

No. 898,193.

PATENTED SEPT. 8, 1908.

R. M. DAVIDSON.
PERFORATING MECHANISM.

APPLICATION FILED JAN. 29, 1908.

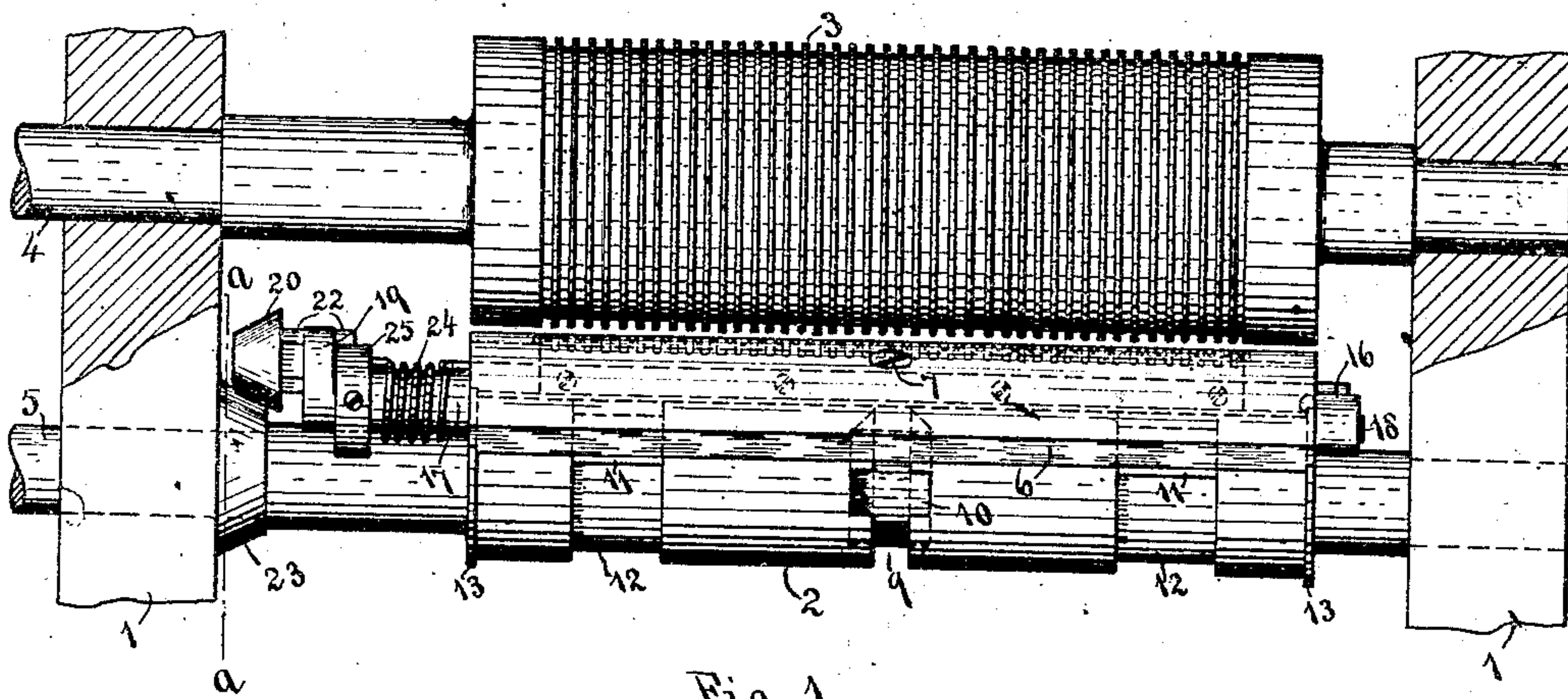


Fig. 1.

