

S. HOLLINGSWORTH.
PERFORATING MACHINE.

APPLICATION FILED MAR. 9, 1908. RENEWED DEC. 13, 1909.

966,408.

Patented Aug. 2, 1910.

2 SHEETS—SHEET 1.

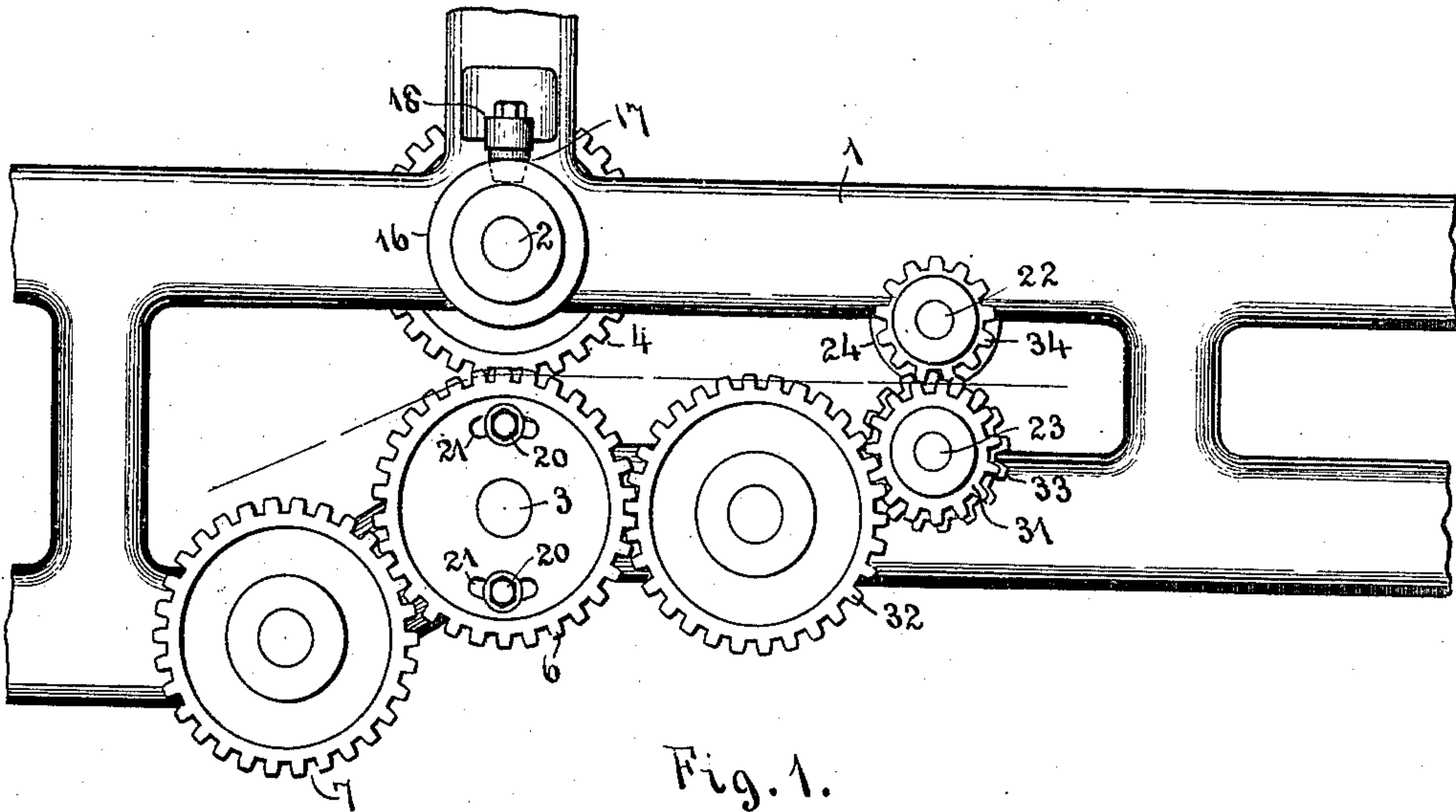


Fig. 1.

