(No Model.) 2 Sheets—Sheet 1.

A. F. UNGER.

FEEDING MECHANISM FOR WOOD GRINDING MACHINES.

No. 524,796. Patented Aug. 21, 1894.

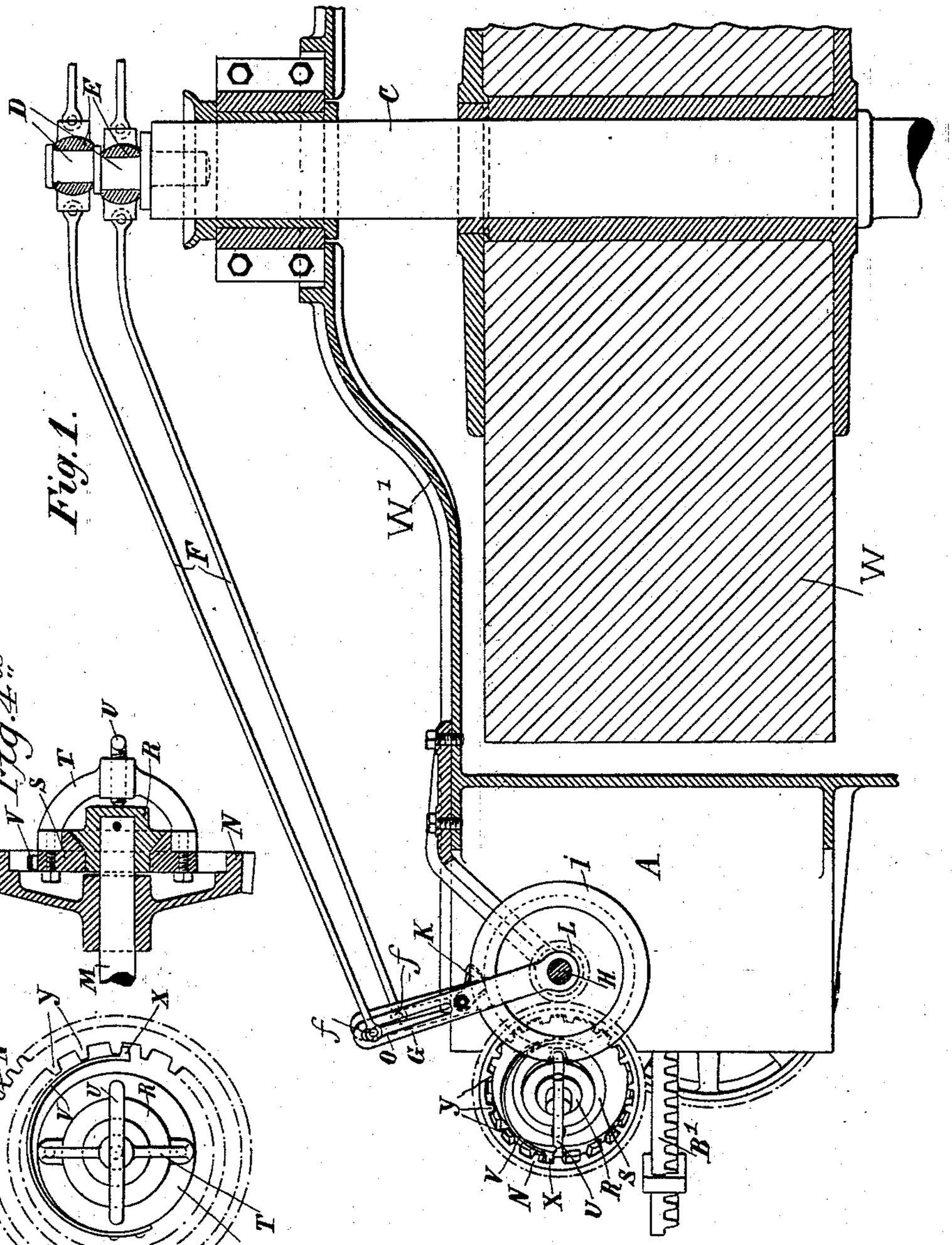

Fig. 1.

Fig. 4a.

Fig. 4.

Witnesses:
Herbert Blossom.
Peter A. Ross

Inventor:
Adolf F. Unger.
by Henry Connett.
his Attorney

(No Model.) 2 Sheets—Sheet 2.

