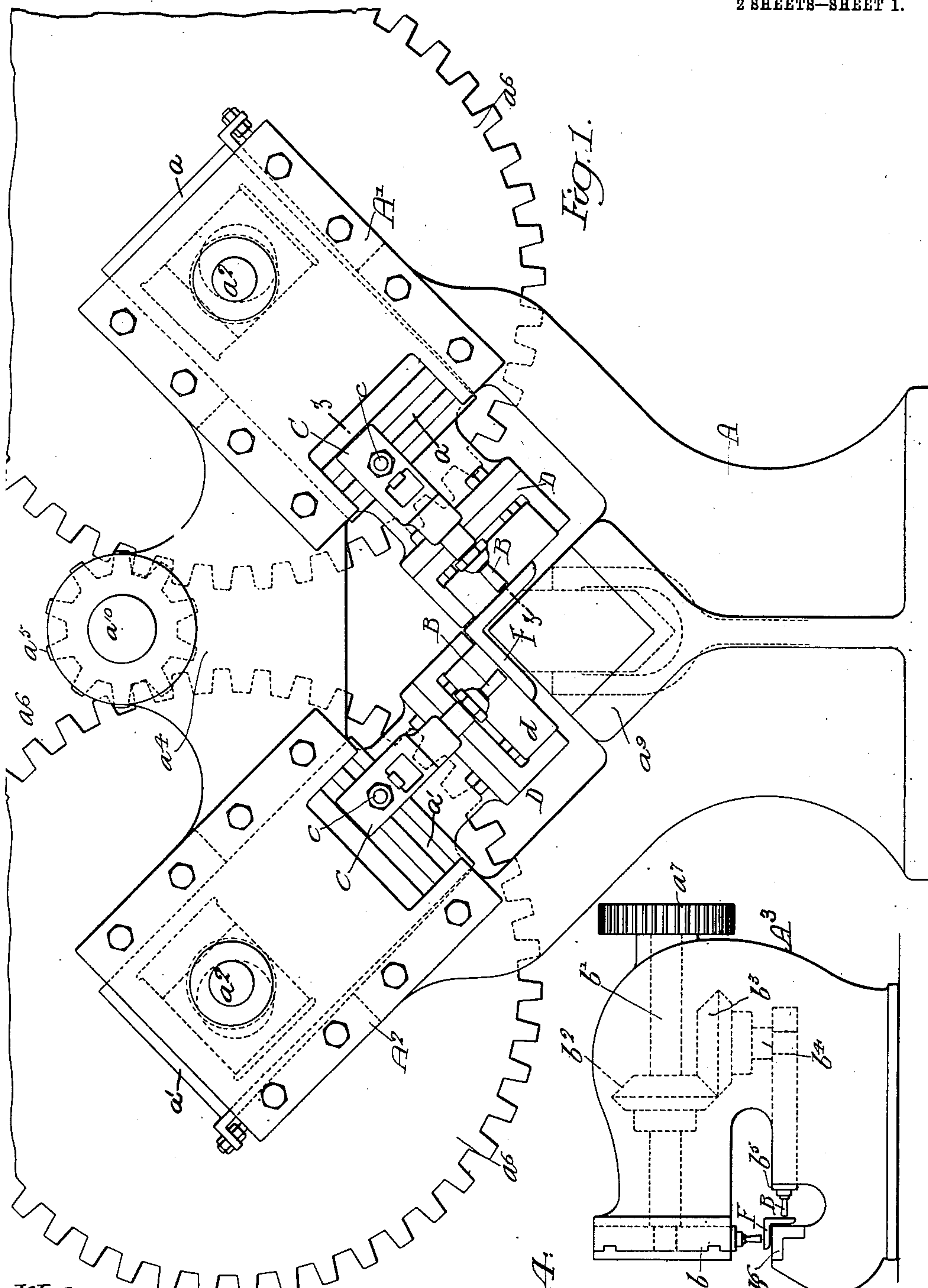


No. 886,876.