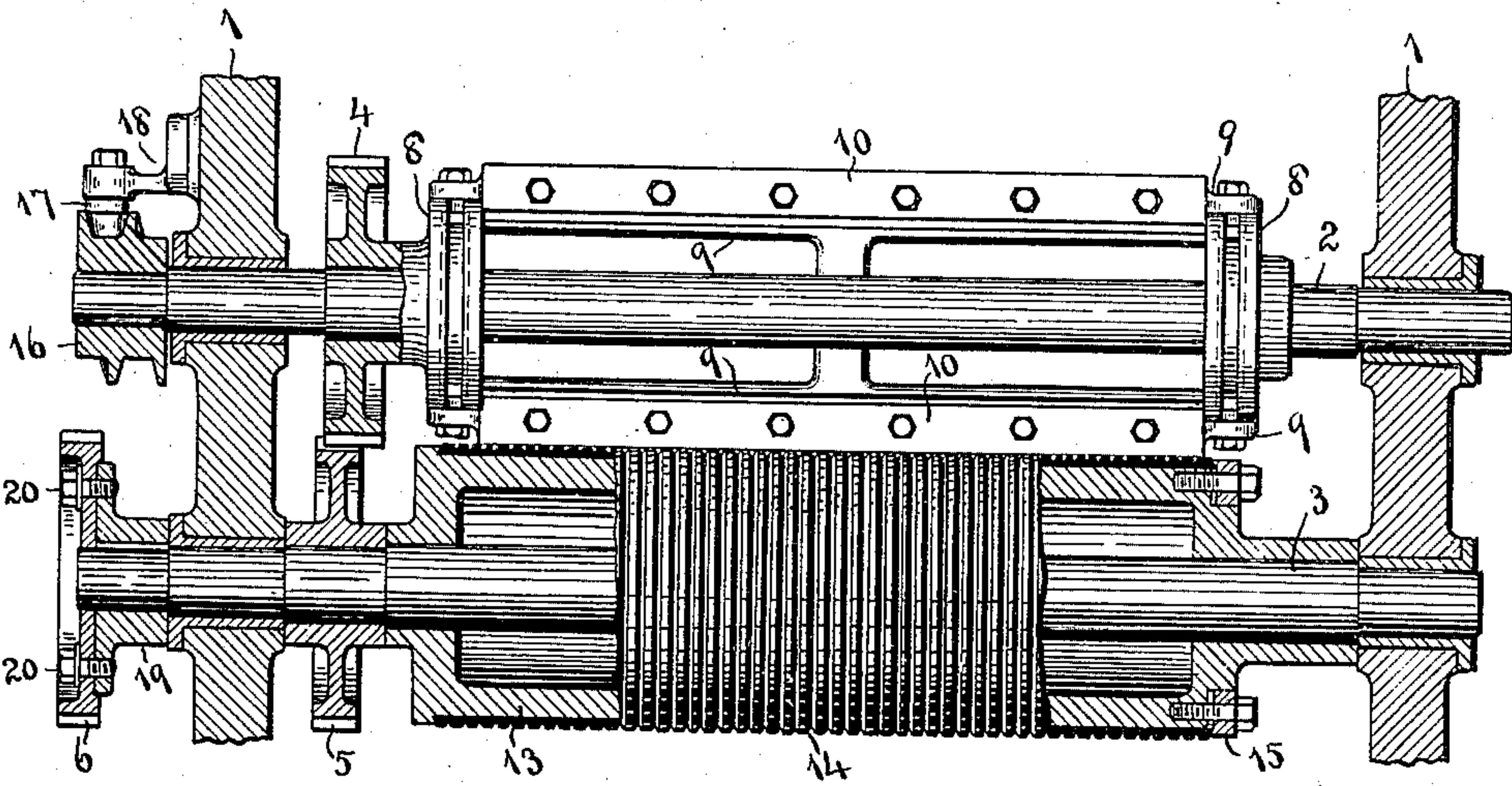


Fig. 2.

