

G. F. LEIGHTON.
PUNCHING AND SHEARING MACHINE.
APPLICATION FILED JAN. 28, 1910.

968,670.

Patented Aug. 30, 1910.

2 SHEETS—SHEET 1.

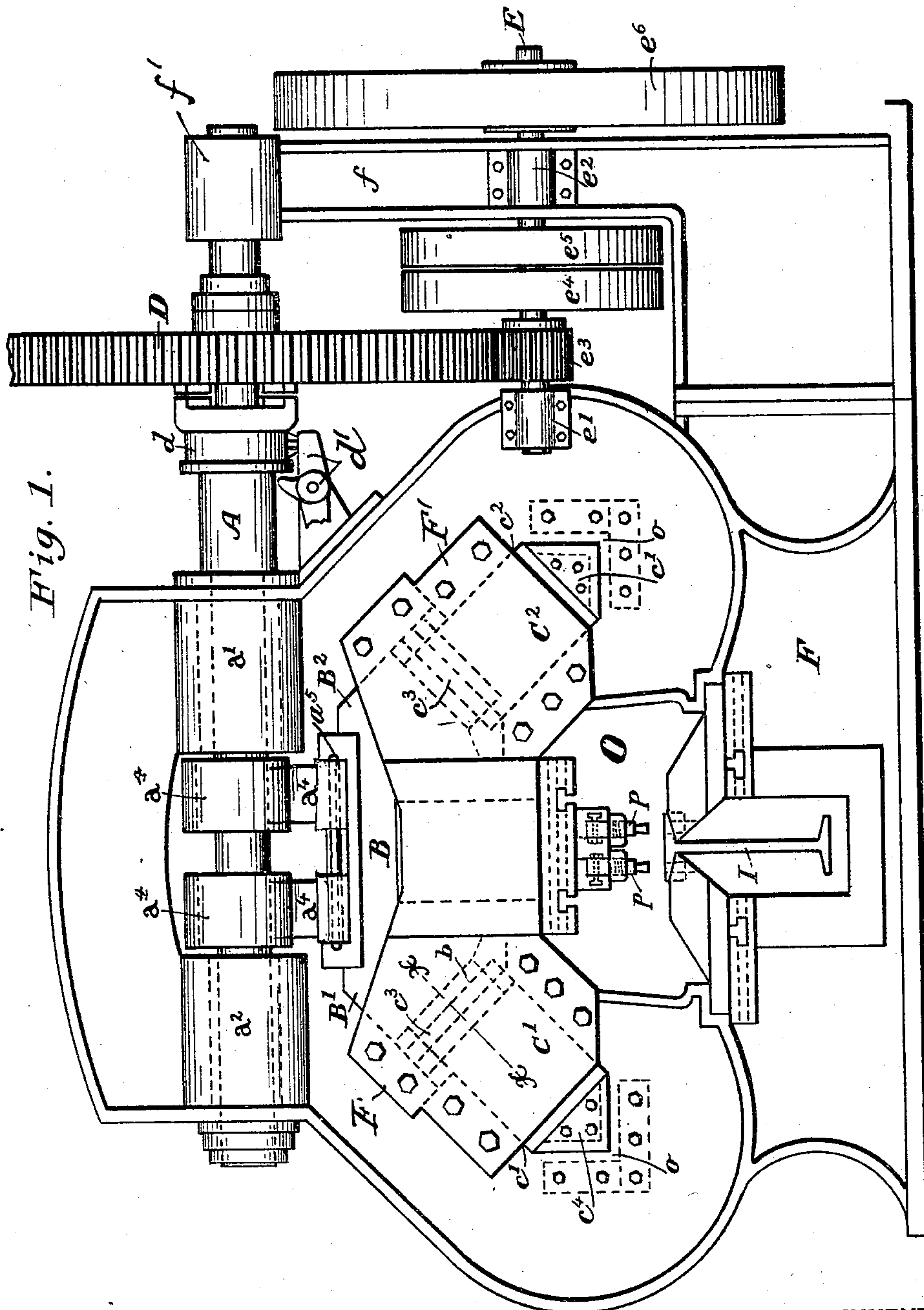


Fig. 1.