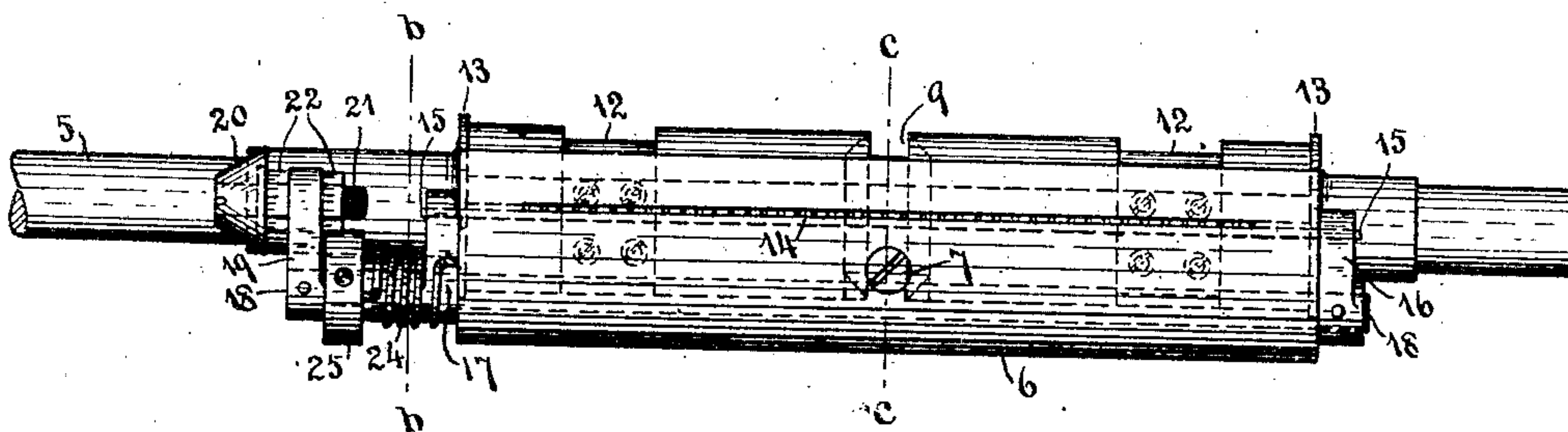


Fig. 2.

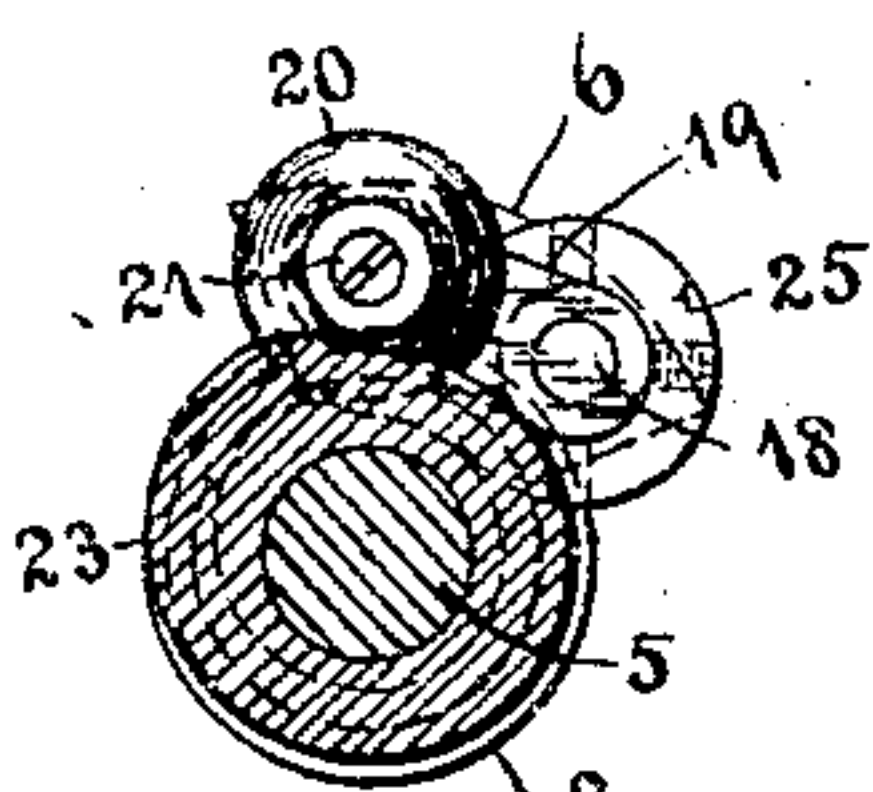


Fig. 3.

