

No. 626,362.

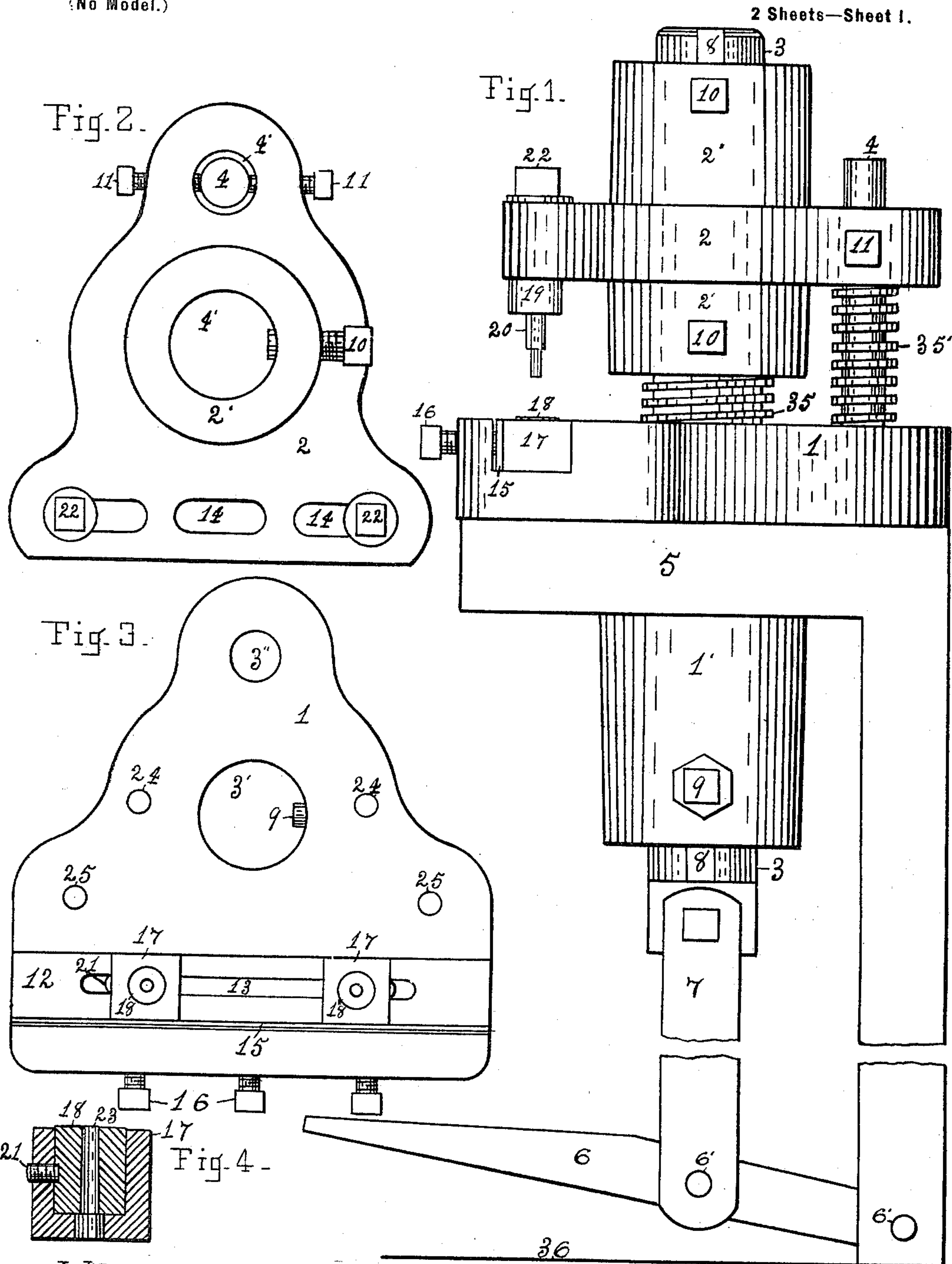
Patented June 6, 1899.

T. B. BLAIR.
PUNCHING MACHINE.

(Application filed Nov. 17, 1898.)

(No Model.)

