

(No Model.)

2 Sheets—Sheet 1.

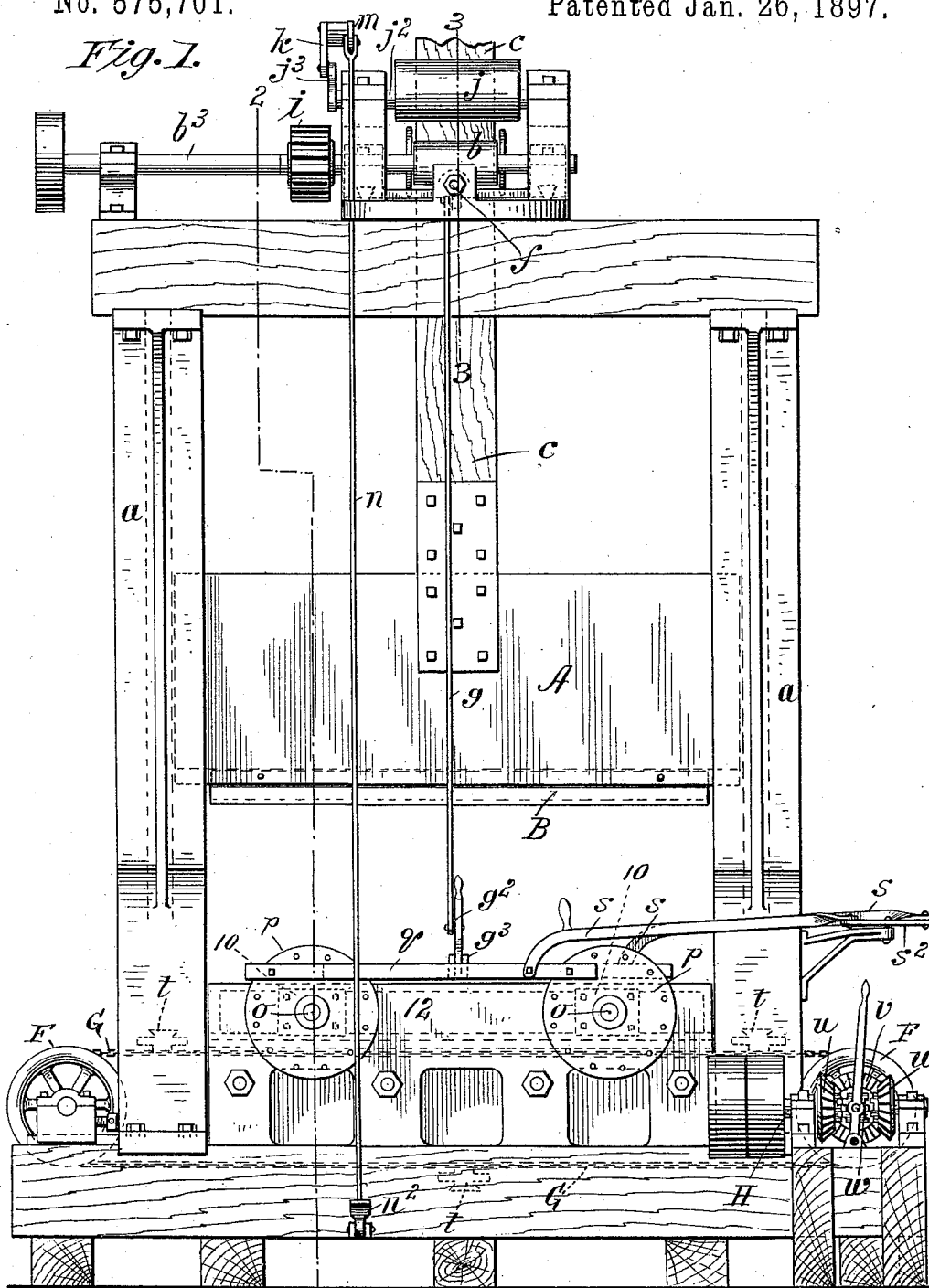
L. COBURN & W. J. SUMNER.

MACHINE FOR BENDING AND FORMING SHEET METAL.

No. 575,701.

Patented Jan. 26, 1897.

Fig. 1.



