

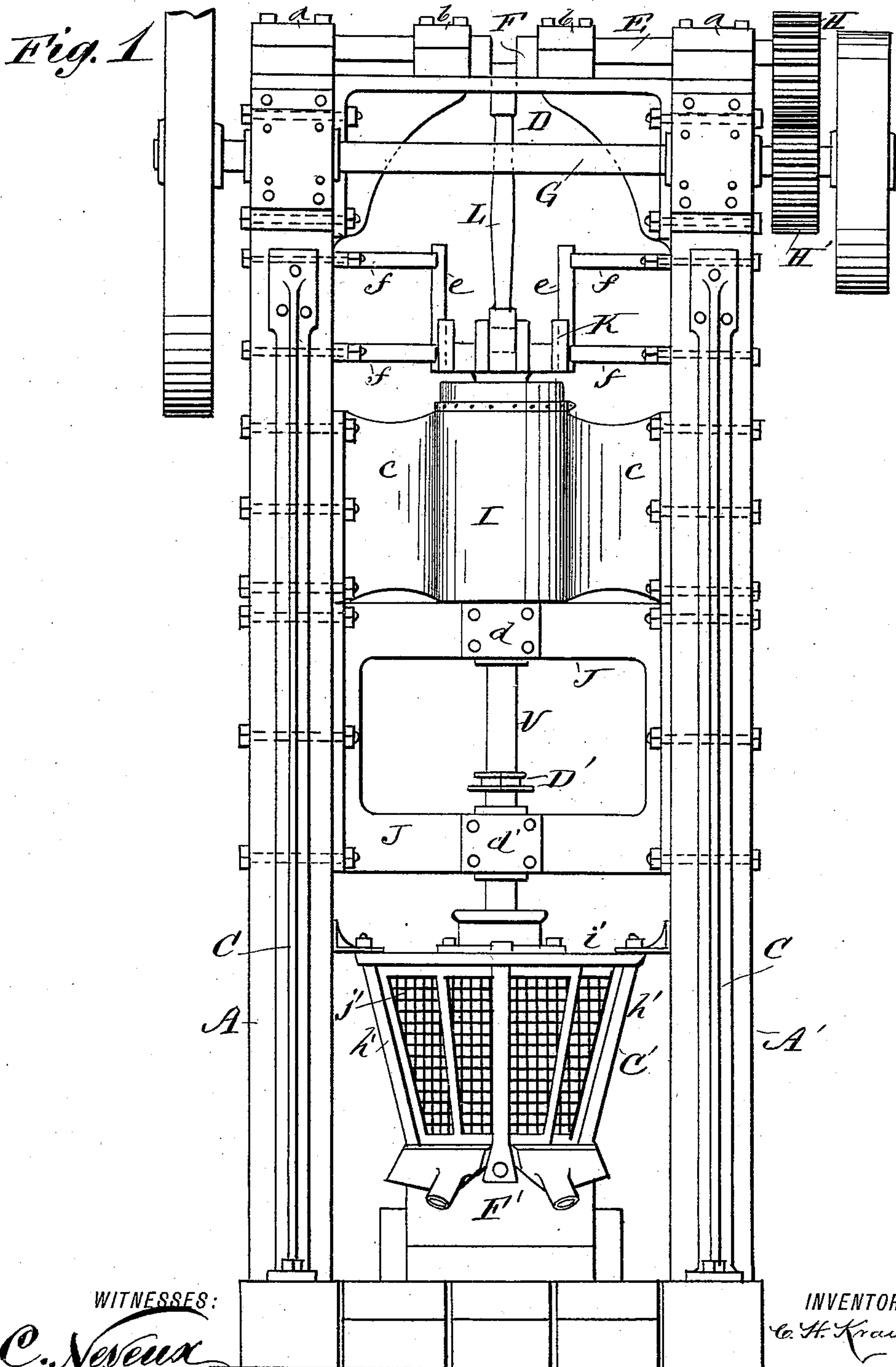
(No Model.)