WITNESSES:

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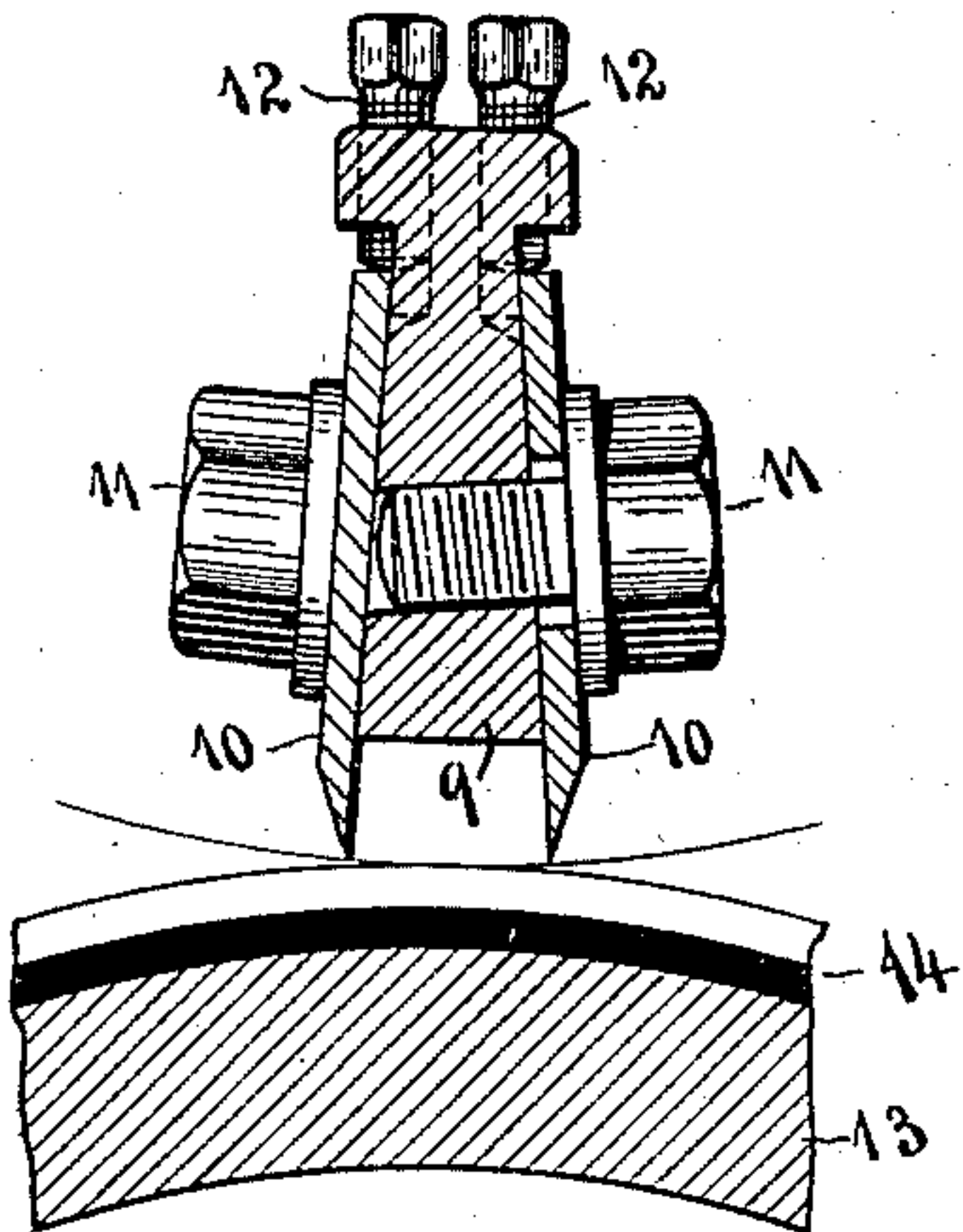


Fig. 3.

