V. E. EDWARDS.

METAL CUTTING SHEARS.

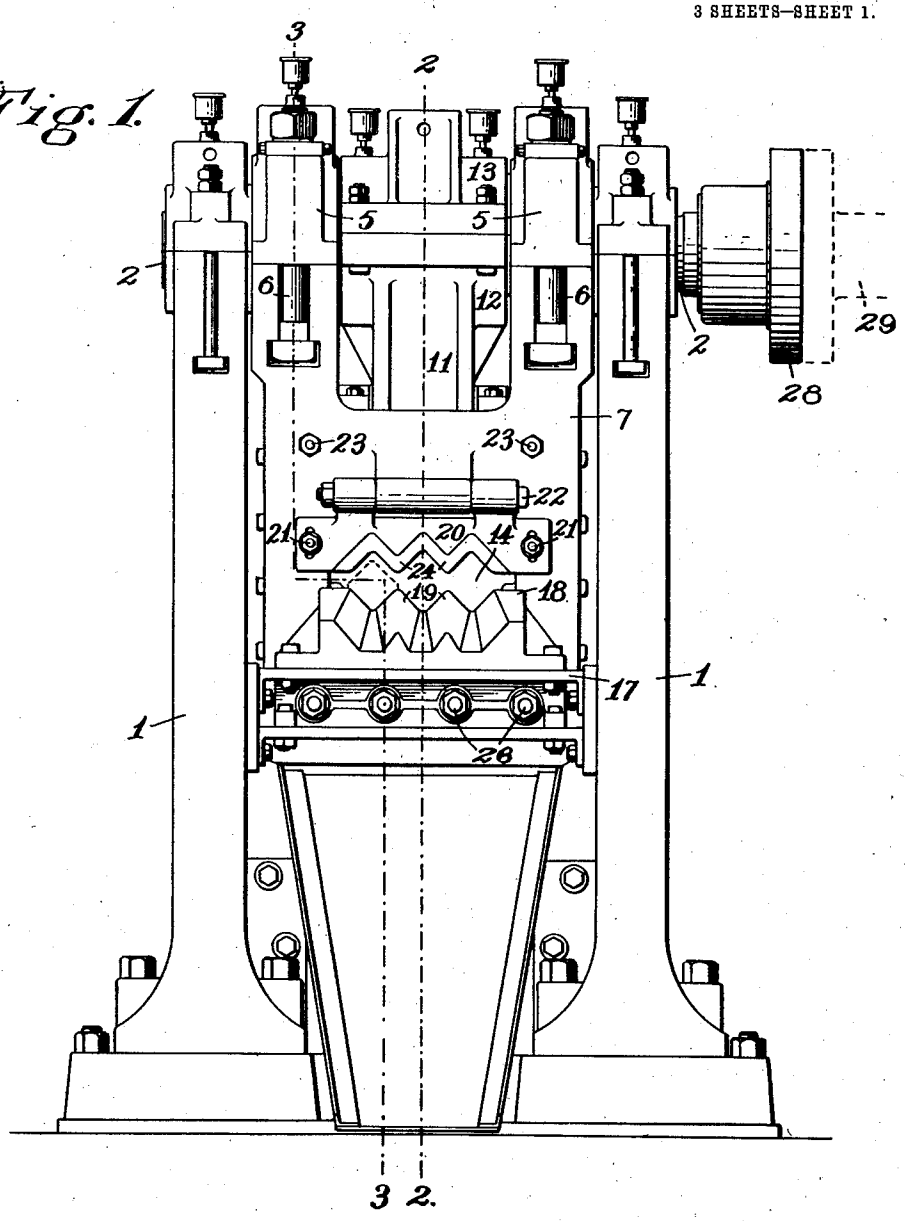
APPLICATION FILED SEPT. 2, 1909.

1,047,185.

Patented Dec. 17, 1912.

3 SHEETS—SHEET 1.

Fig. 1.



Witnesses

R. D. Tolman.

Nellie Whalen.

Inventor

Victor E. Edwards.

By Rufus B. Fowler

Attorney

V. E. EDWARDS.

METAL CUTTING SHEARS.