3 Sheets—Sheet 1.

C. H. KRAUSE.
ATMOSPHERIC STAMP.

No. 414,910.

Patented Nov. 12, 1889.



WITNESSES:

C. Newell
C. Bedgwick

INVENTOR

C. H. Krause

BY

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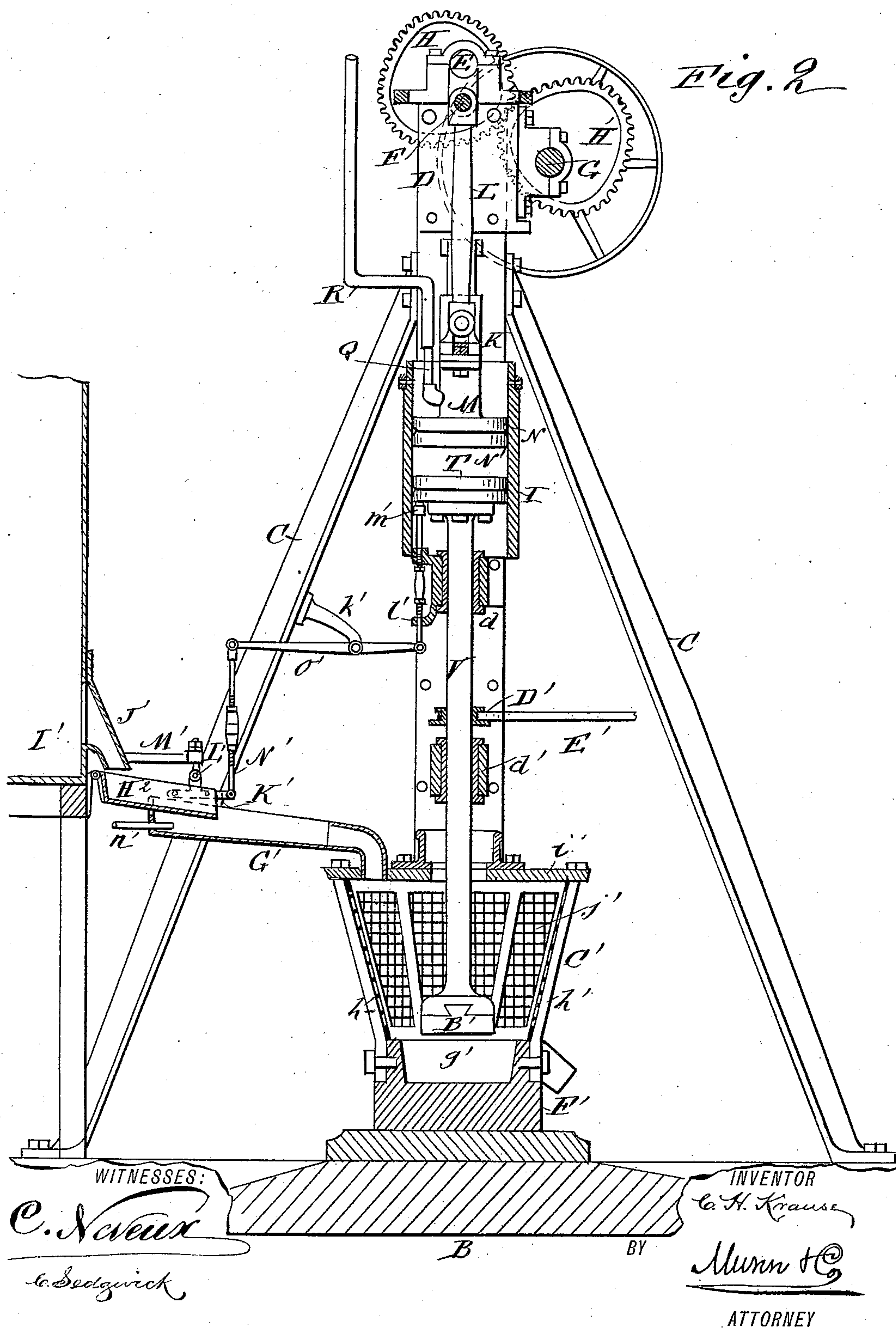
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3 Sheets—Sheet 2.