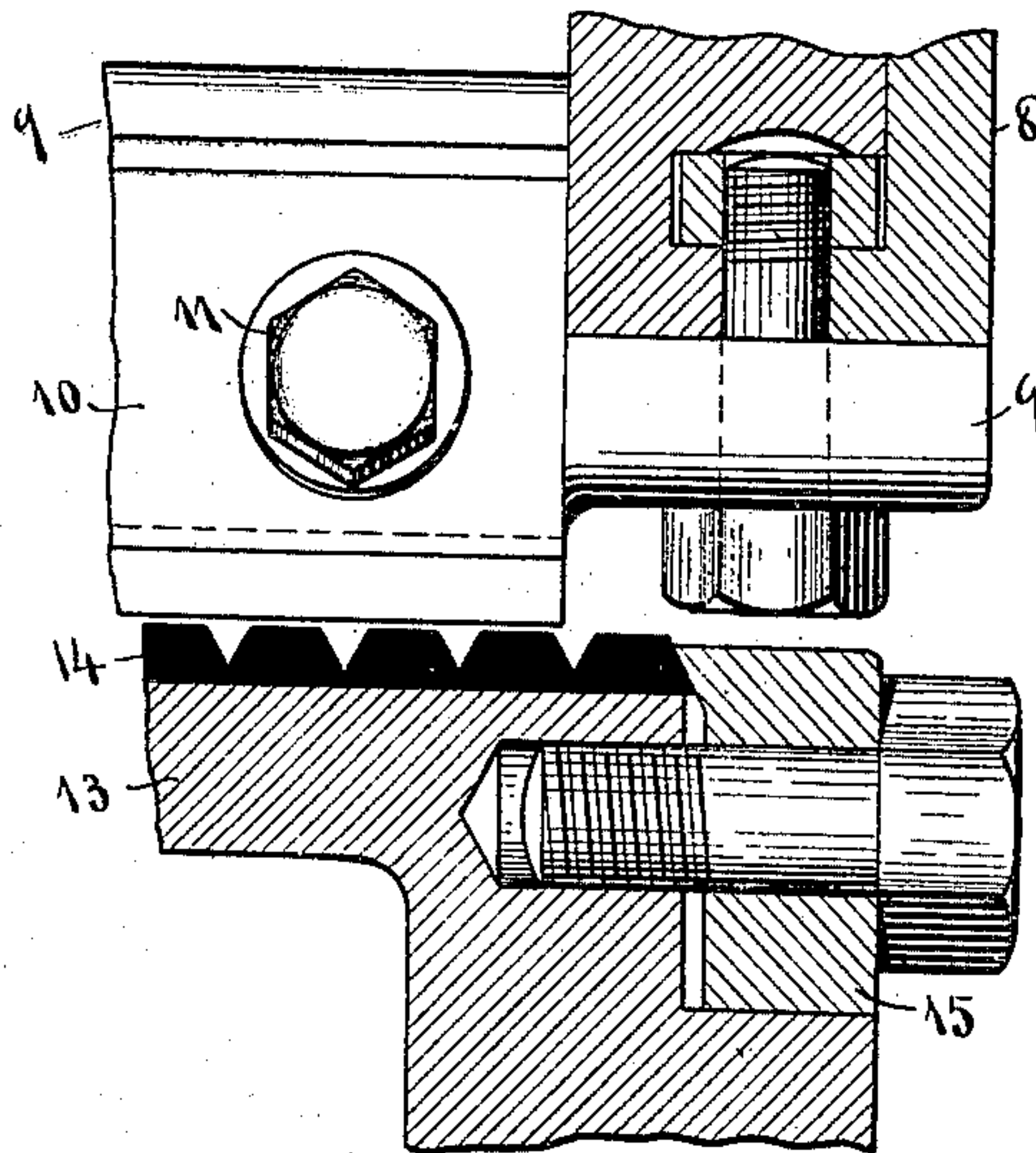


Fig. 4.