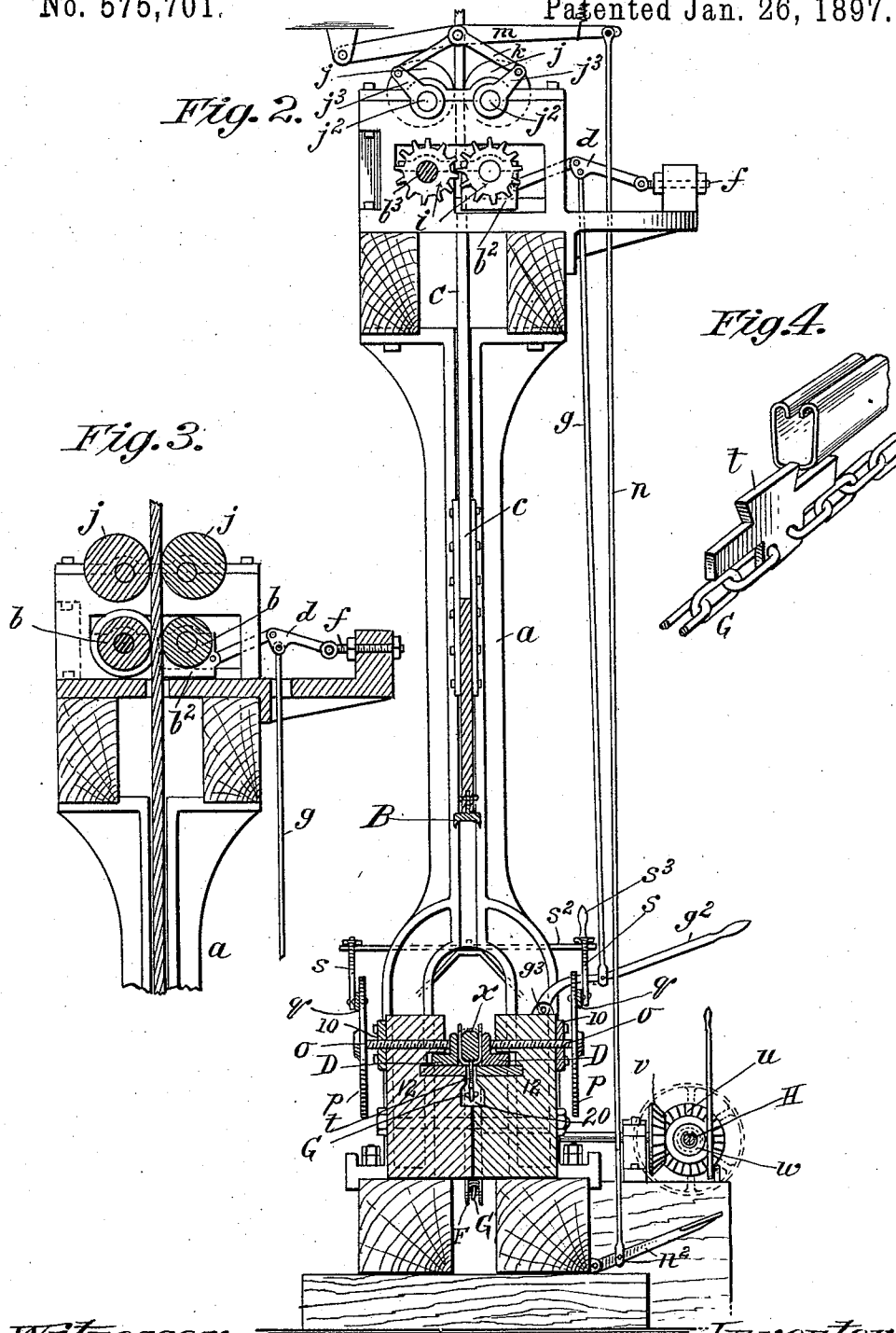
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# UNITED STATES PATENT OFFICE.

LEMUEL COBURN AND WILLIAM J. SUMNER, OF HOLYOKE, MASSACHUSETTS.

## MACHINE FOR BENDING AND FORMING SHEET METAL.

SPECIFICATION forming part of Letters Patent No. 575,701, dated January 26, 1897.

Application filed September 7, 1895. Serial No. 561,724. (No model.)