2 Sheets—Sheet 1.



Witnesses.
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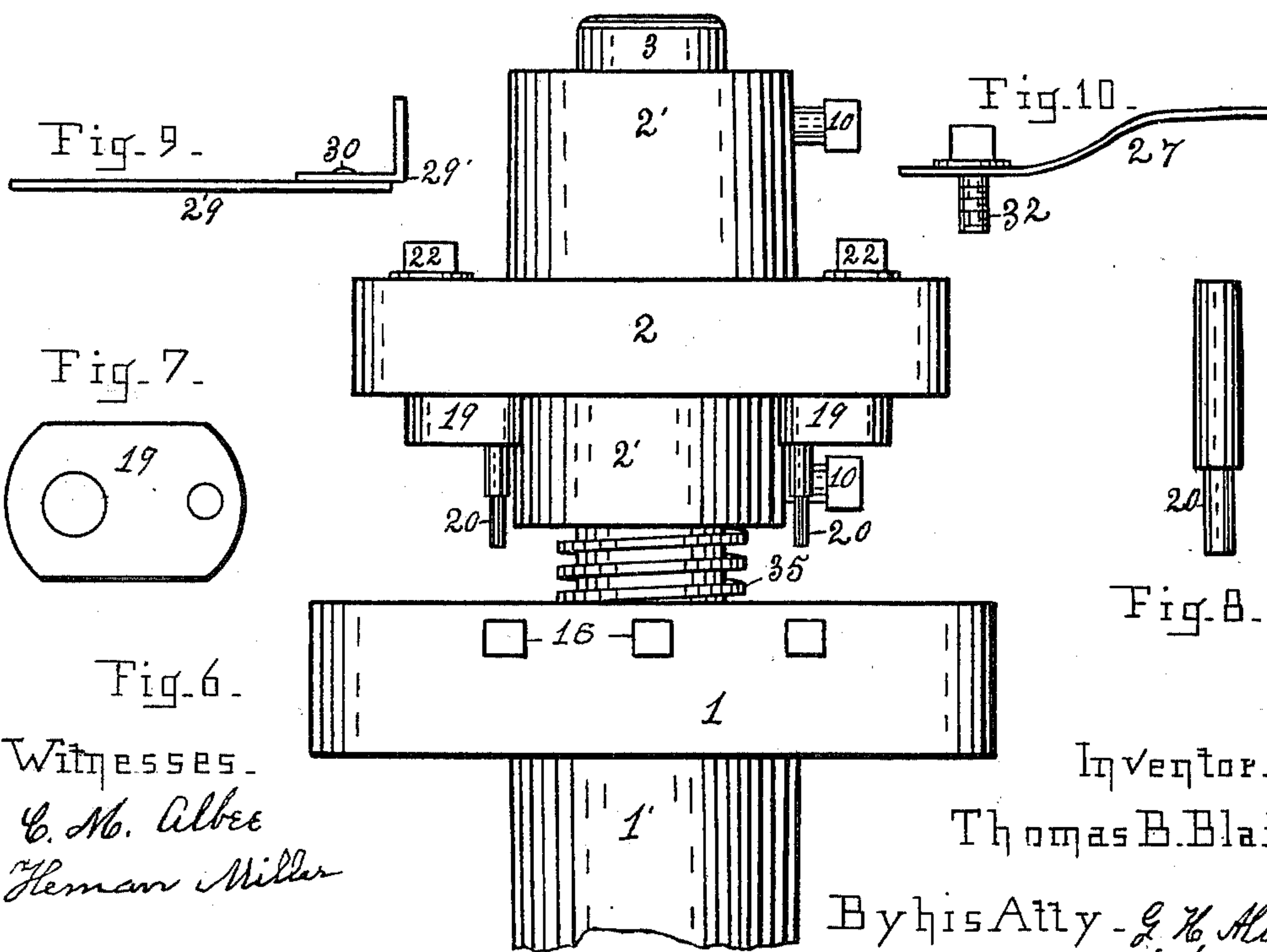