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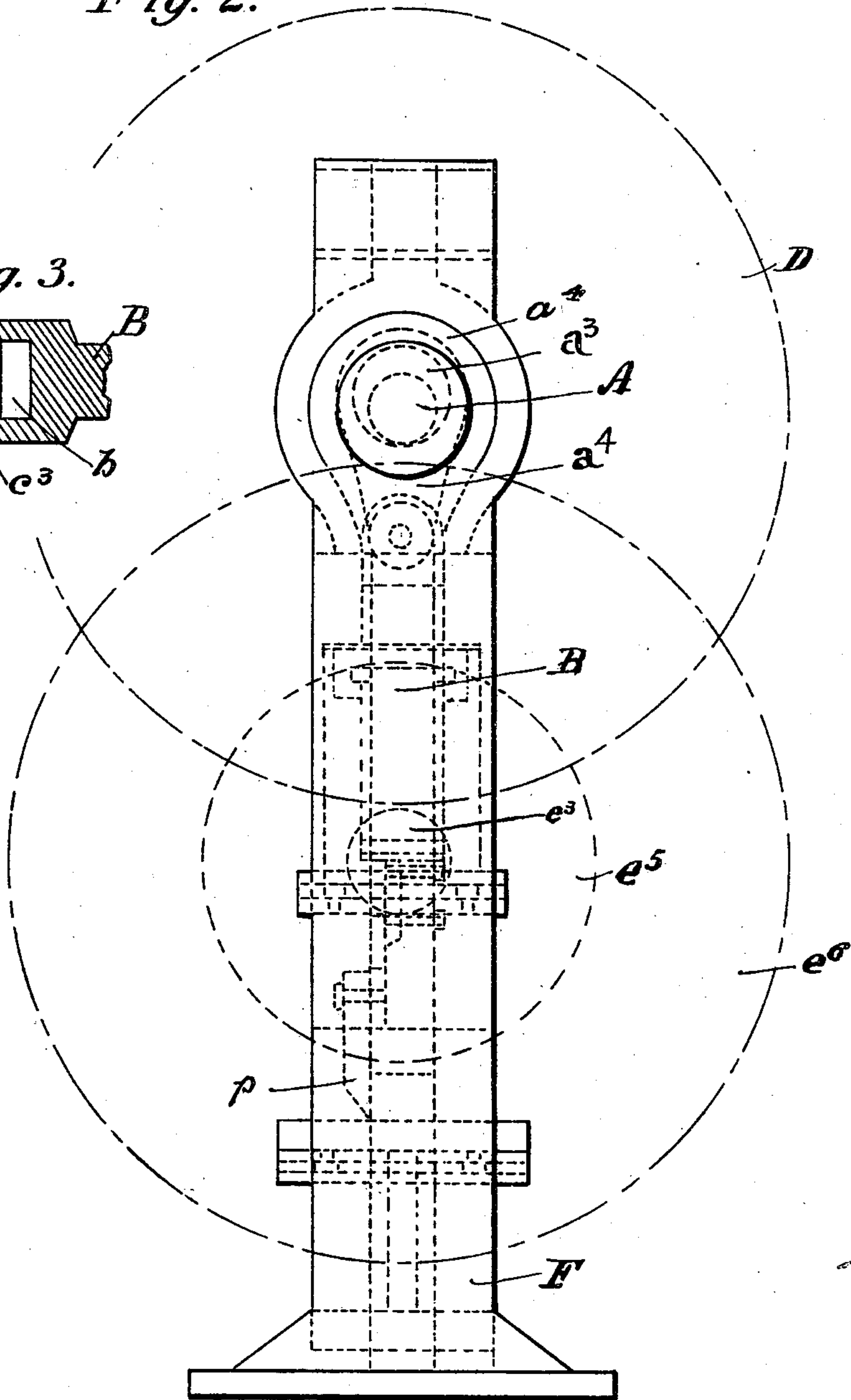
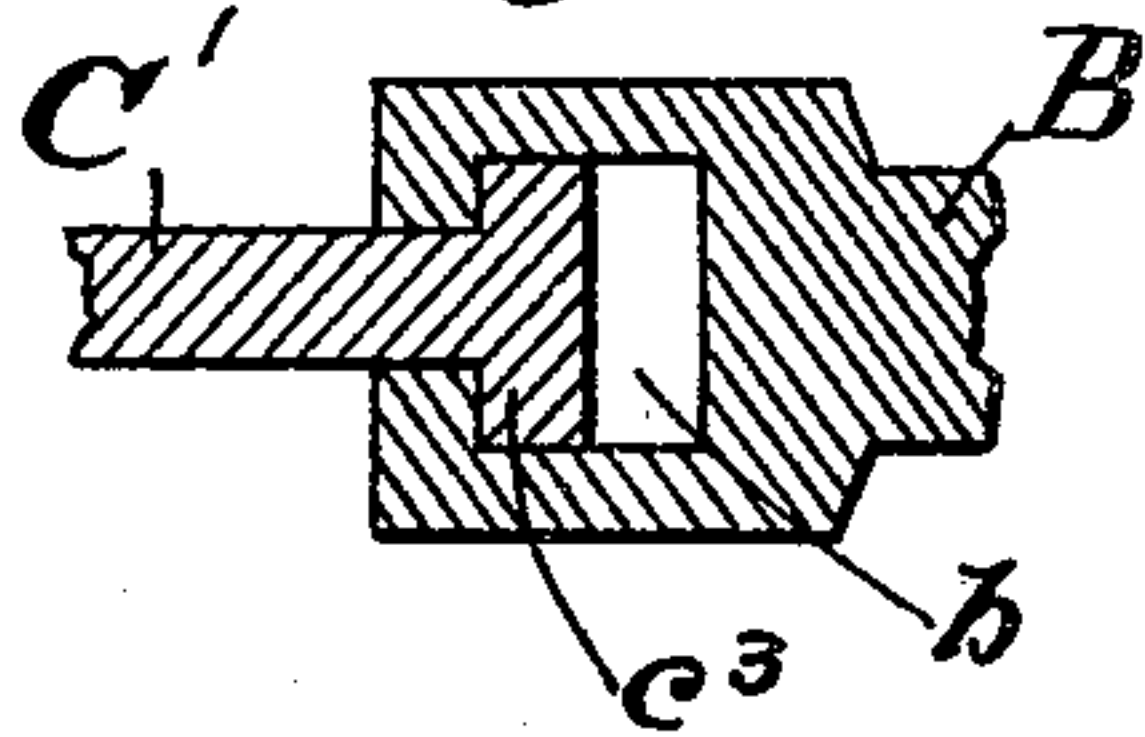
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2 SHEETS—SHEET 2.

