

(No Model.)

2 Sheets—Sheet 1.

E. W. NAYLOR.
HYDRAULIC SHEARING MACHINE.

No. 471,824.

Patented Mar. 29, 1892.

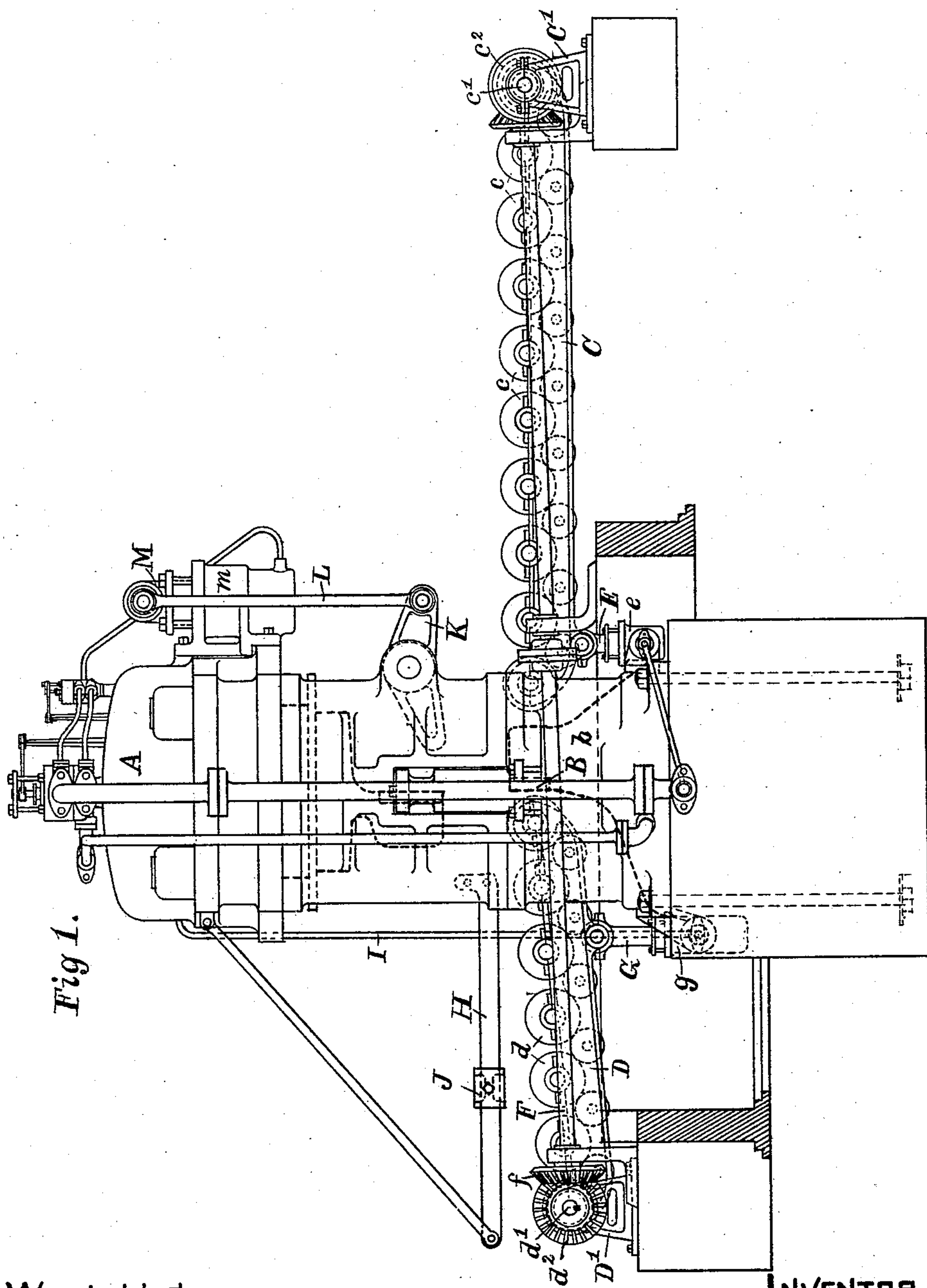


Fig 1.