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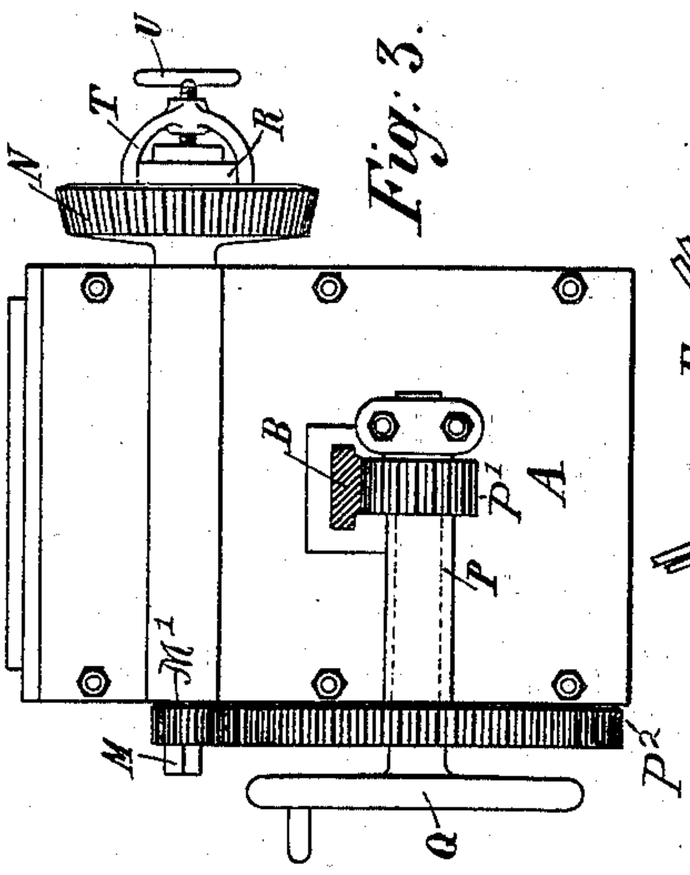
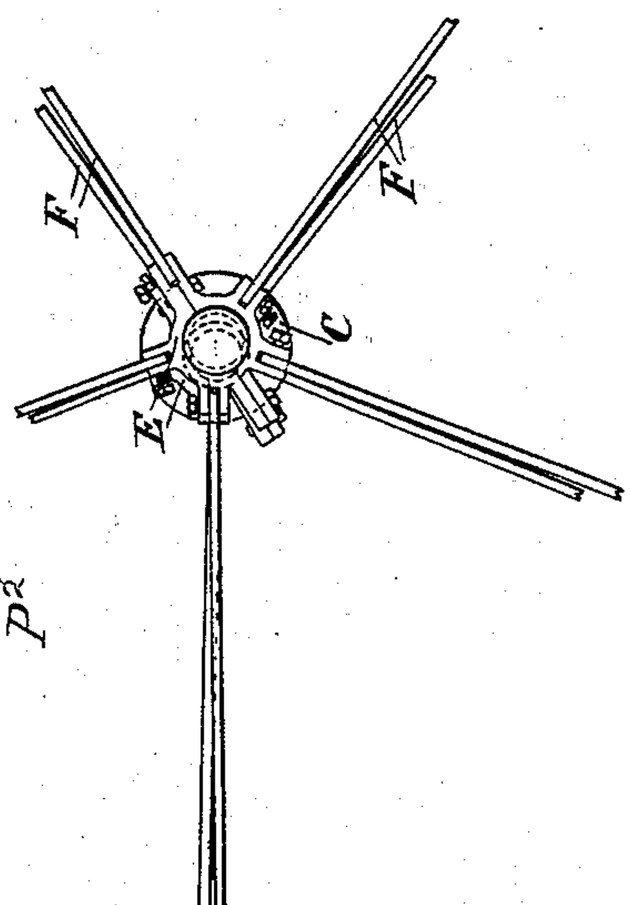


Fig. 3.