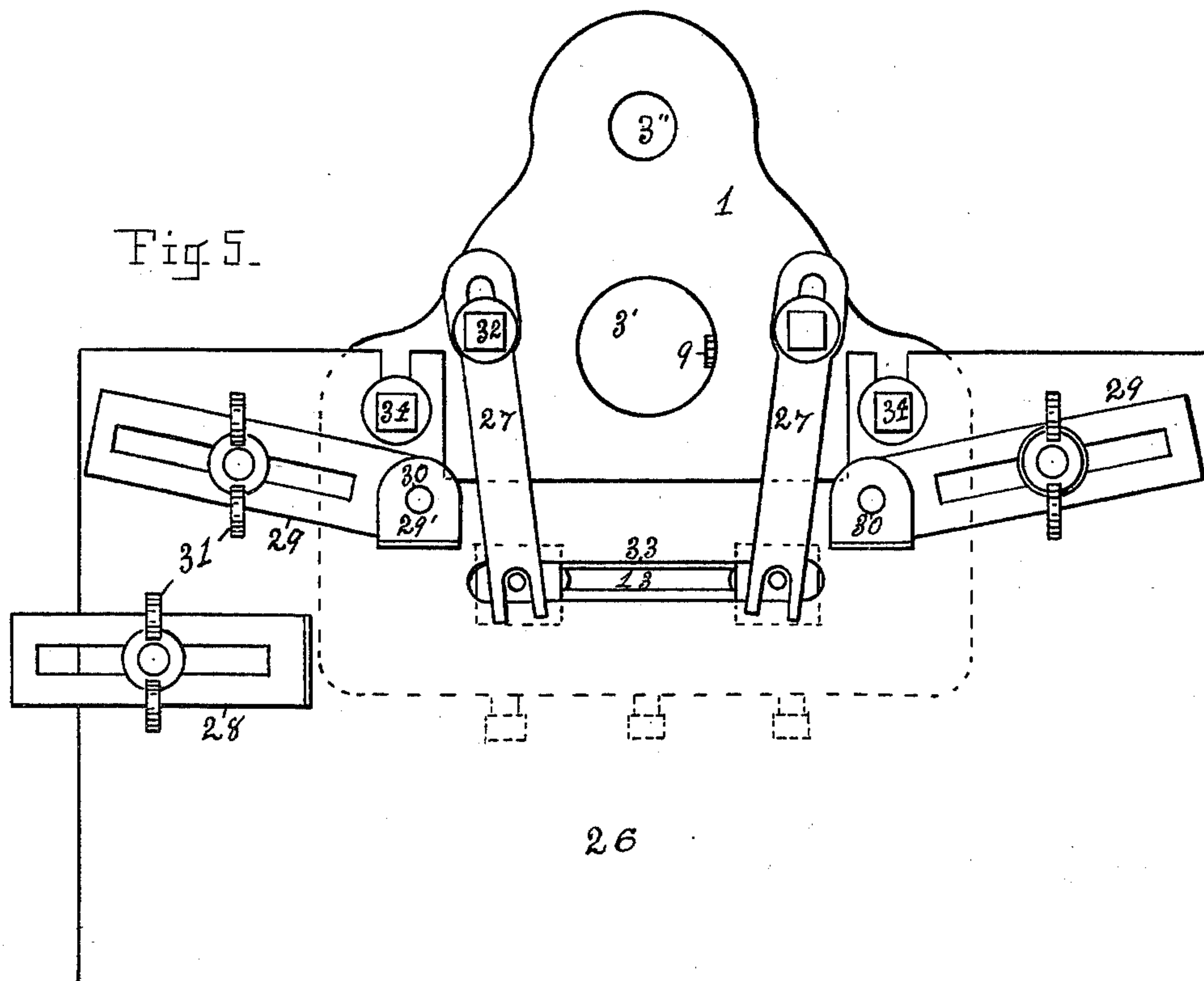
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2 Sheets—Sheet 2.