WITNESSES.

Frank. Miller.
Albert H. Bates.

INVENTOR.

Ernest W. Naylor
By his attorney
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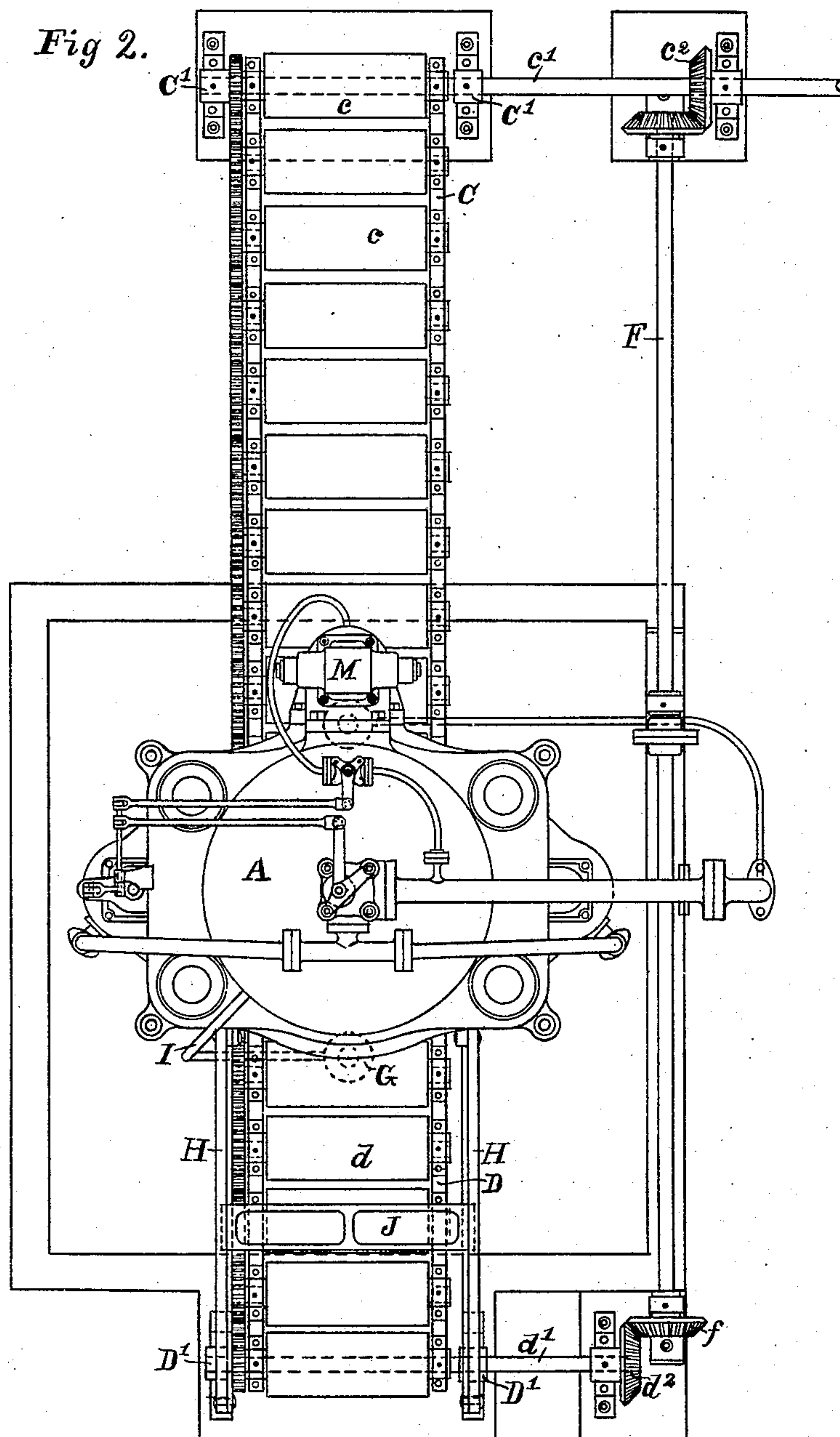
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Frank. Miller.