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3 Sheets—Sheet 3.

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Fig. 4

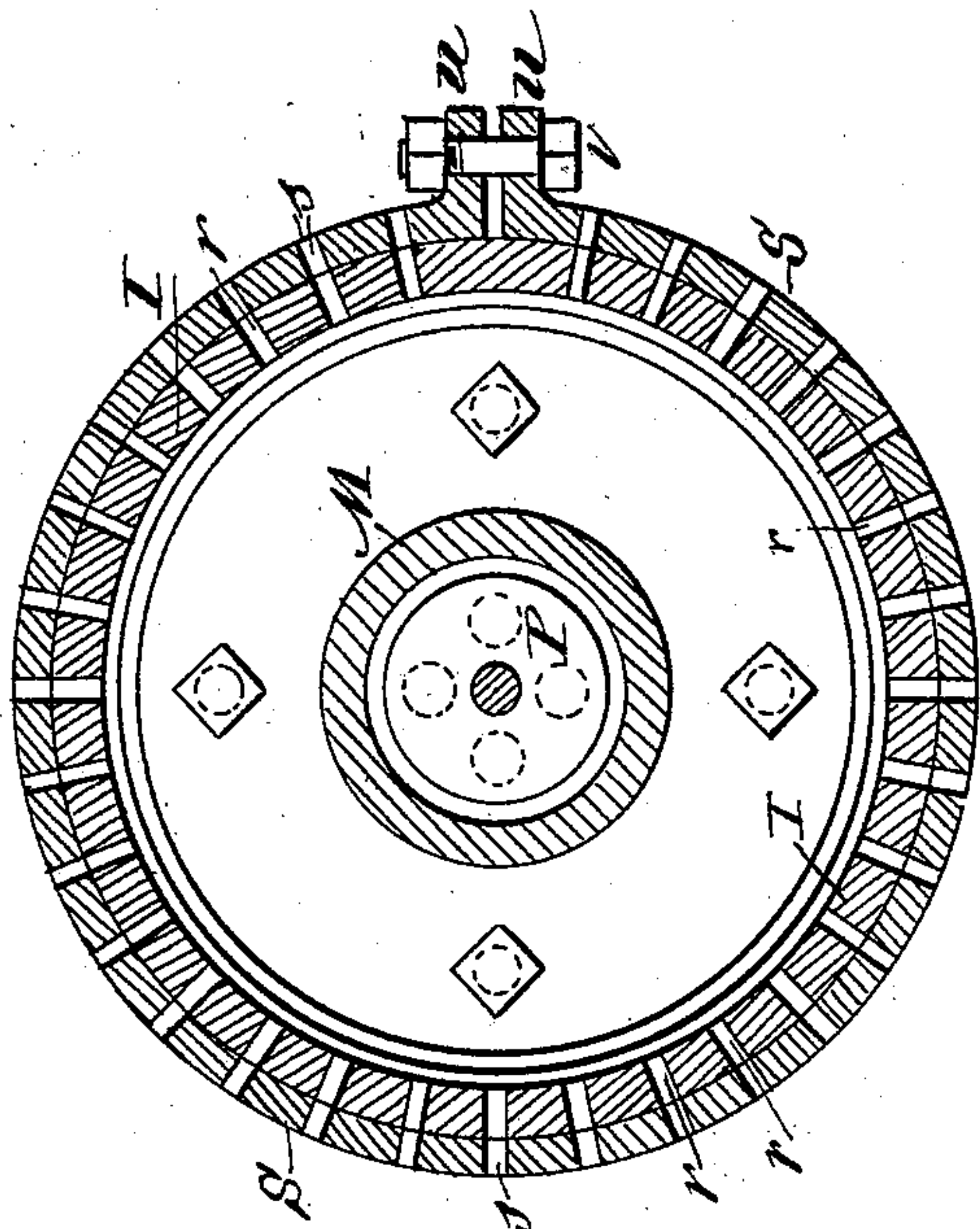


Fig. 5

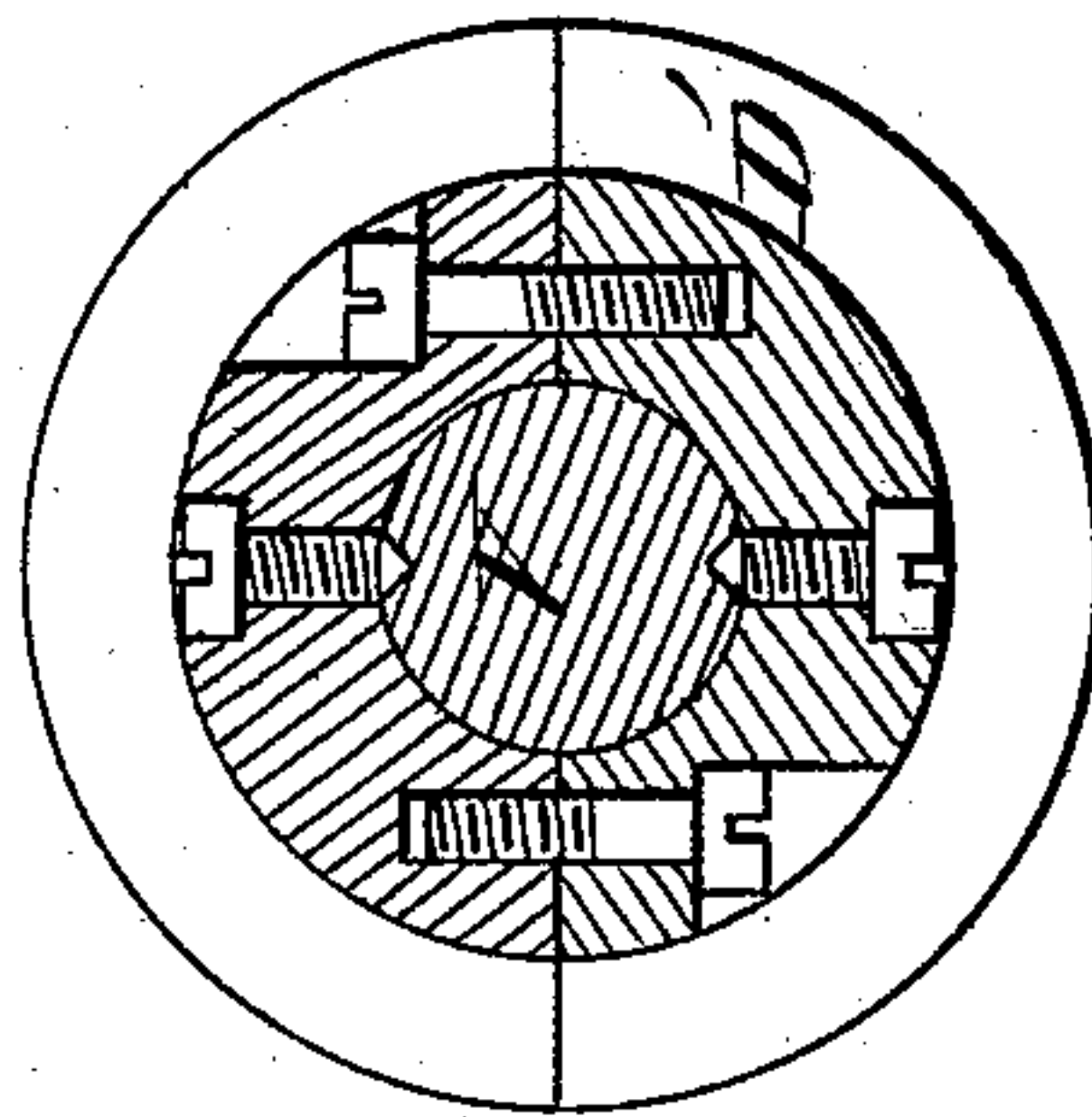
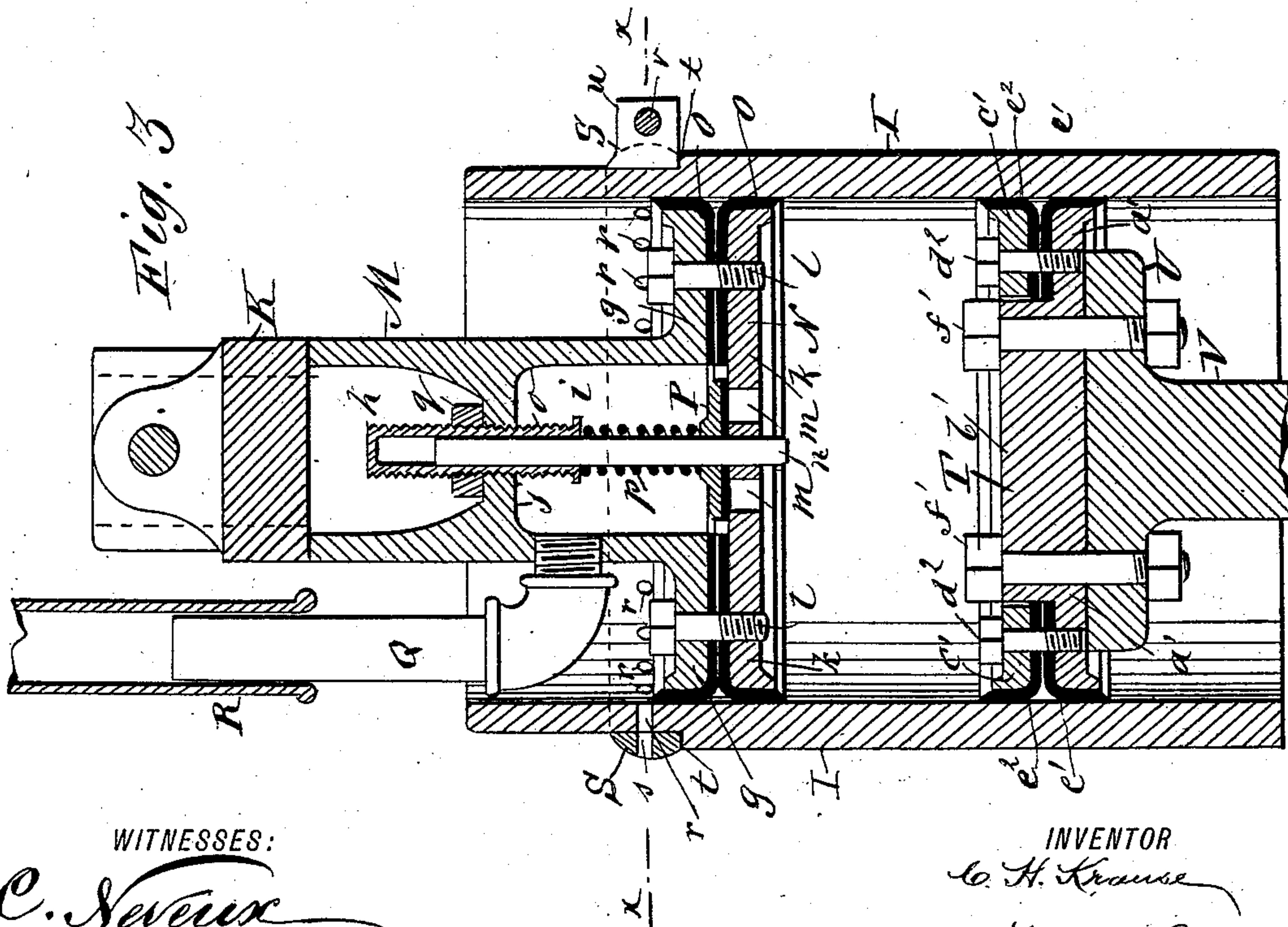


Fig. 3



WITNESSES:

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UNITED STATES PATENT OFFICE.