UNITED STATES PATENT OFFICE.

THOMAS B. BLAIR, OF NEENAH, WISCONSIN.

PUNCHING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 626,362, dated June 6, 1899.

Application filed November 17, 1898. Serial No. 696,689. (No model.)

To all whom it may concern:

Be it known that I, THOMAS B. BLAIR, a citizen of the United States, residing at Neenah, in the county of Winnebago and State of Wisconsin, have invented a new and useful Improvement in Punching-Machines, which are to be operated with the foot of the workman and are for use in printing-offices, but the improvements upon which this application is made are equally applicable to hand or power machines, both large and small, for use in punching holes in metal or other material, of which the following is a specification.

My improvements consist in the manner of constructing the punch-holder and connecting the holder to the plunger-plate, whereby the punches can be firmly held and quickly adjusted to the dies in whatever position upon the die-groove in the bed-plate the dies may be and to the manner of securing the die upon the bed-plate at any point within its die-groove, and also to a supplemental table to be secured upon the bed-plate and to a gage for use in placing the material to be punched in the correct position upon the table for being punched; and the object of my improvements is to produce a punching-machine for printers' and bookbinders' use in which clean-cut holes can be punched and in which a plurality of both the punches and dies can be easily and quickly changed in position for punching holes at greater or less distances apart, said improvements being illustrated in the accompanying drawings, in which—

Figure 1 is a side elevation of the punching-machine supported upon a bracket or shelf 5, the lower part of said bracket and of the rod connecting the main plunger-shaft and foot-lever being broken and the supplemental table which belongs upon the top of the bed-plate being removed. Fig. 2 is a plan of the plunger-plate. Fig. 3 is a plan of the bed-plate of the machine. Fig. 4 is a vertical section across the die and its holder. Fig. 5 is a plan of the bed-plate with the plunger removed and with its supplemental table in position thereon. Fig. 6 is a front elevation of the punching-machine, its lower portion being broken away and its supplemental table removed. Fig. 7 is a plan of the punch-holder. Fig. 8 is an elevation of a punch to be inserted in and held by said holder. Fig. 9 is a side

view of one of the back gages, and Fig. 10 is a side view of one of the punch-strippers.

All of the figures are upon the same scale excepting Figs. 4, 7, and 8, they being upon an enlarged one.

Similar numerals of reference indicate like parts in all of the views.

1 indicates the bed-plate of the punching-machine; 1', its hub; 2, the punch-stock or plunger-plate; 2', its hubs; 3, the principal guiding-shaft; 3' 3'', the shaft-holes in the bed-plate; 4, small guiding-shaft; 4', shaft-hole in plunger; 5, shelf or bracket supporting the punching-machine; 6, foot-lever for operating punch; 6', lever fulcrum-pins; 7, connection between lever and plunger-shaft; 8, groove in guiding-shaft; 9, set-screw in hub of bed-plate; 10, set-screws in hub of plunger-plate; 11, set-screws in rear end of plunger-plate; 12, die-holding groove in bed-plate; 13, slot through bottom of groove; 14, slots through plunger-plate; 15, gib in groove 12; 16, set-screws for tightening gib; 17, the die-holder; 18, the die; 19, the punch-holder; 20, punches; 21, set-screws for holding the die in its holder; 22, bolts for securing the punch-holder to the plunger-plate; 23, the punch-hole in the die; 24 and 25, holes in bed-plate for receiving the punch-stripper and supplemental table holding bolts, respectively; 26, supplemental table; 27, punch-strippers; 28, the end gage; 29, the back gages; 30, a rivet for connecting the end 29' and body 29 together; 31, thumb-nut bolts for securing gages in position; 32, the punch-stripper-holding bolts; 33, a slot in the supplemental table; 34, bolts for securing table to bed-plate; 35 and 35', springs for holding plunger at the highest limit of its movement; 36, the floor of building.

The bed-plate 1 has the two guiding-shaft holes 3' and 3'', the bolt-holes 24 and 25, groove 12, slot 13, gib 15, set-screws 16, hub 1', and set-screw 9. The shaft 3 is turned to a sliding fit within the hole 3', and the shaft 4 is firmly fixed within the hole 3'' of the bed-plate. A groove 8 is planed lengthwise of the shaft, into which the end of the set-screw 9 extends and holds the bed-plate from turning around upon the shaft, while allowing the shaft to slide up and down therein. Above said bed-plate and firmly secured to the shaft 3 with set-screws 10 is arranged the plunger-

plate 2, its rear end having a hole 4', through which the shaft 4 is fitted to slide easily. In the present case said hole is considerably larger than the shaft 4, and set-screws are inserted in opposite sides of said hole, extending into it and bearing upon opposite sides of said shaft for swinging the opposite end of the plunger around upon the shaft slightly for adjusting said end, so that the punch-holder slots 14 will be brought over the groove 12 of the bed-plate in a suitable position.

Springs 35 and 35' are mounted upon the bed-plate around the shafts 3 and 4 for holding the plunger at the desired distance above the bed-plate. The shaft 3 extends down through the bed-plate and its hub a short distance and is connected with a foot-lever 6 by means of the connecting-pieces 7, the lever being suitably fulcrumed for being pressed down by the foot of the operator.

