(No Model.) 3 Sheets—Sheet 1.

L. M. HAM.

MACHINE FOR SAWING METAL.

No. 428,773. Patented May 27, 1890.

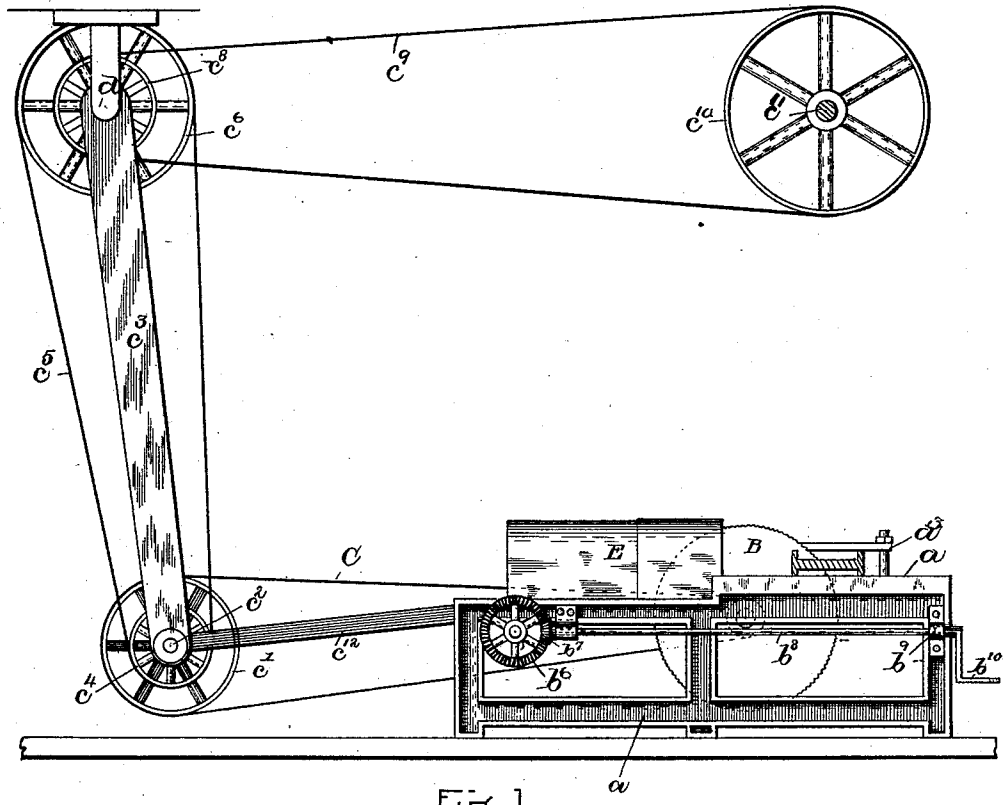


Fig. 1.

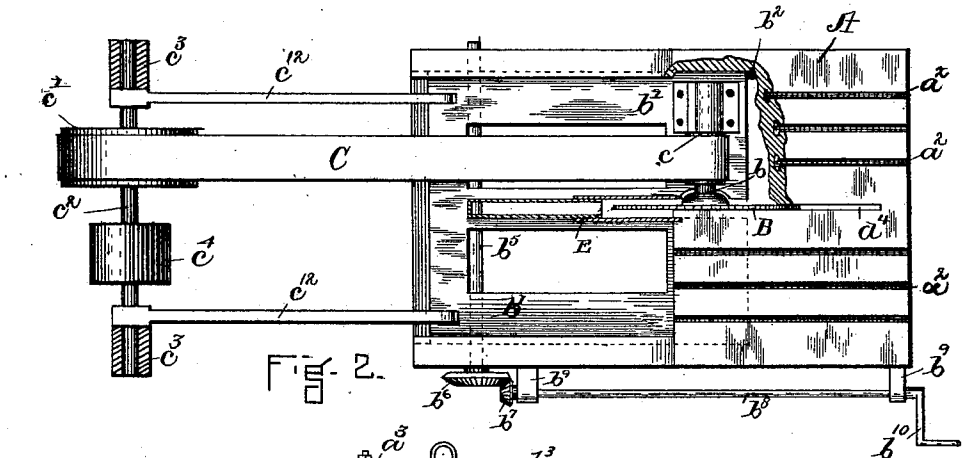


Fig. 2.