Fig. 2.

Fig. 3.



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UNITED STATES PATENT OFFICE.

GEORGE FREDERICK LEIGHTON, OF CINCINNATI, OHIO.

PUNCHING AND SHEARING MACHINE.

968,670.

Specification of Letters Patent. Patented Aug. 30, 1910.

Application filed January 28, 1910. Serial No. 540,691.

To all whom it may concern:

Be it known that I, GEORGE FREDERICK LEIGHTON, a citizen of the United States, residing at Cincinnati, in the county of Hamilton and State of Ohio, have invented new and useful Improvements in Punching and Shearing Machines, of which the following is a specification.

My invention relates to the class of punching and shearing machines designed to be used more particularly with architectural iron work; its object being to produce a compact and durable machine adapted to operate upon a wide range of structural iron.

A further object is to simplify the operative mechanism and so dispose the same as to afford no obstruction to the free accessibility and use of the punches and shearing cutters for iron of any length.

My invention is illustrated in the accompanying drawings, in which:—

Figures 1 and 2 are a front and side elevation respectively, of my improved punch and shear machine complete;—the transmitting pulleys and gears being indicated in Fig. 2 by dotted lines. Fig. 3, a detail cross section on the line *x* of Fig. 1.

Referring now to the drawings, F designates the main supporting frame of the machine; and A, its operating shaft, journaled in bearings a^1 , a^2 and provided with eccentrics a^3 , a^3 , preferably integral with the shaft. The eccentrics, which operate in unison are each provided with a pendulous yoke, a^4 , bearing downward against a main plunger, B, arranged beneath and in line with the eccentrics, connected with the yokes by a common pin, a^5 , and moving in a vertical guideway in and upon the frame A, is a main plunger B, the lower end of which is finished in a suitable manner for the attachment of punch or shear tools, p , p . The main plunger B is formed with lateral projections at each side, as B^1 , B^2 , each having near its lower outer edge a cross slot b , (Fig. 3), arranged at an angle of about forty five degrees (45°) outward and upward in relation to the vertical axis of the plunger B.

Adjacent to the plunger B at each side, is a guideway c^1 and c^2 , respectively, arranged at an angle of about forty five degrees (45°) upwardly and inwardly toward the vertical axis of the main plunger B, and carrying auxiliary plungers

C^1 , C^2 , respectively. The auxiliary plungers C^1 , C^2 , are provided with cross bars or ribs c^3 formed to engage in a sliding fit in the cross slot b of the auxiliary plungers C^1 , C^2 , respectively; and the lower terminals C^4 of the auxiliary plungers are suitably formed for the attachment of punching and shearing tools.