PATENTED MAY 5, 1908.

W. T. SEARS.
PUNCHING MACHINE.
APPLICATION FILED MAY 9, 1905.

2 SHEETS—SHEET 1.



Witnesses:
Hamilton D. Turner
Titus N. Jones.

Fig. 4.

Inventors:
Willard T. Sears.
By his Attorneys,
Howson & Howson

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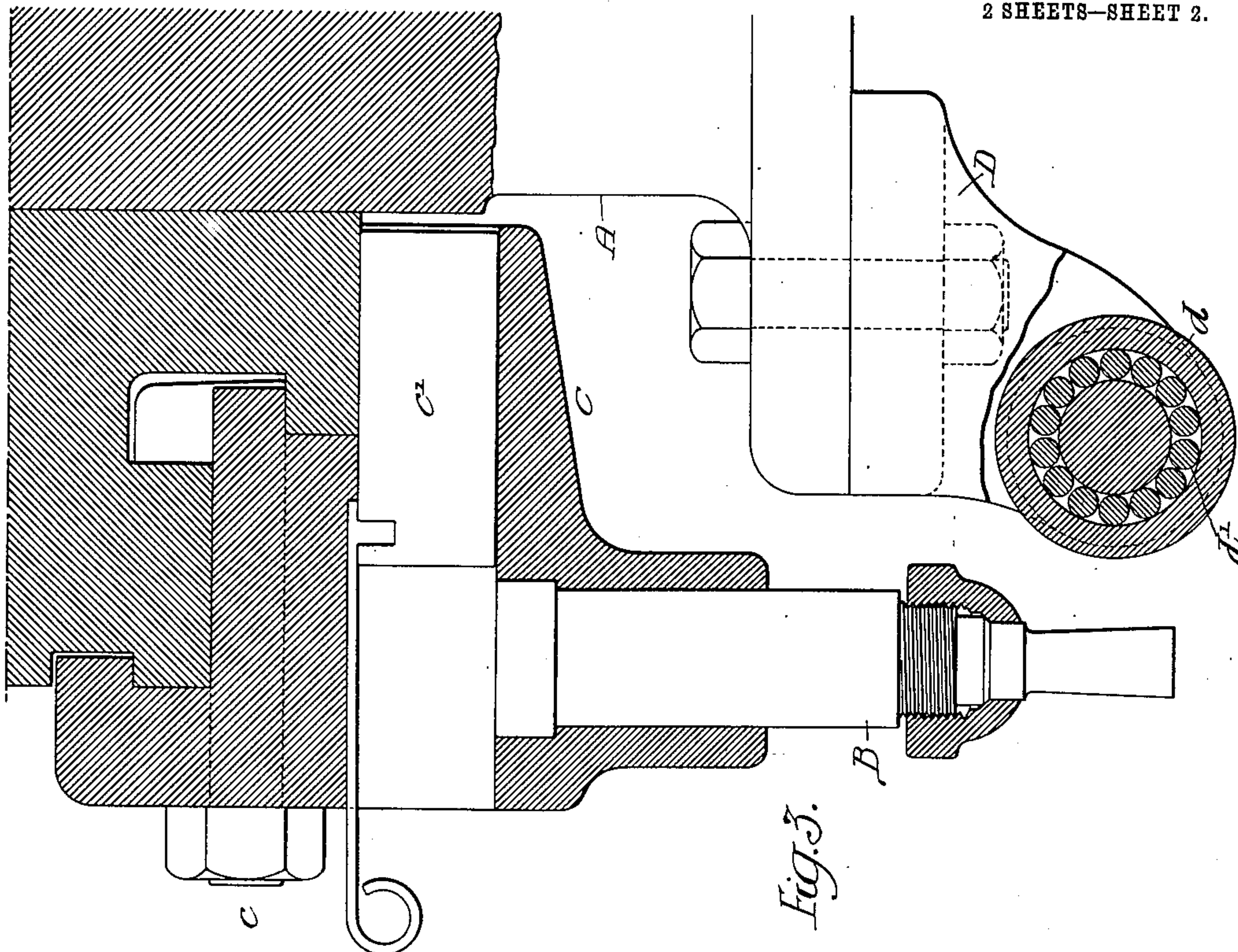


Fig. 3.

