. 7.

By bending the metal bar or rod in two successive steps in the manner described an equal strain is exerted on every part, and hence no opportunity for fracture at any point is afforded.

By changing the form of the dies the forms into which the metal may be bent can be varied at will.

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

1. The combination of the plunger and the lever-arms having the die portions, substantially as described, with the locking-bolts, the parts being so constructed and arranged that the plunger is caused, first, to give a partial bend to the central portion of the metal and the lever-arms having the die portions are caused, second, to give the final bend, as described.

2. In combination with the plunger, the lever-arms having the die portions, the locking-bolts, as described, and the mechanism for withdrawing the same at the proper time.

3. The combination of the plunger, the lever-arms having the die portions, the cam-pieces, and the rods 15 15, with the locking-bolts, as described.

4. The combination of the plunger, the slide-block 9, having the cam-pieces 14 14, the bars 15 15, with the locking-bolts and lever-arms having the die portions, as described.

5. The machine described, having the reciprocating plunger adapted to perform the first part of the bending action, the pivoted lever-arms with die portions adapted to exert after the first bending action a further bending action, the locking-bolts for holding the lever-arms against action, and the mechanism for withdrawing the same at the proper time, as and for the purpose set forth.

This specification signed and witnessed this 26th day of March, 1888.

SAMUEL VANSTONE.

Witnesses:
JESSE J. HAWKINS,
GILMAN E. JOPP.