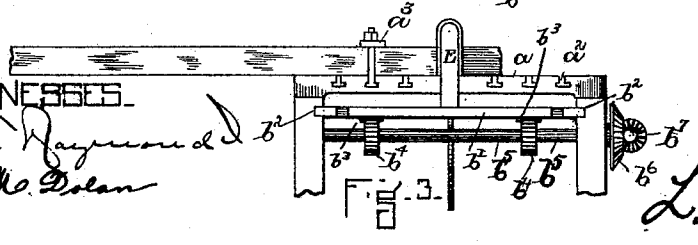


Fig. 3.

WITNESSES.

F. F. Raymond

J. McDolan

INVENTOR.

L. M. Ham

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(No Model:) 3 Sheets—Sheet 2.

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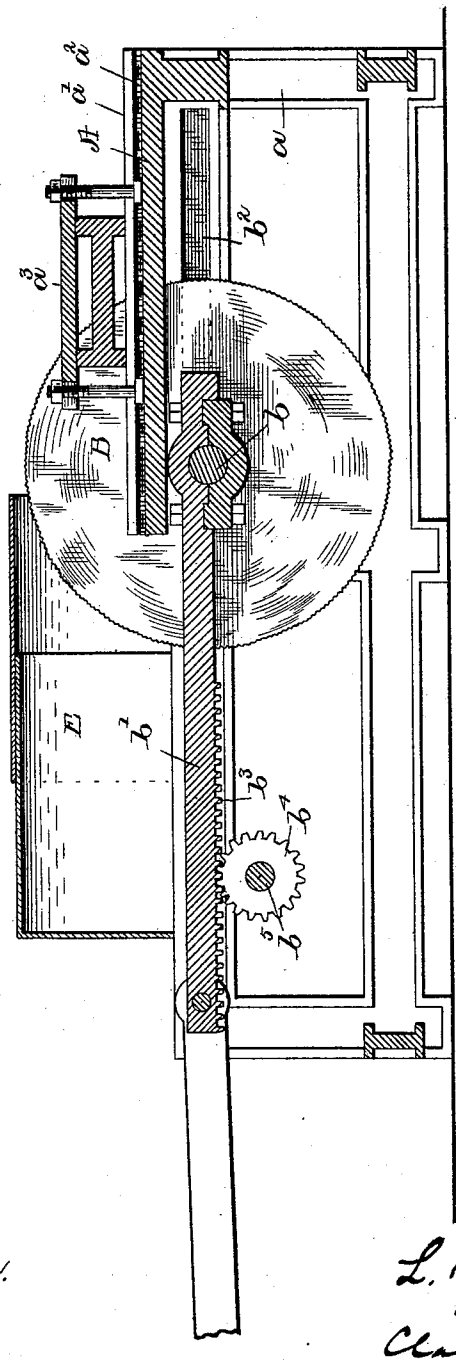


Fig. 4.

WITNESSES.
James T. Gall.
A. P. Porter.

INVENTOR.
L. M. Ham
by his attys
Clarke & Raymond

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

(No Model.) 3 Sheets—Sheet 3.

L. M. HAM.

MACHINE FOR SAWING METAL.