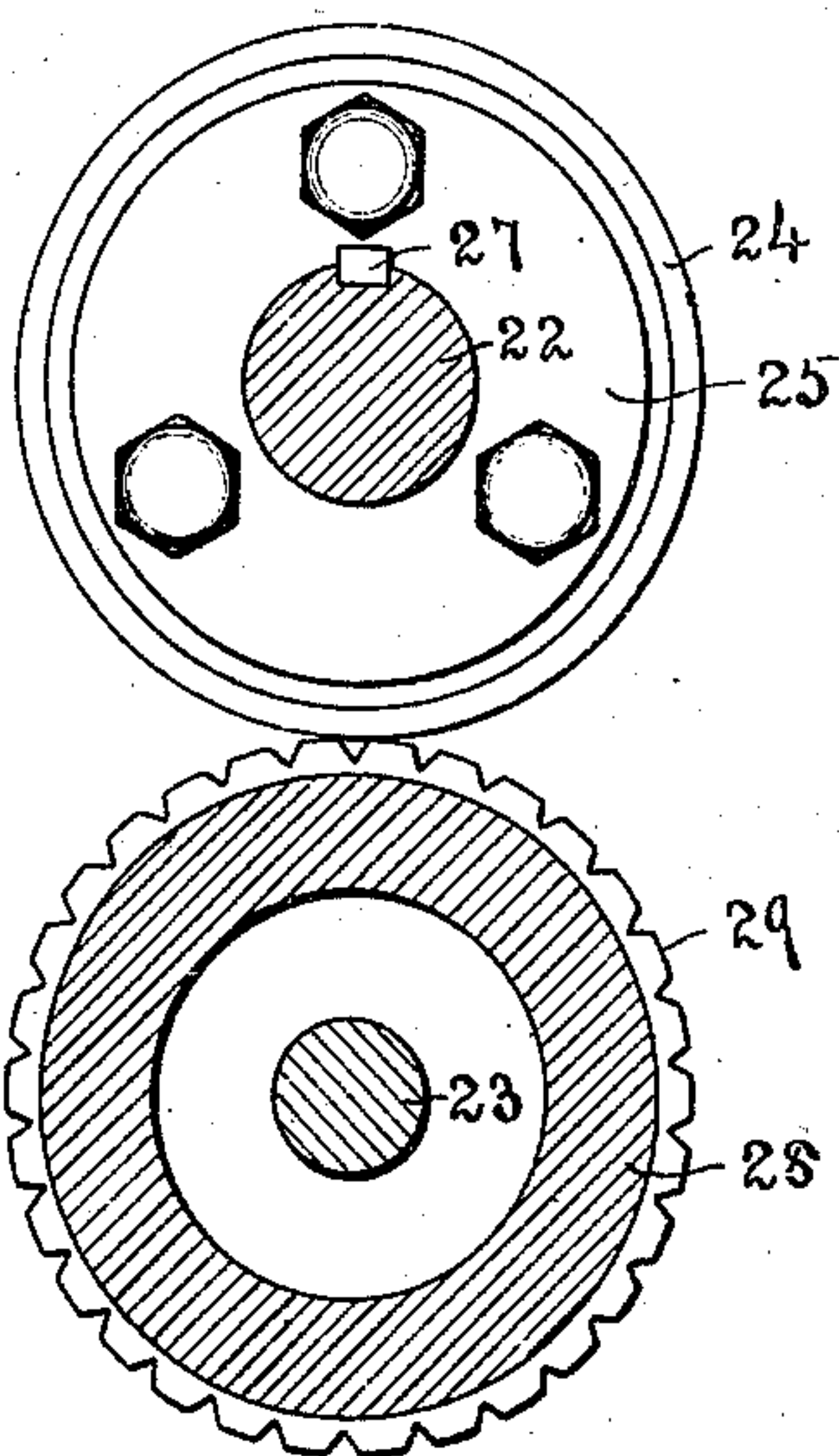


Fig. 5.