CHARLES H. KRAUSE, OF LAKE LINDEN, MICHIGAN.

ATMOSPHERIC STAMP.

SPECIFICATION forming part of Letters Patent No. 414,910, dated November 12, 1889.

Application filed June 4, 1888. Serial No. 275,993. (No model.)

To all whom it may concern:

Be it known that I, CHARLES H. KRAUSE, of Lake Linden, in the county of Houghton and State of Michigan, have invented a new and Improved Atmospheric Stamp, of which the following is a specification, reference being had to the annexed drawings, forming a part thereof, in which—

Figure 1 is a front elevation of my improved stamp. Fig. 2 is a transverse vertical section. Fig. 3 is an enlarged vertical transverse section of the cylinder and piston. Fig. 4 is a horizontal section taken on line $x x$ in Fig. 3, and Fig. 5 is an enlarged horizontal section of the split pulley.

Similar letters of reference indicate corresponding parts in all the views.

The object of my invention is to construct a stamp-mill in which a cushion of air is interposed between the driving mechanism and the stamp to secure an elastic connection, so that the blows of the stamp may accommodate themselves to the thickness of ore in the mortar.

My invention relates to improvements in stamp-mills; and it consists in the particular construction and arrangement of parts, as hereinafter fully described, and pointed out in the claims.

The frame of the stamp-mill is formed of timbers $A A'$, arranged in a vertical position upon the base-frame B , and strengthened by braces C , attached to the upright timbers and to the base.

To the upper ends of the timbers $A A'$ is secured an iron frame D , provided with four journal-boxes $a a$ and $b b$, in which is journaled the crank-shaft E . The crank F is preferably located at the center of the shaft E and between the boxes b . The shaft E receives its motion from a shaft G through the gears $H H'$. The said gears are of oval form and arranged so that an irregular motion is imparted to the crank-shaft E , the wheels being arranged with reference to the crank F , so as to impart a quick downward and slow upward movement to the crank.

Below the crank-shaft E and between the uprights $A A'$ is a cylinder I , provided with lateral arms c , which are secured to the uprights, and below the cylinder I is secured a

frame J , provided with guides $d d'$, which are axially in line with the cylinder I . Above the cylinder I guides e are supported by arms f , secured to the uprights $A A'$, and to the said guides e is fitted a cross-head K , which is connected with the crank F by a connecting-rod L of the usual construction.

To the cross-head K is attached a short hollow-piston-rod M , carrying the upper piston N , the hollow rod M being divided into two compartments $h i$ by the horizontal partition j . To the upper half g of the piston N is attached the lower half k by tap-bolts l . Between the two halves of the piston N are clamped centrally-apertured packing-disks O , of leather or other suitable material, the edges of which are turned in opposite directions, forming an air-tight packing between the piston N and the cylinder I , in which the piston works. In the central part of the piston N are formed exhaust-valve openings m , which are covered by a valve P , located in the compartment i , and secured to a valve-rod n , passing through a central opening in the lower half k of the piston N .

In the center of the partition j is arranged a screw-threaded sleeve o , which receives the upper end of the valve-rod n and forms an abutment for the spring p , placed on the valve-rod n above the valve P . The sleeve o serves to give more or less compression to the spring p , as may be required, and the said sleeve is held in place by a jam-nut q .

In the side of the hollow stem M is screwed a pipe Q , which communicates with the compartment i and extends upwardly parallel with the axis of the cylinder I and enters an exhaust-pipe R , which extends to the exterior of the building containing the stamp.