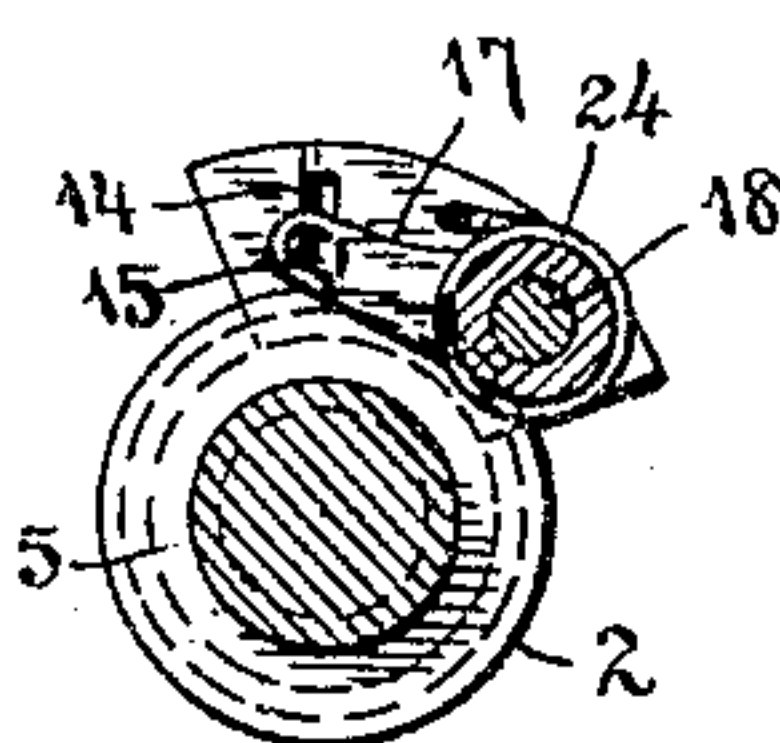


Fig. 4.

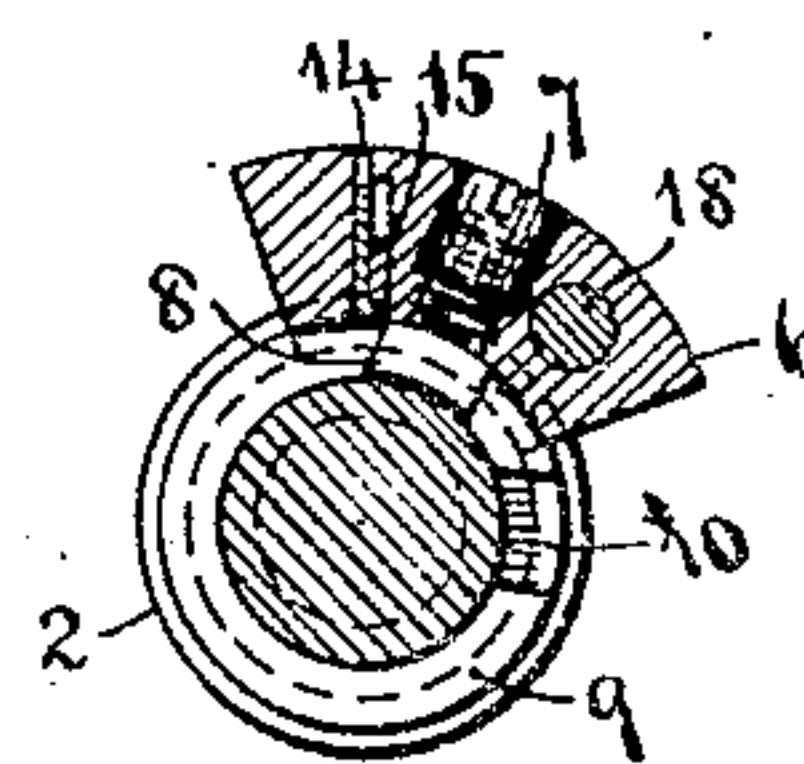


Fig. 5.

WITNESSES:

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RODERICK M. DAVIDSON, OF ELMIRA, NEW YORK.