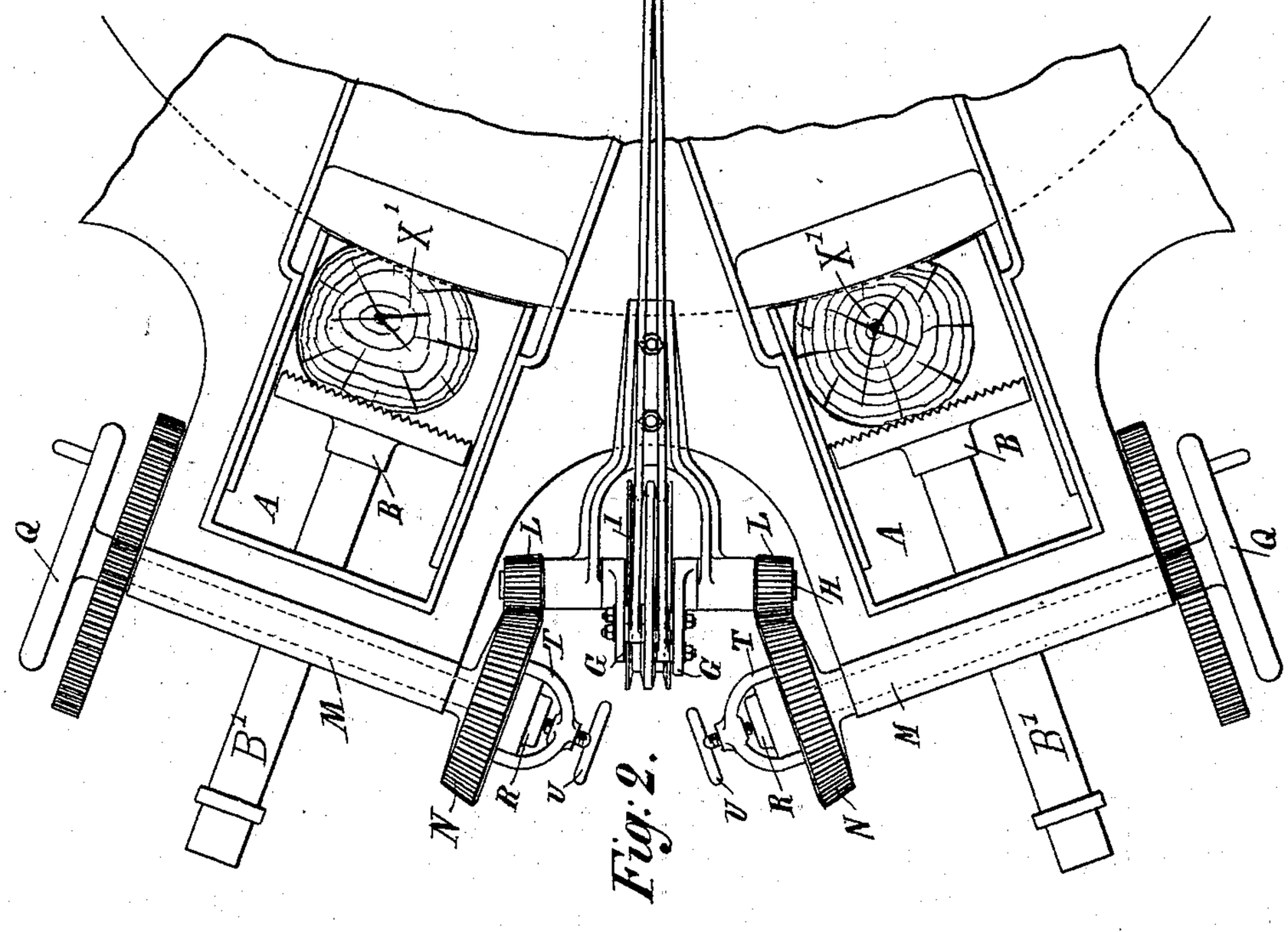


Fig. 2.

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UNITED STATES PATENT OFFICE.

ADOLF FREDRIK UNGER, OF HENRIKSHOLM, SWEDEN.

FEEDING MECHANISM FOR WOOD-GRINDING MACHINES.

SPECIFICATION forming part of Letters Patent No. 524,796, dated August 21, 1894.

Application filed March 3, 1893. Serial No. 464,614. (No model.)

To all whom it may concern:

Be it known that I, ADOLF FREDRIK UNGER, a subject of the King of Sweden and Norway, residing at Henriksholm, Ånimskog, Sweden, have invented certain new and useful Improvements in Feeding Mechanisms for Wood-Grinding Machines, of which the following is a specification.