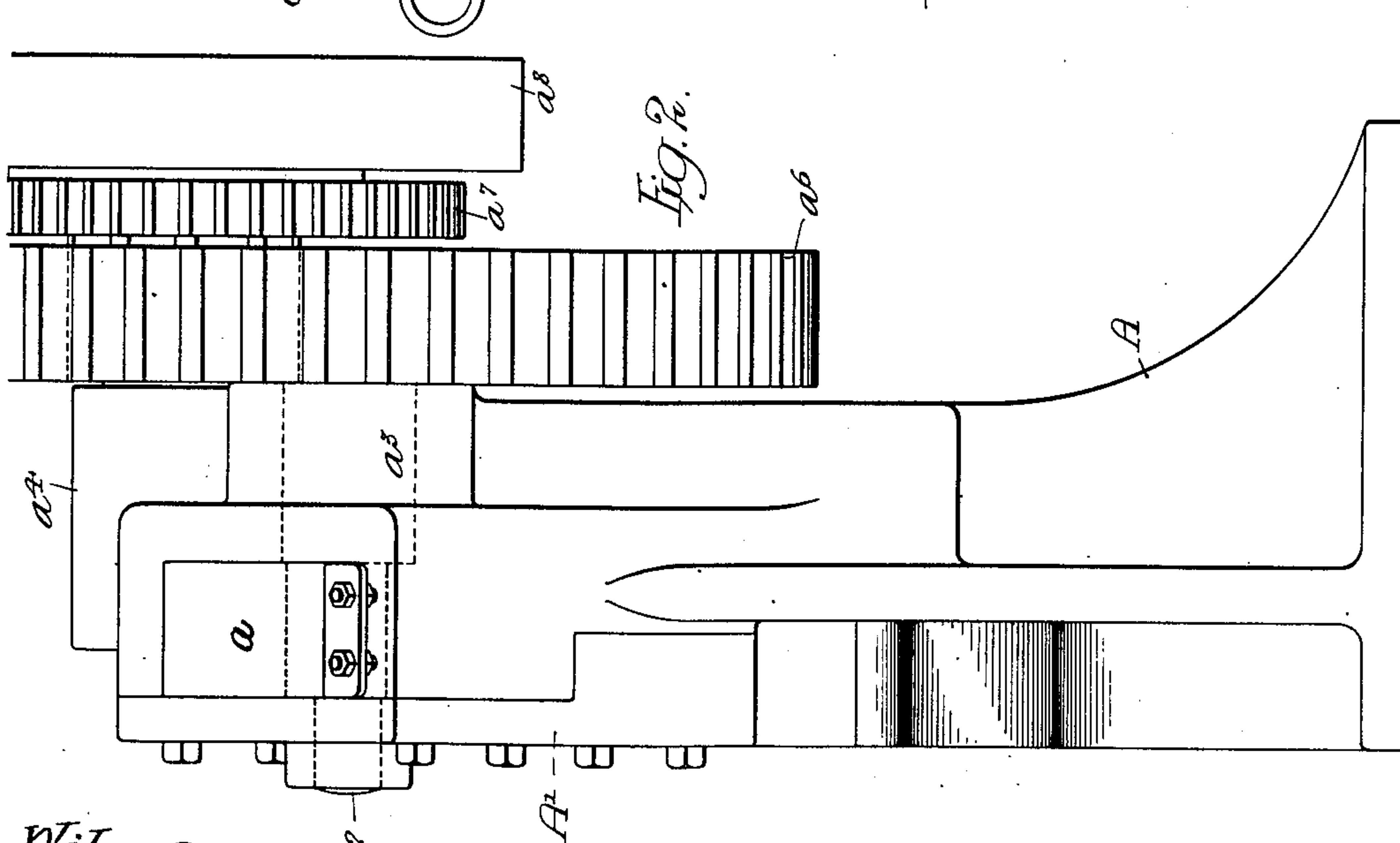


Fig. 4.