PERFORATING MECHANISM.

No. 898,193.

Specification of Letters Patent.

Patented Sept. 8, 1908.

Application filed January 29, 1908. Serial No. 413,288.

To all whom it may concern:

Be it known that I, RODERICK M. DAVIDSON, a citizen of the United States, residing at Elmira, in the county of Chemung and State of New York, have invented certain new and useful Improvements in Perforating Mechanisms, of which the following is a specification.

This invention relates to improvements in mechanisms for forming lines of perforations in traveling webs or sheets of paper.

One object of my improvements is to provide, in a mechanism of this character, a rotating cylinder carrying a radially reciprocating perforating blade so operated as to be withdrawn below the surface of the cylinder immediately after the paper has been perforated, thereby avoiding the necessity of employing withdrawing rolls to draw the paper from the perforator teeth and the consequent tendency to tear the paper at the perforations while passing through the machine.

A further object is to provide means for setting the perforating blade at different points around the cylinder to locate the perforations where required on the paper; and to provide the cylinder with means for attaching more than one perforating blade, independently adjustable, whereby several lines of perforations at variable distances apart may be produced for each revolution of the one cylinder.

I attain my objects by constructing and arranging the parts of the perforating mechanism in the manner illustrated in the accompanying drawings, in which—

Figure 1 represents a front elevation of the perforating mechanism, in so far as my improvements are concerned; Fig. 2, a plan view of the perforating cylinder showing one of the adjustable cylinder segments containing the perforating blade; Fig. 3, a transverse section on the line *a—a* in Fig. 1; and Figs. 4 and 5, similar sections, respectively, on the lines *b—b* and *c—c*, in Fig. 2.

Like numerals designate like parts in the several views.

The two cylinders, 2 and 3, which carry the several parts of the perforating mechanism, are mounted to rotate between the

frame-plates 1, 1, portions only of which are shown in Fig. 1. At one side, the cylinder shafts are extended at 4 and 5 to receive the driving gears through which motion is imparted from the main gear train of the machine. (For an example of one application of this mechanism see my co-pending application Ser. No. 413,289, filed January 29, 1908, for improvements in perforating, cutting, and delivery apparatus). Upon the cylinder 2 is mounted a cylinder segment 6, which is adjustably fastened upon the cylinder 2 by means of the countersunk nut 7, which receives a screw stud on the clamping block 8, which slides in a dovetailed groove 9, formed around the cylinder 2, said groove being provided at 10 with an aperture through which the block may be inserted in the groove. At each side of the central groove are shallower grooves 12, adapted to receive plates 11, attached to the under side of the segment to fasten together the two parts thereof formed by cutting the slot for the perforating blade. The cylinder ends are flanged at 13, to hold the block in proper longitudinal alinement upon the cylinder. The segment 6 is provided with a longitudinal groove or chamber to receive the perforating blade 14. This blade is fastened to a cross bar 15, within said groove, the ends of which project outwardly from each end of the block into engagement with slotted openings at the ends of arms 16 and 17, fastened to a shaft 18 mounted to oscillate in the segment 6. One end of the shaft 18 is provided with an arm 19, upon which is carried a conical roller 20 on a pin 21, said pin being screw threaded and adapted to be adjusted longitudinally in the crank arm 19, by means of the adjusting and lock nuts 22. The roller 20 engages a cam surface 23, cast or otherwise fastened upon the inner face of one of the frame-plates 1; said cam surface being beveled to correspond with the roller, and being so formed as to impart the necessary movement to the roller and the crank arm 19 to project the perforating blade, when said blade is approaching axial alinement with the cylinder 3, and to depress the blade immediately it has passed the line of centers between the two cylinders, as will appear from

an inspection of Fig. 3. In order to hold the roller 20 against the cam surface and to retract the perforating blade after each outward stroke thereof, a coiled spring 24 is placed on the extended hub of the arm 17, one end of which spring is fastened to the segment 6, and the other end to a collar 25 adjustably mounted upon the shaft 18, whereby the tension of the spring may be regulated as required.