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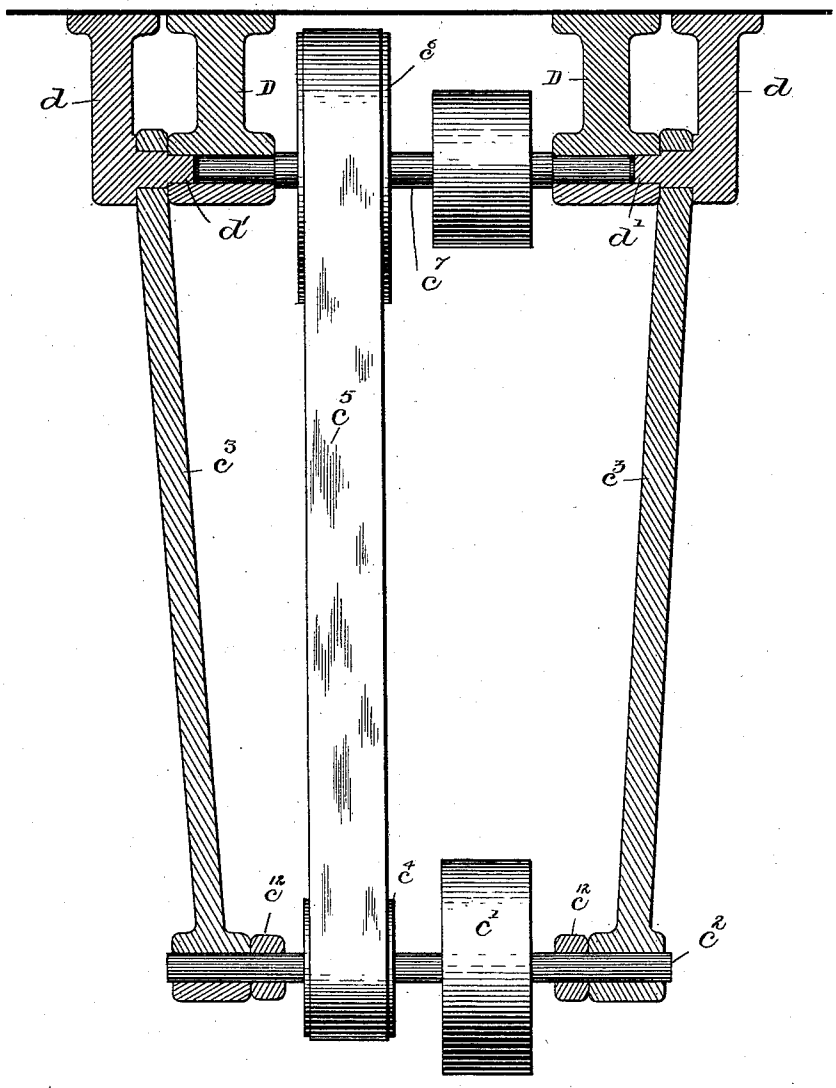


Fig. 5

WITNESSES.

J. M. Dolan

A. P. Porter,

INVENTOR.

L. M. Ham

by his Attys

Clarke & Raymond

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

LEMUEL M. HAM, OF BOSTON, MASSACHUSETTS.

MACHINE FOR SAWING METAL.

SPECIFICATION forming part of Letters Patent No. 428,773, dated May 27, 1890.

Application filed June 22, 1889. Serial No. 315,244. (No model.)

To all whom it may concern:

Be it known that I, LEMUEL M. HAM, of Boston, in the county of Suffolk and State of Massachusetts, a citizen of the United States, have invented a new and useful Improvement in Machines for Sawing Metal, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming a part of this specification, in explaining its nature.

The invention relates to a machine especially adapted to the sawing of cold metal of large shapes, like beams, girders, &c.; and it comprises a bed and clamps for holding the work stationary, a traveling frame for supporting a rotary saw or cutter, a feed for controlling the movement of the traveling frame, and devices for rapidly rotating the cutter or saw and arranged to travel with it.

It further relates to various details of construction and organization, all of which will hereinafter be described.

Referring to the drawings, Figure 1 is a view in side elevation of a machine having the features of my invention. Fig. 2 is a view thereof principally in plan. Fig. 3 is a detail view, in rear elevation, representing especially the bed and feed for the saw-carriage. Fig. 4 is a view in longitudinal vertical section representing the saw, the saw-shaft, one of the racks on the saw-shaft carriage, the gear which engages said rack, and the connection between the saw-shaft carriage and a swinging pulley. Fig. 5 is a sectional elevation showing the stationary and swinging hangers and their connections.

In the drawings, A represents the bed of the machine. This is mounted upon or integral with the frame a, and it is made heavy and solid and has a flat surface a' for the support of the work, dovetail grooves a^2 for holding work-clamps a^3, and a slit or recess a^4 extending from the back edge of the table forward to very nearly the front edge, in which the cutter or saw B is moved. The cutter or saw B is mounted upon a short shaft b. This shaft has suitable bearings in the forward end of a sliding carriage b', which is horizontally movable in ways b^2 in the inner side of the frame a. A portion of one of these ways is represented in full lines in Fig. 2 and in dotted lines in said figure, and also in full lines in Fig. 3. The carriage is provided with a horizontal movement by means of racks or rack-bars b^3, formed in or attached to its under surface. (See Figs. 3 and 4.) The pinions b^4 on the shaft b^5 mesh with the teeth of the said rack-bars b^3, the shaft having suitable bearings in the frame a, and being rotated by the bevel-gear b^6, (see Figs. 1, 2, and 3,) attached to its front or outer end, and the bevel-gear b^7 upon the operating-shaft b^8 meshes with the gear b^6. The shaft b^8 is supported by brackets b^9, and has a handle b^{10}, which is adapted to be turned by the operator to feed the carriage and saw horizontally in relation to the stationary work. The saw is rotated by means of the belt C running over a small pulley upon the shaft b (see Fig. 2) to the large pulley c' upon the hanging shaft c^2. This hanging shaft is suspended by swinging hangers c^3, (see Figs. 1 and 2,) and carries a small pulley c^4, over which a driving-belt c^5, extending to the larger pulley c^6, extends, and this pulley c^6 is carried upon a shaft c^7, which also has a smaller pulley c^8 driven by the belt c^9 running from a large pulley c^{10} on the main shaft c^{11}. The hanging or suspended shaft c^2 is connected with the saw-carriage b' by means of the long links or arms c^{12}. (See Figs. 1 and 2.) It will be seen that by this construction a movement imparted to the saw-carriage will also cause the suspended or hanging shaft c^2, its pulleys, and the hangers to be easily moved, and the saw or cutter to be advanced into its work without changing its speed or in any way interfering with the relation between it and its primary driving-pulley.