*To all whom it may concern:*

Be it known that we, LEMUEL COBURN and WILLIAM J. SUMNER, citizens of the United States, residing at Holyoke, in the county of Hampden and State of Massachusetts, have invented new and useful Improvements in Machines for Bending and Forming Sheet Metal, of which the following is a specification.

This invention relates to improvements on the machine for bending sheet metal patented to Lemuel Coburn October 2, 1888, No. 390,346, the same being especially applicable to the manufacture of trolley-tracks.

The invention particularly relates to improvements in the elevating mechanisms for the drops or male plunger-dies which are comprised in the machine, to improvements in the means for supporting the said dies when in their raised positions and for releasing them to drop, to improved mechanism for ejecting the bent metal from the stationary or female dies, and to mechanism for operating the movable side walls of such of the female dies in the machine as comprise such side walls.

The invention consists in combination of parts and devices, all substantially as will hereinafter appear, and be set forth in the claims.

The machine to which the present improvements relate, as set up for the production of trolley-tracks such as illustrated in the aforesaid patent, comprises three sets of male and female dies, the first being to bring the blank of sheet metal to U form, the second set subject to the action of which the so-bent sheet metal is next brought, turning the opposing upstanding edge portions of the trough-shaped metal inwardly toward each other, while the third set of dies subject to the action of which the partially-bent sheet metal is next moved, forcing the marginal portions of the sheet metal inwardly more or less nearly parallel to each other and to the sides of the trough.

Inasmuch as the present invention does not relate to the system, that is, the three sets of the dies in combination, but to devices which are applicable to the individual sets, only one set of the dies is here shown, the duplicated or multiplied illustrations being deemed unnecessary and inadvisable.

In the drawings, Figure 1 is a side eleva-

tion of the portion of the trolley-track machine which comprises the intermediate set of metal-bending dies. Fig. 2 is a sectional elevation of the same, taken on the line 2 2 of Fig. 1. Fig. 3 is a cross-sectional view taken on line 3 3, Fig. 1. Fig. 4 is a perspective view of a portion of the bent-up trolley-track and one of the ejectors, together with a portion of the carrying-chain for the latter.

Similar characters of reference indicate corresponding parts in all of the views.

In the drawings, A represents the hammer of the drop guided in the ways provided therefor in the end standards *a a* therefor, and B is the die carried on the hammer A. The said hammer A has bolted thereto the lower portion of the upwardly-extended plank or bar *c*, which extends upwardly through the head framing of the machine and between the two friction-wheels *b b*, one of which rotates in stationary journals, while the other is mounted in a journal-bearing of the block *b*<sup>2</sup>, which slides toward and from the axis of the stationary roll.

*d* represents a toggle, one member of which is pivoted to the said movable journal-block, while the opposite end is pivotally secured to the end of the adjustable bolt *f*.

The connecting-rod *g*, which has its upper end secured to the middle of the toggle, has its lower end secured to the operating-lever *g*<sup>2</sup>, which is fulcrumed on a stationary support, as seen at *g*<sup>3</sup>. The said friction-rolls *b b* are constantly rotated, one of the said rolls being on the shaft *b*<sup>3</sup>, to which a continuous rotation is imparted, while the other is, through the long-toothed gears *i i*, rotated as is common in the driving of feed-rolls. Above the said friction-rolls *b b* is a pair of cylinders *j j*, arranged opposite each other and eccentrically fixed on the journal-studs *j*<sup>2</sup> *j*<sup>2</sup>, which have the cranked projections *j*<sup>3</sup>, to which the members of the toggle *k* are pivoted. The said eccentrically-mounted cylinders *j j* have their faces adjacent the opposite sides of the aforesaid extension-bar *c*. The overhead endwise-pivoted lever *m* is, intermediately of its length, also pivoted to the said toggle *k*, while to the outer end of this lever is secured the upper end of a connecting-rod *n*, which has its lower end connected to the treadle *n*<sup>2</sup> or other adequate operating device.

The aforesaid friction-rolls *b b* are normally

in contact, with only slight pressure against the sides of the said bar C, such pressure not being sufficient to exert any feeding or elevating action on the bar.