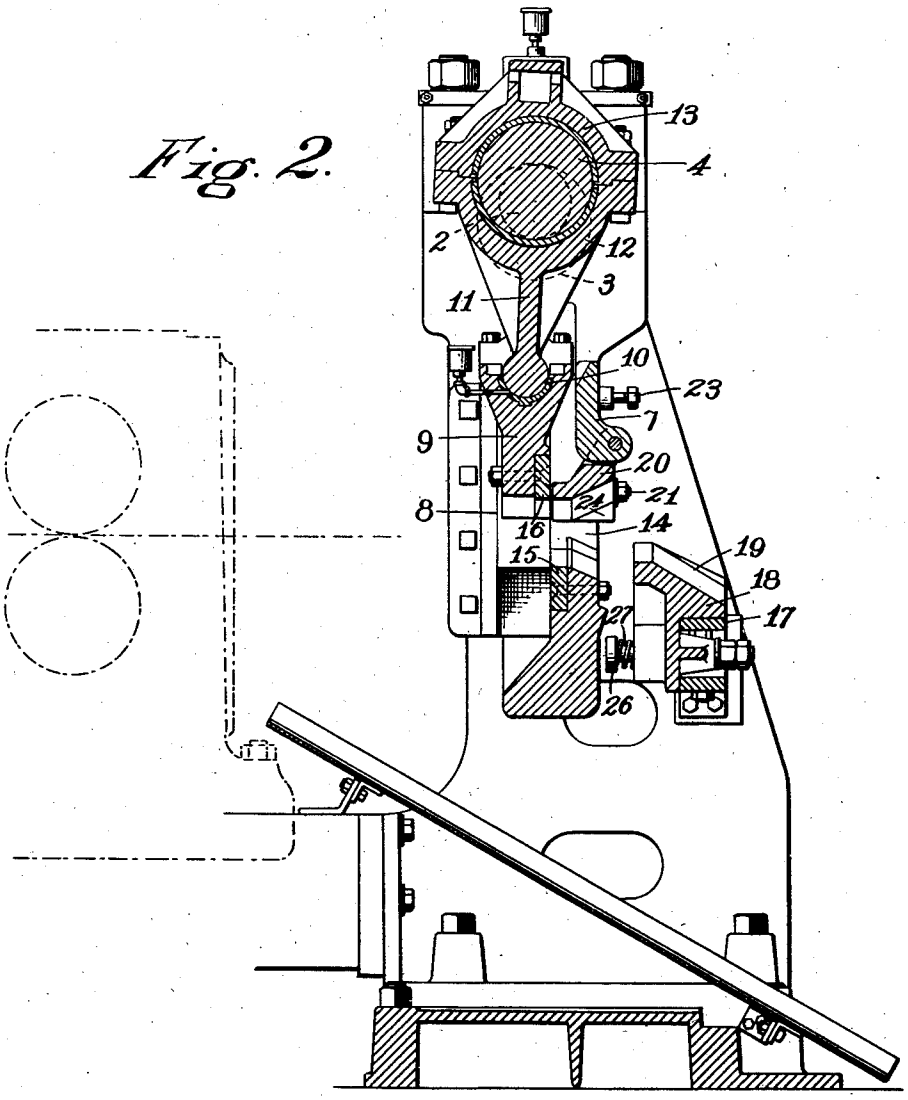
APPLICATION FILED SEPT. 2, 1909.

1,047,185.

Patented Dec. 17, 1912.

3 SHEETS—SHEET 2.

Fig. 2.



Witnesses

R. D. Tolman.

Nellie Whalen.

Inventor

Victor E. Edwards.

By Rufus B. Fowler

Attorney

V. E. EDWARDS.

METAL CUTTING SHEARS.

APPLICATION FILED SEPT. 2, 1909.

1,047,185.

Patented Dec. 17, 1912.

3 SHEETS—SHEET 3.

Fig. 3.