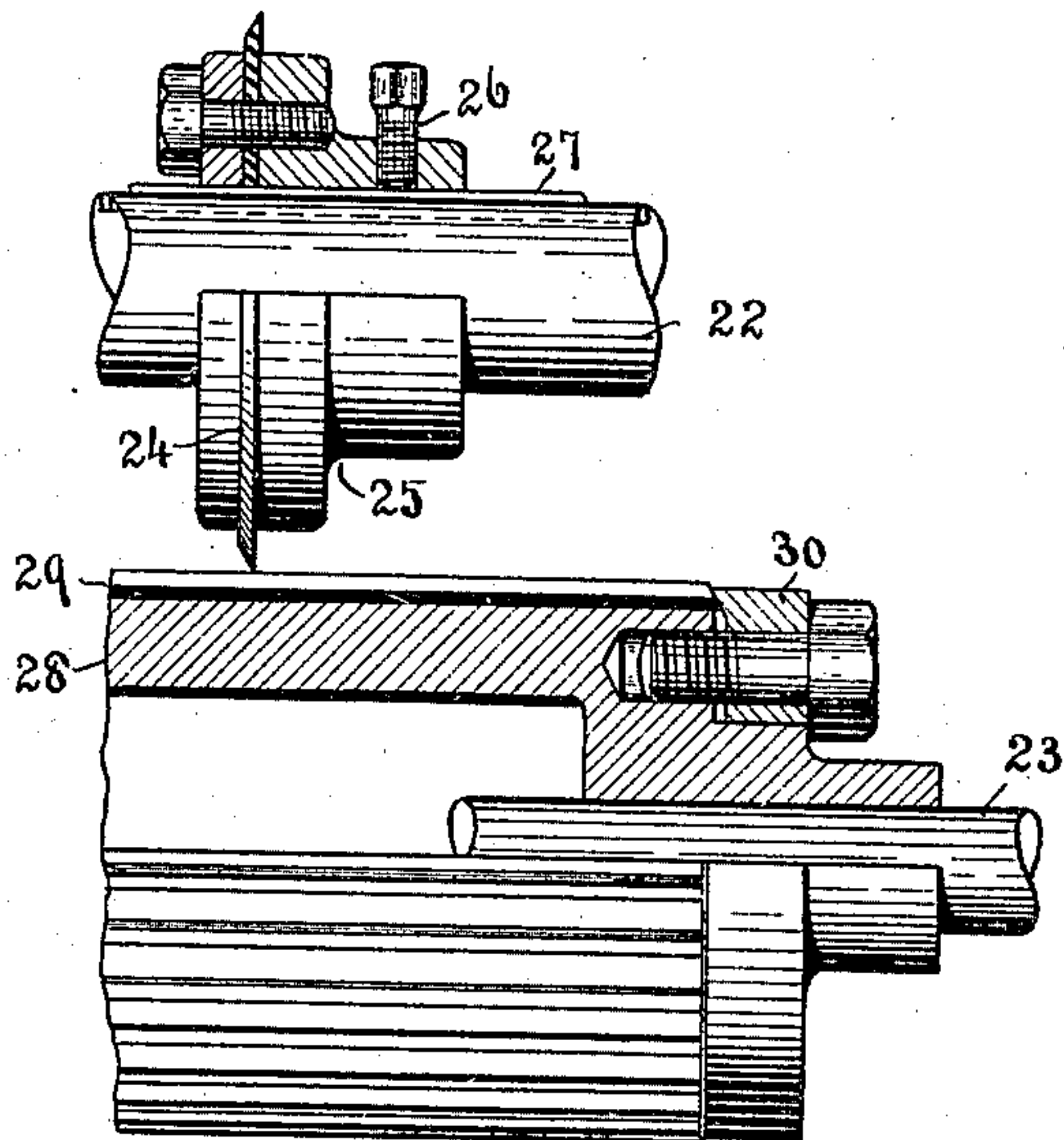


Fig. 6.

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UNITED STATES PATENT OFFICE.

SAMUEL HOLLINGSWORTH, OF PLAINFIELD, NEW JERSEY, ASSIGNOR TO AMERICAN
SALES BOOK COMPANY, OF ELMIRA, NEW YORK, A CORPORATION OF NEW YORK.

PERFORATING-MACHINE.

966,408.

Specification of Letters Patent.

Patented Aug. 2, 1910.

Application filed March 9, 1908, Serial No. 420,044. Renewed December 13, 1909. Serial No. 532,906.