My invention relates to machines for grinding wood to form pulp, wherein blocks or pieces of wood are held and fed up to a grindstone by means of feeding mechanisms or devices; and the object of the invention is to provide an improved automatic feeding device for the blocks whereby they will be pressed or fed up to the face of the stone in proportion, directly, to the extent of the wearing away of the blocks by abrasion, as the feeding up of the blocks is in direct proportion to the speed of the stone, the power for operating the feed being taken from the shaft of the stone. I may say here that one of the advantages of this mode of operating the feed, is that the pressure per square inch on blocks of different sizes will always be the same, which is very important as it yields pulp of uniform fineness throughout. In this respect, and in regard to the facility with which the feeding pressure may be regulated, my improved feeding mechanism is especially advantageous as compared with the ordinary feeding devices used with this class of machines wherein a weight or hydraulic pressure is employed and with which the feeding pressure is constant, for with this latter mechanism for feeding, the pulp from a large block must inevitably be finer than that from a small one.

I do not claim to be the first to adapt this principle to the feeding mechanisms of wood grinding machines but my specific mechanism possesses novel features which will be hereinafter described and carefully defined in the claims.

In the accompanying drawings I have shown my feeding mechanism applied to a grinding machine which is otherwise of ordinary construction and employs a grindstone revolving in a horizontal plane.

In the drawings—Figure 1 is a vertical, fragmentary, mid-section of the machine, and Fig. 2 is a plan or top view of the same. Fig. 3 is a fragmentary end-view of one of the feeding devices, and Fig. 4 is a face view and Fig. 4ª is a sectional view, on a larger scale, illustrating a feature of the invention which will be hereinafter described.

I will first briefly describe the features of the machine which are now well known.

W is the grindstone, which is fixed on a vertical shaft C, capable of rotation in a frame or casing W′. This shaft will be driven in the usual, or in any satisfactory manner. Arranged about the casing W′, are the cells, A, in which play the feeding pistons or followers, B, which press upon the blocks of wood, X′, and feed them up to the stone. Each piston B, has a rod or stem, B′, toothed to form a rack, which gears with a pinion P′, on a shaft P (see Fig. 3) rotatively mounted on the end-plate of the cell A. On the shaft P, is a spur wheel P^2, which gears with a pinion M′, on a shaft M, also rotatively mounted on the end-plate of the cell.

So far as described the construction is in substance the same as that now in use in some forms of wood grinding machines.

I will now describe my novel mechanism for operating the piston B, to press the block X′ up to the stone W, through the medium of an intermittent rotation of the shaft M, premising that, as here indicated, although not fully illustrated, there will be ten cells A arranged about the stone, in five groups of two each, one group being fully illustrated in Fig. 2.

On the adjacent ends of the shaft, M, of a pair of feeding devices, are mounted bevel gear wheels, N, and these wheels gear, respectively, with wheels, L, fixed on a shaft, H, which has bearings in a bracket on the casing or frame. Swinging radially on the shaft H, are two arms, G, each of which carries a friction shoe or pawl, K, which engages a groove in a double-grooved friction wheel, I, fixed on the shaft H. As here shown the wheel I is arranged between the arms G. By rocking these arms alternately, the shaft H

will be intermittently rotated in one direction and the two pistons B will be thus moved inward so as to feed the blocks up to the stone. As the pawls K do not bite and rotate the wheel on the back stroke they will act only on the forward stroke. It will be obvious that these pawls may engage teeth on the wheel if this construction be preferred to the grooves in the wheel.

On the shaft C of the grindstone are formed two eccentrics D, which are eccentric with each other as well as with the shaft; and embracing these eccentrics, respectively, are two yokes, E, which latter are coupled respectively, to the pawl arms G, by rods F. Thus the rotation of the shaft C effects alternate vibrating movements of the arms G. I have only shown one pair of rods F in full in Fig. 2, but the fragments of the other pairs of rods show how the same yoke, E, is coupled to all of the pairs of rods leading to the several pairs of feeding mechanisms about the stone. In order to regulate the extent of vibratory movement imparted to the arm G by the eccentric and rod, the arm has a slot O, in which is set the coupling pin *f*, of the rod F. This pin may be set at any point in the slot.