Albert H. Baker.

INVENTOR.

Ernest W. Naylor.

By his attorney

C. L. Thurston

UNITED STATES PATENT OFFICE.

ERNEST W. NAYLOR, OF CLEVELAND, OHIO.

HYDRAULIC SHEARING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 471,824, dated March 29, 1892.

Application filed June 18, 1891. Serial No. 396,681. (No model.)

To all whom it may concern:

Be it known that I, ERNEST W. NAYLOR, a subject of the Queen of Great Britain, residing at Cleveland, in the county of Cuyahoga and State of Ohio, have invented certain new and useful Improvements in Hydraulic Shearing-Machines, of which the following is a full, clear, and exact specification, reference being made to the accompanying drawings.

My invention relates to hydraulic shearing-machines, and it is particularly useful in a machine adapted to shear large blooms into lengths which are themselves too heavy to handle conveniently without the aid of a crane of other lifting-machine.

In the drawings, Figure 1 is a side elevation of a hydraulic shearing-machine containing my invention, and Fig. 2 is a top plan view of said machine.

Referring to the parts by letters, A represents the main hydraulic cylinder, which is supported by suitable frame-work. Its ram protrudes from its lower end, and to the lower end of the ram is secured a cross-head, which carries the movable shearing-knife. The cylinder is provided with the usual valve, whereby it may be placed in communication with either the pressure-column or exhaust-column or shut off from both. Suitable means are provided for raising the main ram when the cylinder A is in communication with the exhaust-column. The fixed shearing-knife B is secured to the block *b*, suitably supported beneath the main ram, as shown by the dotted lines in Fig. 1.

C represents the feed-table, which is pivoted to standards C' C' at a suitable distance from the shearing-knives. A series of transverse rollers *c c* are journaled to this table and preferably in such manner that the shaft *c'* of the first roller is concentric with the pivot of the table. The roll-shafts have gears on their ends, which mesh with the intermediate pinions, also journaled to the table, whereby all the feed-rolls are driven from the first. The free end of this table C is supported by a vertically-movable ram, which protrudes from the top of a cylinder *e*, the lower end of which is pivoted to a fixed support. This cylinder is in constant communication with the pressure-column, whereby the table when not pressed downward by a greater

force will be moved to and held in the highest position. In its highest position it will just guide the bloom across the block *b* and knife B without touching them. In its lowest position it permits the bloom to rest on the block *b*.

D represents the discharge-table, which is pivoted to standards D' D'. It is provided with transverse rollers *d*, which are driven from the end roll by similar gears and pinions to those on the table C. The shaft *d'* of the end roll, which is concentric with the pivot of the table, is provided with a beveled gear *d*², which engages with the beveled gear *f* on shaft F. A similar beveled gear on the other end of this shaft engages with a beveled gear *c*² on shaft *c'*, whereby the rolls are constantly driven from one main shaft whatever be the position of the tables. The end of the table D adjacent to the block *b* is supported by the vertically-movable ram, which protrudes from the top of the pivoted cylinder *g*. Whether one or two rams G and associated cylinders are employed depends on their size and the weight of the table. The same is true respecting the employment of one or two rams E and associated cylinders.

Means are provided whereby the cylinder *g* is connected with the pressure-column or with the exhaust-column at the same time that the main cylinder A is similarly connected. This effect is produced by means of an open pipe I, connecting the two cylinders.