To all whom it may concern:

Be it known that I, SAMUEL HOLLINGSWORTH, a citizen of the United States, residing at Plainfield, in the county of Union and State of New Jersey, have invented certain new and useful Improvements in Perforating-Machines, of which the following is a specification.

This invention relates to improvements in machines for cutting lines of perforations in paper; and the object of my improvements is to provide mechanism for forming the perforations by means of a shearing cut, in a simple and effective manner.

A further object is to provide a machine of this character which will be adapted for cutting the perforations either transversely or longitudinally, or both, as the paper passes through the machine, whether in the web or in separate sheets.

I attain my objects by constructing the several parts of the machine in the manner illustrated in the accompanying drawings, in which—

Figure 1 represents a side elevation of the machine; Fig. 2, a vertical transverse section through the transverse perforating cylinders; Figs. 3 and 4, sectional details on an enlarged scale, showing the arrangement of the cutting blades and the cutting surfaces on the two cylinders; and Figs. 5 and 6, enlarged details, showing the arrangement of the longitudinal perforating cylinders and knives.

Like numerals designate like parts in the several views.

This perforating machine is particularly designed for application to web printing machines; and in Fig. 1 I have illustrated it as applied to the framework of such a machine; said framework consisting of two side-frames, 1, 1, portions only of which are shown in the drawings. It will be understood however, that the machine may be applied to other types of printing machines, and also to other than printing machines wherein paper is to be perforated for different purposes.

Between the side-frames, and journaled therein, are two shafts 2, and 3, the shaft 2

being mounted to reciprocate longitudinally in its bearings, and being driven from shaft 3 by means of the gears 4 and 5. Shaft 3 is driven from some source of power; as by means of a gear 6, fastened to the end of said shaft, said gear 6, in Fig. 1, being shown in mesh with a gear 7, which in turn will be run in with the main gear train of the machine. Upon the shaft 2, the disks 8, 8, are mounted, said disks having annular T-shaped grooves formed on their peripheries to receive locking nuts, by which cross bars 9, (one or more,) are bolted in place; thereby permitting said cross bars to be set in any required adjustment around the shaft. Fastened to these cross bars, on either one or both sides of the cross bars, are the cutting blades 10, said blades being fastened to the cross bars by means of cap screws 11, and the cross bars being provided at 12 with set screws, for adjusting the blades toward the surface of the cylinder 13; these set screws 12 being shown only in Fig. 3. The cylinder 13 is provided with a shell 14, of suitable composition, or other metal, said shell being circumferentially grooved; and being held upon the cylinder by a locking ring 15, set up by cap screws at one end of the cylinder, as shown in Figs. 2 and 4. These shells are made removable, in order that they may be readily renewed, or changed for others where narrower or broader perforations are required.

The shaft 2 is reciprocated in its bearings by means of the grooved cam wheel 16, fastened to the end of the shaft, and engaged by a roller 17 mounted upon a bracket 18, attached to the side-frame.

In operation, the cutting blades will be set outward on the cross bars 9, so that they will just touch the outer surface of the grooved shell 14, without pressing or cutting into it. As the paper passes through the machine, each reciprocating blade, when it gets in radial alinement with the cylinder 13, by reason of its reciprocating motion in one direction or the other, will shear through the paper where it rests upon the outer surface of the shell, the paper, where it runs over the grooved portions, remaining intact.

As it frequently occurs, particularly in the manufacture of counter check books, that the lines of perforations must be placed close together; as where detachable coupons are to be formed on the leaves of the finished book; I so construct the cross bars 9 that cutting blades may be fastened upon each side thereof, as shown in Fig. 3, the cap screws 11 being staggered on the opposite sides of the bar, so that if more than two perforations are to be made in close proximity, a second bar, with its blade, or blades, may be brought into close proximity to the first bar. These bars also may be made of different widths, or plates may be inserted between the cutting blades and the bars, to space the blades farther apart, where two blades are to be fastened to one bar. By thus arranging the cutting cylinder, any required number of bars may be placed thereon to form perforations where needed in a length of paper passing between the cylinders during one revolution thereof, so that any desired positioning of the perforations may be readily attained.