Suitable openings, o , in the frame are left for the introduction of material to the plungers to be operated upon.

The shaft A, is carried outward laterally at one side of the frame F to an outer bearing f^1 in a standard or pillar f , and between said pillar and the frame F, the shaft A is provided with a loose spur gear D, adjacent to which, upon a squared section of the shaft A, is a movable clutch d , by which the said gear and shaft may be rotatively connected or disconnected at will by a dog or engaging element d^1 , operated by a system of levers (not shown) preferably arranged as shown in Letters Patent #771375 issued to me October 4, 1904.

Beneath and parallel with the shaft A, in journal bearings e^1 , e^2 , upon the machine frame F and standard f , respectively, is a counter-shaft E, carrying a spur pinion e^3 , in mesh with the gear D; and also carrying a fixed pulley e^4 and adjacent loose pulley e^5 , for the reception and transmission of power; and, external to the standard f , a fly wheel e^6 . It will be observed that this arrangement of the operating mechanism locates it entirely out of the way of the work openings of the machine, so that the freest possible use can be had of the latter without interference with the driving mechanism.

The work openings o , in the frame F, in connection with the auxiliary plungers C^1 , C^2 , are designed more especially for treating angle iron; to this end suitable platens or fixed shear blades may be attached to the frame or housing, while the center opening O beneath the main plunger B is enlarged below and relatively deep for the reception and treatment of T-iron or I-beams, as I, etc. The central and side plungers are retained in place and the guiding function in part performed by a supplemental housing or plate F^1 , suitably recessed at the back for this purpose (as indicated by dotted lines), and bolted upon the main frame F.

The slots in the main plungers, as indicated in Fig. 3, are made spacious enough

to allow a "gag" bar to be inserted when it is desired to operate the work plunger, or omitted when it is desired otherwise. As this is usual in duplicate plunger machines, 5 no further mention is necessary.

By this construction the main plunger is operated by the two eccentrics acting in unison, and one or both of the auxiliaries may be used at a time, thus reducing the operative mechanisms to the lowest terms of simplicity. The auxiliary plungers are actuated by the lateral projections of the main plunger, engaging by means of the sliding connections producing wedging action 10 against contacting surfaces at an angle of 45° to the line of the main plunger movement.

The driving mechanism and connections are all in the same line at one side or end of the machine, thereby avoiding all obstruction to the free use in the machine of 20 bars of any length as already indicated.

I claim as my invention and desire to secure by Letters Patent of the United States:

1. In a metal punching or shearing machine, comprising a frame having therein 25 guide-ways inclined upwardly toward each other, tool-holding cross heads moving therein, a central vertical guideway between the inclined guideways and a tool-holding cross head operating therein, having lateral 30 wings with inclined surfaces contacting with corresponding surfaces of the lateral cross heads.

2. An apparatus of the class described, 35 comprising a frame provided with suitable work-openings, a central vertical guideway and two oblique guide-ways flanking the same; tool-carrying plungers operating in said oblique guide-ways; a central tool- 40 carrying plunger operating in said central guide-way having lateral projections; slid-

ing contact connections upon said auxiliary and main plungers, engaging each auxiliary with the main plunger at an angle with the line of movement of the latter, and at right 45 angles to the line of movement of said auxiliary plungers, whereby the movement of the main plunger is communicated to the auxiliary plungers simultaneously.

3. A metal punching or shearing machine, embodying a frame provided with a 50 central vertical and two lateral inclined guideways, a tool-holding cross head operating in the central guideway and engaging by contact of relatively inclined surfaces 55 with tool-holding cross heads in the inclined guideways, and a countershaft journaled above and in the common plane of said guideways, and eccentric driving connections operatively connecting the shaft with 60 the central cross head.

4. A metal punching or shearing machine, embodying a frame provided with a central 65 vertical and two lateral inclined guideways, a tool-holding cross head operating in the central guideway and engaging by contact of relatively inclined surfaces with tool- 70 holding cross heads in the inclined guideways, and a countershaft journaled above and in the common plane of said guideways, and eccentric driving connections operatively connecting the shaft with the central cross head, and power-receiving connections 75 located wholly at the side of the frame.

In testimony whereof I have hereunto set my hand in presence of two subscribing witnesses.

GEORGE FREDERICK LEIGHTON.

Witnesses:

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A. L. TILDESLEY.