To each side of the frame is attached a substantially horizontal bar or bars H, and a stop or gage J is adjustably secured to said bars. The bloom is fed between the shearing-knives by the revolving rolls *c* and *d* until the end strikes and is stopped by said gage. When the part of the metal which has passed the knives is being sheared off by the downward movement of the movable knife, the table D is moved downward. When the main cylinder is placed in communication with the exhaust-column, whereby the main ram may be raised, the cylinder *g* is likewise placed in communication with the exhaust-column, and the table D therefore remains in its depressed position. When in this position, the piece of metal which has been sheared off can pass beneath the gage J and is carried beneath it and discharged from the end of the machine by the driven rolls *d*. When the main ram

has reached its highest position and the cylinder A is again placed in communication with the pressure-column for the purpose of driving said ram down, the cylinder *g* is likewise placed in communication with the pressure-column and the ram *G* is moved upward, carrying with it the table *D* to a position where its rolls *d* co-operate in feeding the bloom forward to the gage and in holding it above the block *b*. The bloom is forced down onto the block *b* and held there while being sheared and until such time as it is released to be again fed forward by a lever *K*, which is pivoted to the frame in such position that one end may move down against the bloom. This lever is operated by a hydraulic ram *M*, protruding from a fixed cylinder *m*, and a link or links *L*, which connect the lever *K* with the ram *M*.

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

1. The combination of a main hydraulic cylinder, its ram, a movable shearing-knife operated thereby, a fixed block and shearing-knife secured thereto, a fixed stop, a discharge-table movable toward and from said stop, a hydraulic cylinder, its ram, means connecting said ram and table, and means for simultaneously connecting the said two cylinders with the pressure and exhaust columns, substantially as and for the purpose specified.

2. The combination of a main hydraulic cylinder, its ram, and a movable shearing-knife operated thereby with a fixed stop, a pivoted discharge-table having a series of revolving rolls mounted thereon, a hydraulic cylinder, its ram, mechanism connecting said ram and table, and suitable means for simultaneously placing the last-named cylinder and the main cylinder in communication with the pressure-column or exhaust-column, substantially as and for the purpose specified.

3. The combination of a main hydraulic cylinder, its ram, a movable shearing-knife operated by said ram, and a fixed block and shearing-knife secured thereto with a substantially horizontal bar, a stop adjustably secured thereto, a pivoted discharge-table having a series of revolving rolls mounted thereon, a

supplemental cylinder, its ram, an open pipe connecting said two cylinders, and suitable means connecting the table and last-named ram, substantially as and for the purpose specified.

4. The combination of a main hydraulic cylinder, its ram, a movable shearing-knife secured thereto, a fixed block, and a shearing-knife secured to said block with two pivoted tables, each having a series of rolls mounted thereon, gears and pinions connecting the rolls of each series, the shaft of the outer roll on each table being concentric with the pivot of its table and extended to one side of said table, a beveled gear on each of said shafts, a shaft having beveled gears which engage with the beveled gears on the roll-shaft, means for driving one of said three shafts, and two independent hydraulic cylinders and their rams, one adapted to raise the free end of one table and the other to raise the free end of the other table, substantially as and for the purpose specified.

5. The combination of a main hydraulic cylinder, its ram, and a shearing-knife connected with said ram with a fixed block, a shearing-knife secured thereto, a pivoted feed-table having mounted thereon a series of revolving rolls, a fixed hydraulic cylinder in constant communication with the pressure-column, a ram protruding from said cylinder, and suitable connections between said ram and feed-table, substantially as and for the purpose specified.

6. The combination of a main hydraulic cylinder, its ram, and a shearing-knife connected with said ram with a fixed block, a shearing-knife secured thereto, a pivoted feed-table having mounted thereon a series of revolving rolls, a fixed hydraulic cylinder in constant communication with the pressure-column, a ram protruding from said cylinder and connected with the feed-table, a pressure-lever *K*, a hydraulic cylinder, its ram, and suitable means connecting said ram and lever, substantially as and for the purpose specified.

ERNEST W. NAYLOR.

Witnesses:

HAROLD SMITH,
E. L. THURSTON.