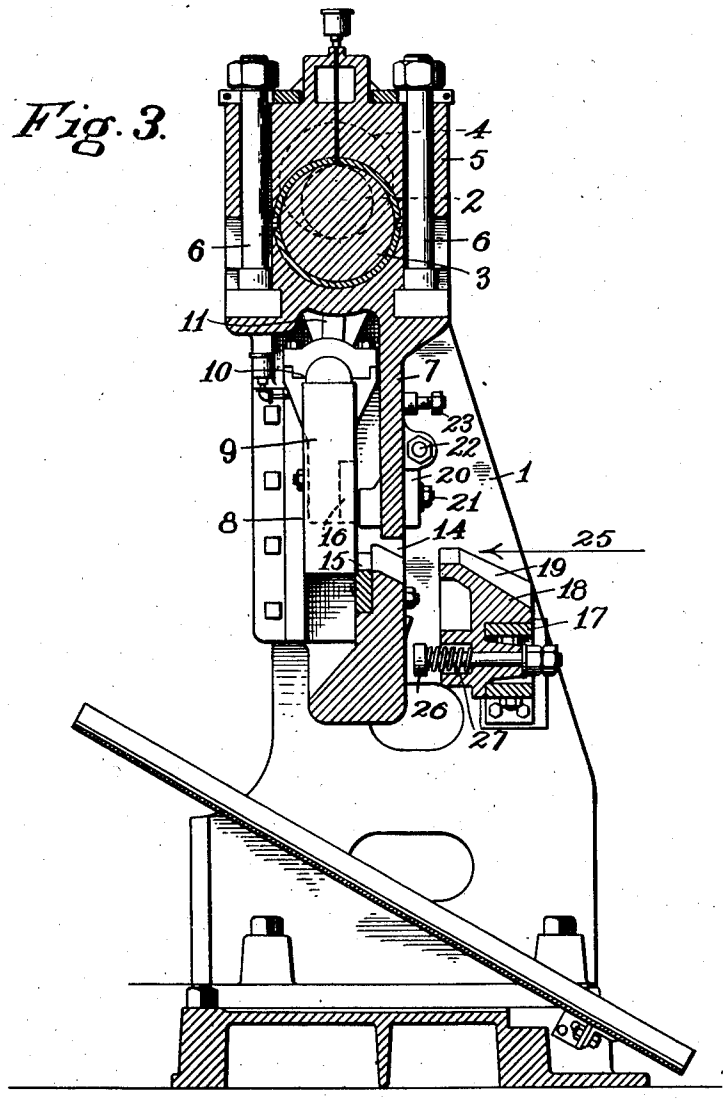
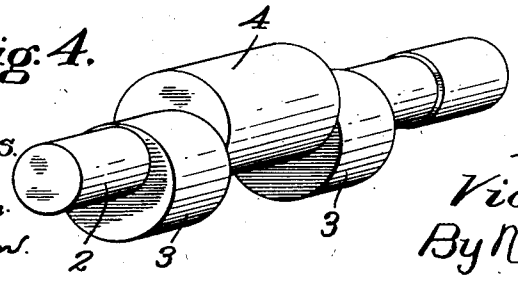


Fig. 4.



Witnesses.

R. D. Tolman.

Nellie Thalen.

Inventor

Victor E. Edwards.

By Rufus B. Fowler

Attorney

UNITED STATES PATENT OFFICE.

VICTOR E. EDWARDS, OF WORCESTER, MASSACHUSETTS, ASSIGNOR TO MORGAN CONSTRUCTION COMPANY, OF WORCESTER, MASSACHUSETTS, A CORPORATION OF MASSACHUSETTS.

METAL-CUTTING SHEARS.

1,047,185. Specification of Letters Patent. Patented Dec. 17, 1912.

Application filed September 2, 1909. Serial No. 515,986.

To all whom it may concern:

Be it known that I, VICTOR E. EDWARDS, a citizen of the United States, residing at Worcester, in the county of Worcester and Commonwealth of Massachusetts, have invented a new and useful Improvement in Metal-Cutting Shears, of which the following is a specification, accompanied by drawings forming a part of the same, in which—

Figure 1 represents a front view of a metal cutting shear embodying my invention. Fig. 2 is a central vertical sectional view on the plane of the broken line 2—2, Fig. 1. Fig. 3 is a central vertical sectional view on the plane of the broken line 3—3, Fig. 1, and Fig. 4 is a detached view of the rotatable shaft 2 and eccentrics 3 and 4 carried thereon.

Similar reference characters refer to similar parts in the different figures.

My invention relates to that class of metal cutting shears which are employed for severing metal while the same is in movement, and the metal cutting shears illustrated in the accompanying drawings is adapted for severing ingots or billets while in longitudinal movement during the process of reduction in a rolling mill.

The construction and operation of the shears are hereinafter described and the novel features pointed out in the annexed claims.