When a piston B is to be withdrawn for the insertion of a fresh block of wood, this may be effected by a crank-wheel, Q, on the shaft P; but before this can be done it is necessary to disconnect gear wheel N, from its shaft M, and this is effected by, as herein shown, the device illustrated on a large scale in Fig. 4.

The wheel N is mounted loosely on the shaft M, and on the shaft is secured a beveled friction pulley or hub, R, which matches a friction disk, S, mounted loosely on the boss of the hub R. On the disk S is fixed an arched bail, T, through the boss of which screws a T-headed screw, U, the point of which bears on the hub R. By setting this screw down firmly, the disk S is forced into frictional contact with the hub, whereby the said disk is set to rotate with the shaft M. The disk S, is within the hollow of the wheel N, and in the same plane with its overhanging rim, as clearly shown in the sectional view at the right in Fig. 4; and secured to the outer periphery of the disk S, is a curved leaf spring, V, the free end of which is furnished with a tooth X, which engages teeth, Y, on the inner face of the rim of the wheel N, as clearly shown in the face view at the left in Fig. 4. The spring V thus connects the disk S with the wheel N, whereby the rotation of said disk serves to drive said wheel. Now if the screw U be loosened, the shaft M may rotate freely during the withdrawal of the piston B, without rotating the wheel N, but if said screw be firmly set, the said wheel and shaft must rotate together. This device for coupling the wheel N to its shaft, or uncoupling it, at will, may as well be applied to some other of the toothed wheels than the wheel N, but I find it most convenient to apply it to this wheel.

The object in using the spring V as a connecting medium between the wheel N and disk S, in lieu of a rigid connection, is as follows: If the resistance to the feeding forward of the piston B should exceed a certain limit, whatever may be the cause of such resistance, the spring will yield and allow the tooth X thereon to slip from one to the other of the teeth Y. The clicking sound thus produced warns the operator that something is wrong with the feed and he is thus enabled to stop the machine and remove the obstacle.

It will be obvious that any suitable form of cam or eccentric D, on the shaft C, may be employed. As here shown this device is in the nature of a pin, fixed in the end of the shaft, this pin having its two superposed sections turned eccentric to each other, and to the portion which is fixed in the axis of the shaft.

The member S of the friction clutch-device seen best in the sectional view in Fig. 3, is herein shown as rotating on the boss of the hub R, but it might as well be mounted directly on the shaft M. This will be readily understood by any skilled mechanic.

Having thus described my invention, I claim—

1. In a wood-grinding machine, the combination with the stone W, its shaft C, the two eccentrics on said shaft, and their yokes, of two cells A, arranged side by side and provided with pistons having rack-like stems, the shaft H, arranged at right-angles to the shaft C and between the cells of the pair, intermediate gearing between the respective extremities of the shaft and the stems of the pistons, the wheel I, fixed on said shaft H, the two pawl-arms G, provided with pawls which engage the wheel I, and rods F, coupled respectively to the arms G at one end and to the eccentric-yokes at the other end, substantially as set forth.

2. In a wood grinding machine, the combination with the stone W and its shaft C, the piston, having a rack-like stem, the shaft M, and gearing intermediate the said shaft M and the stem of the piston, of the wheel N, mounted loosely on the shaft M, means substantially as described for coupling this wheel to its shaft, the shaft H, arranged at right-angles to the shaft C, the pinion L, on said shaft, gearing with the wheel N, and means substantially as described intermediate the shaft of the stone and the shaft H whereby the former imparts intermittent rotation to the latter, as set forth.

3. In a wood grinding machine, the combination with the revolving stone and its shaft, the cell for the block, the piston therein, and its stem, of the shaft H, mechanism intermediate the shaft of the stone and said shaft H, for driving the latter, a gear-wheel L on the

shaft H, the shaft M, gearing between said shaft M and the stem of the piston for driving the latter, a gear-wheel N, loose on the shaft M and gearing with the wheel L, and the spring V, frictionally connected with the shaft M at one end and provided with a tooth at the other end which engages teeth on the wheel N, substantially as set forth.

In witness whereof I have hereunto signed my name in the presence of two subscribing witnesses.

ADOLF FREDRIK UNGER.

Witnesses:
M. ÃHLÉN,
G. OLSSON.