5 The bar C, having been run up between the eccentrically-journaled cylinders, will, by the automatic tendency which said cylinders have to exert pinching actions, remain elevated until said pinching-cylinders release it, as effected by the operation of the treadle, whereupon the drop will fall with a force corresponding to its considerable weight. The drop is elevated by operating the lever-arm  $g^2$ , which causes the movable roll  $b$  to press  
15 against the bar C.

By keeping the foot on the treadle and pressing down the lever  $g^2$  several times in quick succession a succession of short quick blows may be imparted by the drop.

20 The second and third female dies of the compound machine have the side walls D D thereof laterally movable. Such side walls are opened when the partially-formed track is drawn in endwise from the preceding female die, and are then closed against the sides of the track, within which is a bar or core  $x$ . The improved means for operating the said movable side walls consist of parts as follows: The screws  $o$  have thread engagements with the nuts 10 10; on opposite outer sides of the upstanding parts 12 12 of the base of the machine, and bear against the outer sides of said side walls. A disk  $p$  is affixed on the outer end of each screw, pairs of these disks at each side of the machine being connected by the connecting-rods  $q$ , while the pairs of these connecting-rods at opposite sides of the machine are connected by the longitudinally-ranging levers  $s$  and the intermediately-pivoted cross-lever  $s^2$ . One of said longitudinal levers  $s$  has the handle  $s^3$ . By grasping this handle and forcing the same longitudinally all of the disks and screws will have rotational movements imparted to them which will cause the setting up of the opposite side walls D D closely against the track.  
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At both ends of the machine are chain-wheels F F, around which runs the endless chain G, having at suitable intervals the dogs  $tt$ . The upper course of this chain runs in a longitudinal aperture 20 therefor, below and opening upwardly into the base of the female die, one or several, as the case may be. Adjacent one of the chain-wheels is mounted a pulley-driven shaft H, having the two opposite bevel gear-wheels  $u$   $u$ , which are loose thereon, and both in mesh with the bevel gear-wheel  $v$  on the extended arbor of one of the chain-wheels F. Each bevel-gear  $u$   $u$  has its hub formed into or provided with clutch-teeth, and splined to slide on the continuously-driven shaft H is the clutch-sleeve  $w$ , which is operated by the lever. The lever may be placed to normally leave both gears  $u$   $u$  out of clutch, but it may be so swung as  
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to throw either one in clutch, whereupon the ejector-chain will have its travel in the one or the other direction, as elected, so long as the clutched condition is maintained, the dogs ejecting endwise the tracks from the female dies.

What I claim as my invention is—  
1. In a metal-bending machine, the combination with the hammer having the upwardly-projecting bar, C, of the pair of rolls,  $b$ ,  $b$ , between which said bar extends, one thereof being movable toward and from the face of the bar, means for rotating said rolls, means for forcing the movable roll against the face of the bar, the pair of eccentrically-pivoted cylinders between which said bar also extends, and means for imparting to said cylinders rotational movements in given directions, whereby they will release the bar, all substantially as and for the purposes set forth.  
85

2. In a metal-bending machine, the combination with a female die comprising a movable side wall, of two or more screws, and supports through which they have threading engagements whereby they bear by their inner ends against said movable wall, disks secured on the outer ends of said screws, and connecting-rods secured to said disks, substantially as described.

3. In a metal-bending machine, the combination with a female die comprising opposing movable side walls, of several screws and supports through which they have threading engagements whereby they bear by their inner ends against the outer sides of said movable die-walls, disks secured on the outer ends of said screws, rods connecting the side sets of the disks, the longitudinally-ranging levers, and the cross-lever, substantially as and for the purposes set forth.  
105

4. In a metal-bending machine, the combination with a female die, comprising opposing movable side walls, of adjusting-screws, supports through which the screws pass, operating mechanism for the screws; an endless chain, wheels around which the chain passes, and ejector-dogs secured to the chain and projecting upwardly into the way between the dies, substantially as described.

5. In a metal-bending machine, the combination with a female die, comprising opposing movable side walls, of adjusting-screws, supports through which the screws pass and operating mechanism for the screws; an endless chain, wheels around which the chain passes, ejector-dogs secured to the chain, and projecting upwardly into the way between the dies, a mechanism for operating the chain, and a clutch mechanism for throwing the chain out of operation, substantially as specified.  
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