Referring to the accompanying drawings, 1, 1 denote a pair of upright sides or housings for a rotating shaft 2, which is journaled in suitable bearings at the tops of the sides 1, 1. The shaft 2, just inside its journal bearings, is provided with a pair of eccentrics 3, 3 and between the eccentrics 3, 3 is an eccentric 4. The throw of the eccentrics 3, 3 is upon diametrically opposite sides of the shaft from the eccentric 4. Upon the upper side of the eccentrics 3, 3 are semicircular eccentric straps 5, 5 connected by bolts 6 with a pendent framework 7, which is thereby supported upon the eccentrics 3, 3 and is capable of a swinging movement between the sides 1, 1.

The frame 7 is provided on opposite sides with ways 8 for a sliding head 9, having a hinged connection 10 with a link 11, which connects the sliding head 9 with eccentric straps 12 and 13 which inclose the central eccentric 4. As the shaft 2 is rotated, the eccentrics 3, 3 will cause a rising and falling movement to be given to the frame 7, and the eccentric 4 will impart a sliding movement to the head 9 in the ways 8. The movements of the head 9 and frame 7, as actuated by the eccentrics 3 and 4, will be in opposite directions; when the frame 7 descends, the head 9 will slide upwardly in the ways 8 and, when the frame 7 is raised, the head 9 will slide downwardly.

The frame 7 is provided with an opening 14 just below the sliding head 9, to allow the metal to be severed to pass through the frame 7. Below the opening 14 and attached to the frame 7 I attach the lower shear blade 15, and to the lower end of the head 9 I attach the upper shear blade 16, adapted to pass by and coöperate with the lower shear blade in severing the metal placed between the blades during the downward movement of the head 9 and the upward movement of the frame 7.

Connecting the upright sides 1, 1, but below the opening 14, is a transverse framework 17 upon which is mounted a metal supporting table 18, which, in the present instance, has its upper or metal supporting surface provided with triangular projections 19, which are spaced to provide recesses through which the metal to be severed is guided to the shear blades. Above the opening 14 a cross bar 20 is attached by bolts 21 to the frame 7. The bar 20 is hinged to the frame 7 by a pintle 22, which allows the bar 20 to be released from the bolts 21 and swung upwardly and attached to bolts 23, which project from the front side of the frame 7. The supporting surface of the table 18 is arranged in a horizontal plane above the plane of the lower shear blade 15 when the latter is in its lowest position. The bar 20, in the present instance, is provided with triangular projections 24 corresponding with the triangular projections 19 on the metal supporting table 18, and form corresponding recesses for the guidance of the metal between the shear blades. The lower surface of the bar 20 is arranged in a horizontal plane below the plane of the shear blade 16 when the latter is in its highest position.

When the shear blades 15 and 16 are the farthest apart, the metal to be severed will be prevented from contacting with the shear blades by its being held above the lower shear blade by the supporting table 18 and prevented from rising above the guide bar

20. A free passage is thereby secured for the longitudinal movement of the metal between the shear blades, which are then brought together by the rotation of the shaft 2, which causes the cutting edges of the shear blades to pass each other by means of the eccentrics 3, 3 and 4. A longitudinal movement imparted to the metal in the direction of the arrow 25, while it is being severed, will cause the frame 7 and the cutting mechanism carried thereby to be swung around the axis of the shaft 2 in the direction in which the metal is moving and, as the shear blades are again separated, the frame 7 will be swung by gravity into its normal vertical position. If the momentum of the swinging frame 7, as it is returned to its normal position, should carry it past a vertical plane passing through its center of gravity, it will be received by the spring actuated buffers 26, by which the momentum of the swinging frame will be checked by the tension of the springs 27, causing the swinging frame to come to rest in its normal position a short distance in front of the buffers 26.

The shaft 2 is supplied with a coupling flange 28, by which the shaft is connected with a driving shaft 29 connected with any suitable source of power by means of a clutching mechanism, not shown, but which may be of any of the known and commonly used types of clutching mechanism which is capable of being automatically thrown out of engagement after each revolution of the shaft 29.

In the operation of my improved shears the shaft 2 is capable of but a single revolution as it is connected with the driving power, causing the shear blades to be brought together and separated when the rotation of the shaft 2 ceases, until it is again connected by the operator with the driving mechanism. The frame 7 is considerably heavier than the sliding head 9 so that, when the shaft 2 becomes released by the automatic disengagement of its clutching mechanism, the weight of the frame 7 will be sufficient to counterbalance the weight of the head 9, and cause the shear blades to be normally maintained at their farthest distance apart.