In the sides of the cylinder I , near the upper end thereof, is formed a series of holes r , and upon the outside of the cylinder is fitted a ring S , provided with holes s , corresponding in number and position with the holes in the cylinder. The ring S is held in position by a shoulder t , and is split and provided with ears u for receiving a bolt v , by which it may be tightened or adjusted upon the cylinder.

In the cylinder I , below the piston N , is placed a piston T , formed of the body a' , having a

central boss b' , to which is fitted a ring c' , which is held in place upon the body a' by tap-bolts d^2 . Between the ring c' and part a' of the piston T are clamped the packing-rings $e' e^2$, which are made cup-shaped and turned in opposite directions to cause the piston T to fit tightly in the cylinder I. The piston T is secured to a flange U on the upper end of the stamp-rod V by bolts f' . The stamp-rod V passes downward through the guides $d d'$, and is provided at its lower end with a head B' , which works in the mortar C' .

Upon the stamp-rod V, between the upper and lower bars of the frame J, is secured a split pulley D' , the construction of which is shown in the enlarged section, Fig. 5. The pulley is grooved circumferentially to receive a round belt E' for imparting slow rotary motion to the stamp-rod V.

The mortar C' is formed of a base-piece F' , having a central cavity g' , and corner-posts h' , supporting the top plate i' , and also supporting the perforated sides j' .

G' is a chute leading into the mortar C' , and H^2 is a vibrating chute for receiving the ore from the tank I' and discharging it onto the chute G' . The chute H^2 is vibrated from the piston T through the medium of the three-armed lever K' , the lever O' , and the connecting-rods $N' l'$. The feeding mechanism, however, forms no part of the present invention.

The stamp receives its motion through a belt running on a pulley secured to the shaft G. When the piston N is raised by means of the crank F, a partial vacuum is formed between the pistons N T in the cylinder I, and the lower piston T is raised, bringing with it the stamp-rod V. When the upper piston N passes above the holes r in the sides of the cylinder, air is admitted to the space between the two pistons, and the upper piston N is quickly forced downward, thereby imparting motion to the piston T through the medium of the interposed air-cushion. The said air-cushion permits of a certain amount of latitude in the motion of the stamp, thereby preventing the breakage of the driving machinery in case of an undue quantity of ore in the mortar C' . The exhaust-valve P is

lifted by the spring p , so as to permit of the escape of air as the piston N completes its downward stroke and the pressure of the air in the cylinder I reaches a maximum. The pressure at which the exhaust-valve P is allowed to rise is varied by raising or lowering the sleeve o .

Having thus described my invention, I claim as new and desire to secure by Letters Patent—

1. In an atmospheric stamp, the combination of a cylinder, a piston reciprocating in the upper part of the cylinder and provided with a hollow piston-rod, an exhaust-valve opening into the hollow piston-rod, a discharge-pipe connected to the said hollow piston, a stamp-rod, and a second piston below the first-named piston and connected to the stamp-rod, substantially as described.

2. In an atmospheric stamp, the combination of the cylinder I, the pistons N T, fitted to the cylinder I, the hollow rod M, connected with the piston N and provided with the compartments $h i$, the exhaust-valve P, the discharge-pipe Q, and the stamp-rod V, connected to the piston T, substantially as specified.

3. In an atmospheric stamp, the combination, with a cylinder and a fixed exhaust-pipe, of a piston working in the cylinder and provided with a hollow piston-rod, and the exhaust-pipe Q, secured to the hollow piston-rod, substantially as described.

4. In an atmospheric stamp, the combination, with the piston N and the piston-rod M, of the exhaust-valve P, provided with the rod n , the adjustable sleeve o , and the spring p , surrounding the rod n between the sleeve and valve, substantially as described.

5. In an atmospheric stamp, the combination, with the cylinder I, provided with holes r , and the perforated ring S, surrounding the cylinder, of the piston N, having the hollow piston-rod M and provided with the exhaust-valve P, the piston T, and the stamp-rod V, to which the piston T is connected, substantially as described.

CHAS. H. KRAUSE.

Witnesses:

PETER GETZEN,
HENRY C. KRAUSE.