The dies 18 consist of short cylinders of steel having a central hole lengthwise thereof. These dies are fitted to be held in the cubical block or die-holder 17 by means of set-screws 21, and the die-holders are fitted to be held at any desired point within the groove 12 by the tightening up of the set-screws 16. A slot 13 is made through the plate for the escape of the chips which drop through the dies.

It will be evident that the dies may consist of but a single piece—the cubical block with a hole of the proper size for the punch to be used; but by making them as first described (in two parts—a die and its holder) one holder serves for holding a variety of sizes of dies, and the dies becoming too much worn for use only the cylindrical part requires renewal.

The punches may be of any suitable form and size, but are preferably of about the form shown in Fig. 8, with a tapering shank. The shanks are fitted to a tapering hole in the punch-holder 19, which holders are to be bolted to the plunger-plate through the slots 14 with bolt 22, the bolt being located in the holder at a point eccentric with the axial line of the punch, whereby by loosening the bolts of any two holders the punches therein can be moved toward or from each other and swung to the right or left of the slot for bringing the punches to correspond with their dies in position.

Gages 28 and 29 are made with slots longitudinally thereof, through which thumb-nut bolts 31 are fitted to pass and secure the gages upon the table. The gage 29 is made of two parts, the front end 29' being connected with the main body of the gage by means of the rivet 30 and said front end arranged to swing upon its pivot, whereby whatever the angle the body of the gage is with the rear edge of the material to be punched the front end of said gage can be brought squarely against said rear edge.

Strippers 27 are provided for stripping the material punched from the punches as the punches are withdrawn after punching said

material. The punches and dies having been adjusted to the position desired, the supplemental table 26 is then secured in position upon the bed-plate with bolts 34. The back and end gages are then adjusted to the desired position for the work in hand and the punch-strippers secured upon the bed-plate. Upon taking a package of paper of suitable thickness and inserting it under the strippers upon the table 26 and up to the gages 28 and 29 and giving a quick and forcible downward movement of the foot upon the foot-lever holes can be made quickly and of a uniform size and at uniform distances apart. The springs should be of the proper degree of resiliency for pulling the punches from the material punched and for holding the punches at the upward limit of their movement and ready for the removal of the package punched and the insertion of another.

It will be evident that by making the front end of the bed-plate of sufficient size the gages can be bolted to it and the supplemental table 23 dispensed with, said table being used principally by reason of its lightness and convenience, its less cost, and for partially covering the groove 12.

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

1. In a punching-machine in combination with its plunger, a punch-holder, a punch therefor, and a bolt for securing the holder to said plunger, the axial lines of said punch and bolt being eccentric, one with the other, substantially as described.

2. In a punching-machine, in combination with its plunger-plate, one or more slots in said plate, one or more punch-holders, each having a punch therein, each holder having a bolt adapted to pass through a slot in said plate and to secure the holder upon said plunger-plate, the axial lines of the punch and bolt in each holder being eccentric, one with the other, substantially as set forth.

3. In a punching-machine, in combination with its bed-plate having a groove transversely thereof, a gib arranged along the front side of said groove, set-screws arranged for moving the gib transversely of said groove, and a die adapted to be held between said gib and the back side of said groove at any desired point in the length thereof by the screwing up of said screws, substantially as described.

4. In a punching-machine, the combination of its bed-plate having a die secured therein, a supplemental table secured upon said bed-plate having gages adjustable thereon for gaging the position of the material to be punched and means for securing said gages upon said table, substantially as set forth.

5. In a punching-machine, a gage for gaging the position of the material to be punched, consisting of a slotted main portion and a separate inner end pivoted thereto, whereby said inner or front end of the gage may be presented squarely to the edge of the material to be

punched at whatever the angle is of said main portion with said edge of the material, substantially as described.

6. In a punching-machine, the combination
5 of the following elements, a bed-plate having a groove transversely thereof, means for securing a die at any point in the length of said groove, a plunger-plate vertically reciprocative above said bed-plate, and having a punch-
10 holder bolted thereto, the punch and bolt of said holder having their axial lines eccentric one with the other, punch-strippers secured

upon said bed-plate, springs arranged between said bed-plate and plunger for normally holding said plunger at the upward limit of its
15 movement, a lever suitably fulcrumed for operating said plunger and a suitable connection between said plunger and lever, substantially as described.

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Witnesses:

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