I claim,

1. In metal cutting shears, a rotatable shaft, eccentrics carried on said shaft, and a pair of coacting shear blades suspended from said eccentrics.

2. In metal cutting shears, a rotatable shaft, eccentrics carried on said shaft, and a pair of coacting shear blades suspended from said eccentrics having simultaneous movements in opposite directions.

3. In metal cutting shears, a rotatable shaft, opposing eccentrics carried on said shaft, and upper and lower shear blades suspended from said eccentrics, with the load on the eccentric supporting the lower shear blade greater than the load on the opposing eccentric supporting the upper shear blade.

4. In metal cutting shears, a rotatable shaft, eccentrics carried by said shaft, a frame pivotally suspended from said eccentrics, ways on said frame for a sliding head, a sliding head, an eccentric for reciprocating said head, an upper shear blade carried by said head and a lower shear blade carried by said frame.

5. Shears for severing metal while in motion, having a swinging framework, normally held in a vertical position by gravity, means for vertically reciprocating said framework, and coacting shear blades, one of which is attached to said framework.

6. Shears for severing metal while in motion, having a swinging framework, normally held in a vertical position by gravity, means for vertically reciprocating said framework, a pair of coacting reciprocating shear blades supported in said framework, with one of said shear blades attached to said framework.

7. Shears for severing metal while in motion, having a swinging framework, normally held in a vertical position by gravity, means for vertically reciprocating said framework, a shear blade attached to said framework, ways on said framework for a sliding head, a shear blade held in said head, and means for reciprocating said head in said ways.

8. In metal cutting shears, a rotatable shaft, a pair of eccentrics on said shaft, a frame suspended from said eccentrics, a shear blade carried by said frame, a head slidable in ways on said frame, a shear blade carried by said head, and an eccentric on said shaft opposing said pair of eccentrics and operatively connected with said slidable head.

9. In metal cutting shears, a swinging framework having an opening for the passage of the metal to be severed, a stationary guide for guiding the metal into said opening, upper and lower coacting shear blades for severing the metal, with the lower shear blade movable, and with the supporting surface of the guide above the plane of the lower shear blade when the latter is in its lowest position.

10. In metal cutting shears, upper and lower shear blades, means for supporting the metal to be severed as it is presented to said blades, with a space between the plane of the metal supporting surface and the plane of the cutting edge of the lower shear blade, and means for imparting a simultaneous movement to each shear blade toward each other to sever the metal.

11. In metal cutting shears, a rotatable shaft, opposing eccentrics carried on said

shaft, and a pair of coacting shear blades operatively connected with said eccentrics to impart a reciprocating movement to said blades simultaneously in opposite directions.

12. In metal cutting shears for severing metal while in motion, a swinging frame normally held in a vertical position by gravity, a yielding buffer to resist the swinging movement of said frame in one direction, coacting shear blades carried by said frame adapted to engage a moving piece of metal, and means for imparting a reciprocating movement to said shear blades.

13. In metal cutting shears, a frame capable of moving with the metal to be severed, a pair of coacting shear blades supported on said frame, a support for the metal to be severed as it is presented to said shear blades, and a guide block above said metal support pivotally held upon said frame.

14. In metal cutting shears, a pair of coacting shear blades, a frame supporting said blades and pivoted about an axis parallel with the cutting edges of said blades, and an eccentric rotatable about the pivotal axis of said blades and operatively connected with one of said shear blades.

15. In metal cutting shears, a pair of coacting shear blades, a frame supporting said blades pivoted about an axis parallel with the cutting edges of said blades, and eccentrics rotatable about the pivotal axis of said frame and operatively connected with said shear blades.

16. In metal cutting shears, upper and lower shear blades, stationary means for supporting the metal to be severed as it is presented to said blades, with the supporting surface of said means above the plane of the lower shear blade when the latter is in its lowest position, and means for moving the lower shear blade toward the upper blade to sever the metal.

Dated this twenty-seventh day of August 1909.

VICTOR E. EDWARDS.

Witnesses:

PENELOPE COMBERBACH,

RUFUS B. FOWLER.