While the perforating blade may be used in conjunction with any form of receiving, or female cylinder, I preferably form said receiving cylinder with a plurality of circumferential grooves, as illustrated in Fig. 1; into which grooves the teeth of the perforating blade enter, when ejected from the segment. By employing this grooved cylinder, I may set the segment around the cylinder 2, in any position, regardless of the alinement of the perforating blade with the cylinder 3; and I may also attach additional segments carrying these perforating blades, and position them about the cylinder 2, as requirement may arise. As herein illustrated the cylinder 2 is capable of carrying as many as four of these cylinder segments, each of which and the perforating mechanisms carried thereby will be the same as that above described, and operated in the same manner as they rotate with their rollers in contact with the cam surface 23. This construction will be of particular advantage when the paper is to be provided with separate stubs, coupons, etc., where more than one line of perforations is required upon each finished sheet or roll at varying distances apart.

By providing the crank arms with the conical rollers, mounted upon adjustable crank pins, I am enabled to readily adjust the throw of the perforating blade, and to take up wear therein, since it will be understood that the blade will be caused to be thrown outwardly more or less from the segment, by causing the roller to ride higher or lower upon the cam 23. If desired, however, a cylindrical roller may be employed upon a corresponding cam surface, and the adjustment of the blade accomplished in a different manner.

With a perforating mechanism so constructed, the web or sheets of paper will pass freely between the cylinders without danger of being carried out of the line of travel by the teeth of the perforating blade, or blades, and no pulling strain is required to be placed upon the paper to free it from the teeth. The mechanism is made compact and readily adjustable to meet requirements.

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

1. A perforating mechanism comprising a

cylinder, a cylinder segment circumferentially adjustable thereon, a perforating blade carried in a slot extending longitudinally across the segment, a shaft passing across the segment and provided with arms at each end, said arms being in engagement at their free ends with projections from the ends of the perforating blade, a crank at one end of the shaft, a cam adapted to actuate the crank to project and retract the perforating blade, a female cylinder adapted to receive the teeth of the blade, and means for rotating the cylinders.

2. A perforating mechanism comprising a cylinder, a cylinder segment circumferentially adjustable thereon, a perforating blade adapted to move radially in said segment, a shaft carried by the segment and adapted to impart motion to the blade, a crank on one end of said shaft, a crank pin mounted thereon provided with a conical roller, means for longitudinally adjusting the pin in the crank, a beveled cam engaged by the roller, a female cylinder adapted to receive the teeth of the perforating blade, and means for rotating the cylinders.

3. In a perforating mechanism, a cylinder, a perforating blade carried thereby and movable in and out of the cylinder, an oscillating shaft provided with arms coupled to said blade, an operating crank on said shaft provided with a crank pin, a stationary cam engaged by said pin, and means for rotating the cylinder.

4. In a perforating mechanism, a cylinder, a perforating blade carried thereby and movable in and out of the cylinder, an oscillating shaft coupled to said blade, an operating crank on said shaft provided with a crank pin of conical form, a beveled stationary cam engaged by said pin, means for adjusting the pin longitudinally, and means for rotating the cylinder.

5. A perforating mechanism comprising a cylinder, a perforating blade mounted thereon and provided with a plurality of teeth, a female cylinder provided with a plurality of circumferential grooves each adapted to receive a tooth of the perforating blade, and means for rotating the cylinders.

6. A perforating mechanism comprising a cylinder carrying a radially reciprocating perforating blade provided with a plurality of teeth, means for adjusting said blade circumferentially on the cylinder, a female cylinder provided with a plurality of circumferential grooves each adapted to receive a tooth of the perforating blade, means for reciprocating the blade as it moves into and out of radial alinement with said cylinder, and means for rotating the cylinders.

7. In a perforating mechanism, a rotating

cylinder adapted to receive one or more circumferentially adjustable cylinder segments, each segment carrying a perforating blade and provided with means for fastening it
5 when properly adjusted upon the cylinder.

8. In a perforating mechanism, a rotating cylinder adapted to have a plurality of radially movable perforating blades fastened thereon and susceptible of circumferential

adjustment, and means for actuating said 10 blades during each revolution of the cylinder.

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

RODERICK M. DAVIDSON,

Witnesses:

A. S. DINEN,

M. E. VERBECK.