To provide suitable supports for the swinging hangers c^3, I have arranged upon each side of the hangers D, which carry the shaft c^7, additional hangers d. Each of these hangers d has extending from the side adjacent to the hanger D a stud or projection d', which preferably enters the hole of the box of the hanger D, and the upper end of each swinging hanger c^3 is mounted or carried by this stud. This provides supports for the swinging hangers c^3, which are not constantly rotating, and secures better wear and less friction than where the swinging hangers c^3 are mounted upon the shaft carrying the pulleys.

In operation, the beam or other cold-metal

structure to be sawed is firmly clamped upon the bed a' by suitable clamping devices, the line upon which it is desired to cut or saw being over the slit or recess a^4. The saw or cutting-tool, which is rotated at very high speed, is, by the action of the feed-shaft b^8, moved gradually against and through the stationary beam. It will be observed that the bevel-gear b^7 upon the shaft b^8 is considerably smaller than the bevel-gear b^6, and that the pinions b^4 are small relatively to the bevel-gear b^6, so that the feed of the carriage and saw is quite powerful and slow.

I prefer to partially cover the saw by a metal hood or covering E extending backward from the rear end of the slit or recess a^4 and the bed a'.

By means of this organization heavy cold-metal shapes can be very accurately and quickly sawed or slit, and the metal shapes easily handled, as it is only necessary to mount them upon the bed and clamp them in place, while the saw by a simple feeding mechanism is moved against and into the shape so held.

Having thus fully described my invention, I claim and desire to secure by Letters Patent of the United States—

1. In a machine for cold-sawing heavy metal structures, the combination of a large flat stationary bed or table, the dovetail grooves a^2 for holding work, clamps a^3, arranged therein, a slit or recess a^4, extending from the back edge of the table forward to very nearly the front edge, and a rotary cutter or saw B, mounted upon a slide-carriage to traverse said slit or recess a^4, as and for the purposes described.

2. The combination, in a machine for cold-sawing heavy metal structures, of a stationary solid flat table, a slit or recess in said table extending from the back edge toward the front thereof, a rotary saw, a sliding carriage upon which the saw is supported movable below the upper surface of the bed of said table, whereby only the blade of the saw or rotary cutter extends above said surface, and it is thereby permitted to traverse the entire length of said slit or recess without its shaft coming in contact with the shape or structure supported by the table, as and for the purposes described.

3. The combination, in a metal-sawing machine, of the bed A, mounted upon the frame a, the slide or carriage b', arranged to be moved horizontally in ways upon the inner side of the frame, the shaft b, carried thereby, the saw B, and the feeding devices comprising the rack-bars b^3, pinions b^4, shafts b^5, bevel-gears b^6 b^7, and operating-shaft b^8, substantially as described.

4. The combination, in a metal-sawing machine, of the bed A, having means for supporting and holding large metal shapes stationary, a saw-supporting frame or carriage movable toward and from said bed, and a feed for effecting said movement, a hanging shaft carrying a driving and driven pulley connected by belts with a driving-pulley and with a driven pulley upon the smaller shaft, and with a saw-carriage by a link or hinge connection c^{12}, as and for the purposes described.

5. The combination, in a machine of the character specified, of the stationary hangers D, the pulley-shaft c^7, and the independent stationary hangers d, their studs d', for supporting the swinging hangers c^3, and said swinging hangers, substantially as described.

LEMUEL M. HAM.

Witnesses:
F. F. RAYMOND, 2d,
J. M. DOLAN.