Witnesses:
Hamilton D. Turner
Titus N. Leno.

Inventor:
Willard T. Sears,
by his Attorneys,
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UNITED STATES PATENT OFFICE.

WILLARD T. SEARS, OF HARRISBURG, PENNSYLVANIA.

PUNCHING-MACHINE.

No. 886,876.

Specification of Letters Patent.

Patented May 5, 1908.

Application filed May 9, 1905. Serial No. 259,578.

To all whom it may concern:

Be it known that I, WILLARD T. SEARS, a citizen of the United States, residing in Harrisburg, Pennsylvania, have invented certain Improvements in Punching-Machines; of which the following is a specification.

My invention consists of an improved machine particularly designed for punching both webs or flanges of angles or like sections during a single passage of such sections through the machine.

The invention further consists of a punching machine having a plurality of reciprocating punches constructed to act in lines at an angle to each other upon two portions of an angle or other section moved in a line preferably at right angles to the plane including the lines of action of the said two punches.

My invention further consists of a machine having two punches constructed to act in lines at angle to each other upon the same piece of material and capable of transverse adjustment whereby it is possible to cause them to act in different lines parallel to each other.

The objects of the invention are to reduce the amount of time and labor required to punch a given number of holes in an angle or other section and also to so punch said holes that it will not be necessary to straighten the section either during or after the punching operation.

In the drawings herewith:—Figure 1, is a front elevation of one form of my invention illustrating the construction of a machine having punches designed to act upon the two webs or flanges of angle sections; Fig. 2, is a side elevation of the machine shown in Fig. 1; Fig. 3, is an enlarged sectional elevation taken on the line 3—3, Fig. 1, and illustrating certain detail features of my invention; and Fig. 4 is a slightly modified form of my invention.

In the above drawings, A is the frame of the machine, consisting of a standard carrying two guideways A' and A², which are of such construction that the punching heads *a* and *a'* operating therein are movable in lines which in the present instance are at right angles to each other.

There are for each punching head bearings *a*³ supporting eccentric shafts *a*² for reciprocating said heads by means of eccentrics in the well known manner, and there is in addition a third bearing *a*⁴ for a main shaft *a*¹⁰ upon which a pinion, shown in

dotted lines at *a*⁵, meshes with two gear wheels *a*⁸ respectively connected to the shafts *a*². The eccentrics of the shafts *a*² are so set that the heads are operated to cause successive action of their respective punches. The main shaft also carries a gear wheel *a*⁷ operated from any desired source of power, in addition to which there is a fly wheel *a*⁸.

It will be understood that, if desired, controlling mechanism may be employed to connect and disconnect the main shaft with its source of power at will, but inasmuch as this forms no part of the present invention, I have not illustrated it. There is also carried upon the frame A an anvil *a*⁹ having two faces respectively at right angles to the lines of action of the two punching heads, and in order that each punch may be capable of acting at different points across its particular face of the anvil I support the punches B so that they are capable of adjustment in lines parallel to their respective faces on said anvil. With this idea in view I form the lower part of each head, as shown in Figs. 1 and 3, with a transverse guideway, slidably mounting thereupon an auxiliary head C, which carries the punch B. Each of said heads has a clamping bolt *c* by which it may be held in any adjusted position.