To locate the perforations on the running sheets or web of paper, after the blades have been fastened in their proper relative positions, so that the lines of perforations will be cut where required, I provide means for turning the shafts 2 and 3 backward or forward, with relation to the gear train, by setting the gear 6 loosely upon the shaft 3, and bolting it to a hub 19, keyed to the shaft, the bolts 20 being passed through slots 21, formed on the web of the gear wheel, so that, by loosening the bolts 20, the shaft 3 may be left free to be turned in one direction or the other to the extent of the slots 21, thus enabling the lines of perforations to be readily located where required on the paper as it runs through the machine.

In forming longitudinal perforations in the sheets or web of paper passing through the machine, I provide the shafts 22 and 23, the shaft 22 being provided with one or more cutting blades formed in the shape of disks 24, (see Figs. 5 and 6;) said blades being fastened to hubs 25, each adjustably mounted upon the shaft by means of a key 27, which fits a groove in the shaft, and a set screw 26, by which the key is clamped in position on the shaft, when a hub is in proper position. Upon the shaft 23 is a cylinder 28, upon which is a shell 29, provided with longitudinal grooves, the blade or blades on the shaft 22 being so set that their cutting edges will just contact with the outer surface of the shell 29. The proper setting of the blades may be accomplished by any device for adjusting the distance between the shafts 22 and 23, such devices being well known in the art and therefore not illustrated herewith. The shell 29 is removably fastened upon the cylinder 28, in the same

manner as above described, by means of the clamping ring 30 at one end of the cylinder. The shaft 23 is driven in any suitable manner, from the source of power. As the machine is arranged in Fig. 1, the shaft is provided with a gear 31, which meshes with an intermediate gear 32, placed between the gear 31 and the gear 6 on shaft 3, the machine being thus arranged to perforate the paper passing through it in both transverse and longitudinal lines. The shaft 23 is provided with a second gear 33, which meshes with a smaller gear 34 on the shaft 22; thus causing the shaft 22 to rotate faster than the shaft 23, and thereby to impart a shearing cut through the paper, as it passes between the blade 24 and the outer surface of the grooved shell 29. The paper is cut only where it passes between the outer surface of said shell and the cutting blade, the portion of the paper passing over the grooves being left intact.

While I have shown these two forms of the cutting cylinders arranged in combination, it will be understood that they may be used separately, and applied in various ways to different machines, for the manufacture of any manner of pads, books, rolls, etc., of paper, requiring perforations.

What I claim, therefore, as my invention, and desire to secure by Letters Patent is—

1. A perforating machine comprising a rotating blade, a cylinder having a grooved periphery transversely across the outer surfaces of which the blade contacts, and means for rotating the blade and cylinder.

2. A perforating machine comprising a rotating blade, a cylinder having a grooved periphery with the outer surfaces of which the blade contacts, means for imparting a shearing motion to the blade across said surfaces, and means for rotating the blade and cylinder.

3. A perforating machine comprising a shaft upon which a cutting blade is longitudinally mounted, a cylinder having a circumferentially grooved periphery with the outer surfaces of which the blade contacts when in radial alinement therewith, means for rotating the shaft and cylinder, and means for reciprocating the shaft.

4. A perforating machine comprising a shaft, one or more longitudinal bars circumferentially adjustable upon said shaft, one or more cutting blades fastened to said bar or bars, a cylinder having a grooved periphery with the outer surfaces of which the blade or blades contact when in radial alinement therewith, means for rotating the shaft and cylinder, and means for reciprocating the shaft.

5. In a perforating machine, the combination with a rotating shaft, of a longitudinal bar fastened thereon and capable of circumferential adjustment around the shaft,

and means for fastening a cutting blade in radial position upon one or both sides of said bar.

5 6. A perforating machine comprising a cutting blade, a plurality of separated cutting surfaces with which the blade is adapted to contact transversely to the lines of separation, and means for imparting to

the blade a transverse shearing motion across said surfaces.

In testimony whereof I have affixed my signature, in presence of two witnesses.

SAMUEL HOLLINGSWORTH.

Witnesses:

WILLIAM RUDDY,
HENRY EGGERDING.