Behind each punch I provide a stripper D, supporting this from the frame of the machine and equipping it with a roller *d* carried upon a roller bearing *d'*. I also provide in the auxiliary head C a gag *c'*, which may be moved from the position shown in Fig. 3, to a position over the head of the punch B so as to prevent motion of said punch in said head and thereby cause it to act to make a hole in a suitably placed piece of material.

It will be understood that under operating conditions the two punching heads *a* and *a'* are alternately reciprocated, but the punches B are inactive by reason of the fact that the gags are normally so placed as to permit them to move into their respective auxiliary heads at each stroke. If, however, the angle section F be placed upon the anvil *a*⁹, as shown in Fig. 1, and the gags of both punches be moved so as to cause them to operate, it will be seen that holes will be punched in both webs of said angle, after which the gags may be automatically or manually thrown into their inactive positions and the angle moved through the machine, in a line at right angles to the plane including the lines of action of

the two punches, into position for another action of said punches.

As above noted, the punches may be moved transversely upon their respective 5 reciprocating heads so as to adapt them for use on angles of different sizes, as well as to permit holes to be made in the same angle at different distances from its edges. The stripper rollers *d* effectually prevent their re- 10 spective punches from lifting the section operated upon and thereby causing breakage of said punches.

If desired, the machine may be made in the form shown in Fig. 4, in which the frame *A*³ 15 is provided with a reciprocating punching head *b* and an operating shaft *b'* therefor, arranged in very much the same manner as is customary in punching machines of the ordinary type. There is, however, in addition a 20 beveled gear *b*² upon the shaft *b'* meshing with a second gear *b*³ upon an eccentric shaft *b*⁴ at right angles to said shaft *b'*. Said shaft *b*⁴ actuates a punching head *b*⁵ so as to operate it in a line at right angles to the head *b* 25 and cause its punch to form holes in the flange of an angle placed upon the anvil *b*⁶ which is at right angles to the flange acted on by the punch of the head *b*. As before, it will be seen that the angle or other section 30 operated is moved through the machine in a line substantially at right angles to the plane including the lines of action of the two punches.

While I preferably employ the two punching 35 heads opposite each other so that the lines of action of the punches are literally in a plane at right angles to the line of movement of an angle through the machine, it is to be understood that the invention also con- 40 templates an arrangement of the reciprocating heads in which instead of being opposite each other, one of the punches is to the rear of the other. Under these conditions the lines of action of the punches lie in parallel 45 planes at right angles to the line of motion of a section operated on and it is my desire to broadly cover such construction.

By punching the holes alternately in the two flanges of an angle the curvature thereof is almost entirely prevented, or if it should 50 occur in some cases the angle may be straightened in one instead of two operations as has hitherto been necessary. Moreover, it will be seen that the efficiency of the machine is much higher than has been previ- 55 ously the case, for not only does it perform a piece of work in but little more than half the time hitherto required but its power consumption is materially less than two machines would require. 60

I claim as my invention:

1. A punching machine including a reciprocable punch, an anvil therefor, and a stripper for the punch provided with an antifric- 65 tion roller supported adjacent to and immediately to the rear of said punch, substantially as described.

2. A machine for punching angles or the like including two punches operative in lines at an angle to each other, an anvil extending 70 in a line transverse to the plane or planes of the punches, and two strippers each having an antifriction roller mounted immediately to the rear of the respective punches in such positions that their axes are at an angle to 75 each other, substantially as described.

3. A machine for punching angles or the like including two punches operative in lines at an angle to each other, an anvil having two faces at an angle to each other and re- 80 spectively at right angles to the lines of action of the punches, with a stripper for each punch, each including an antifriction roller supported adjacent to and immediately to the rear of each punch and adjacent to the 85 anvil therefor, substantially as described.

In testimony whereof, I have signed my name to this specification, in the presence of two subscribing witnesses.

WILLARD T. SEARS.

Witnesses:

WM. BROWN, Jr.,
WILLIAM E. BRADLEY.