(No Model.) 2 Sheets—Sheet 1.

C. MOORE.

MACHINE FOR GROOVING METAL ROLLS.

No. 249,382. Patented Nov. 8, 1881.

fig. 1

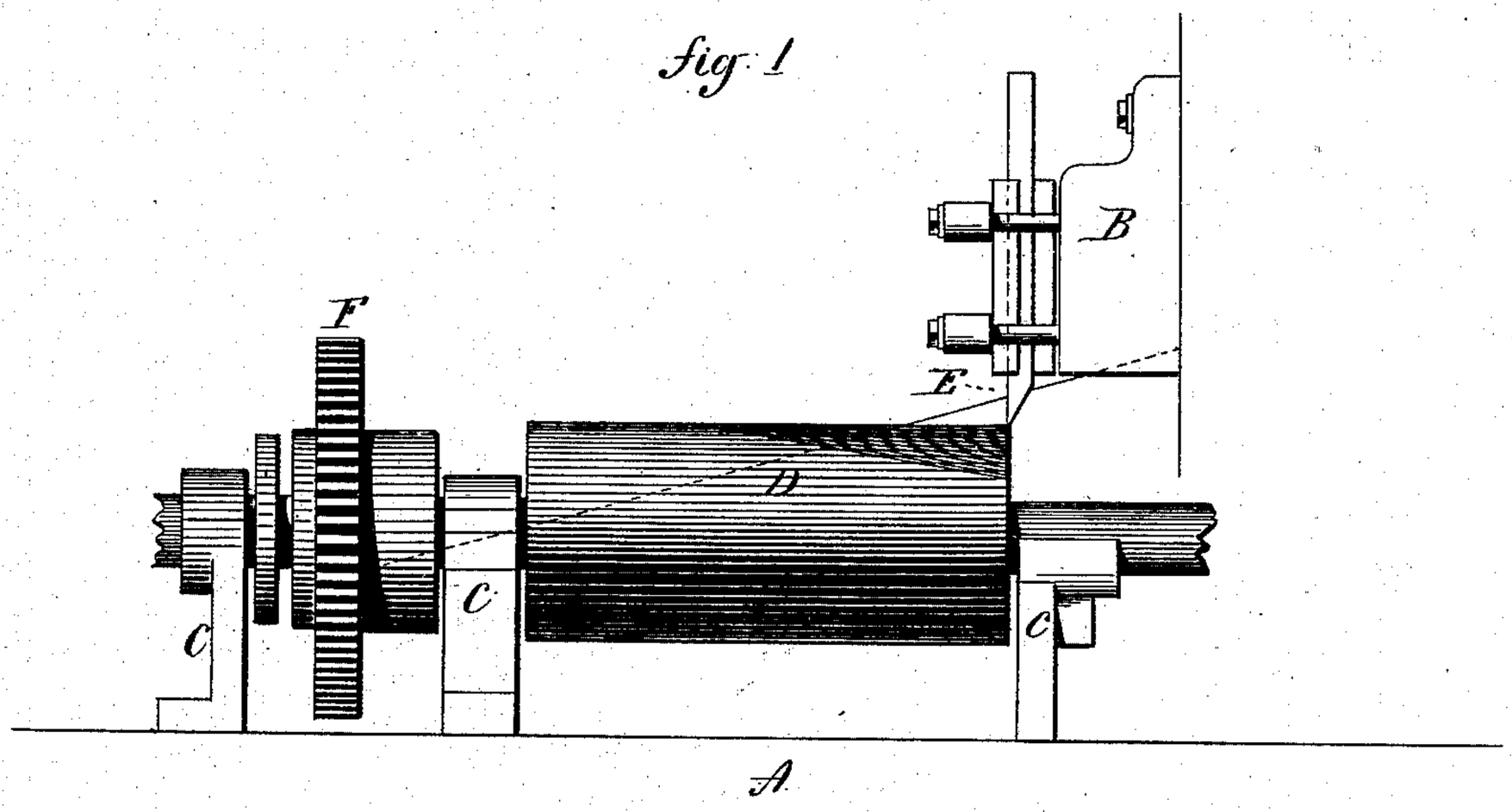


fig. 2

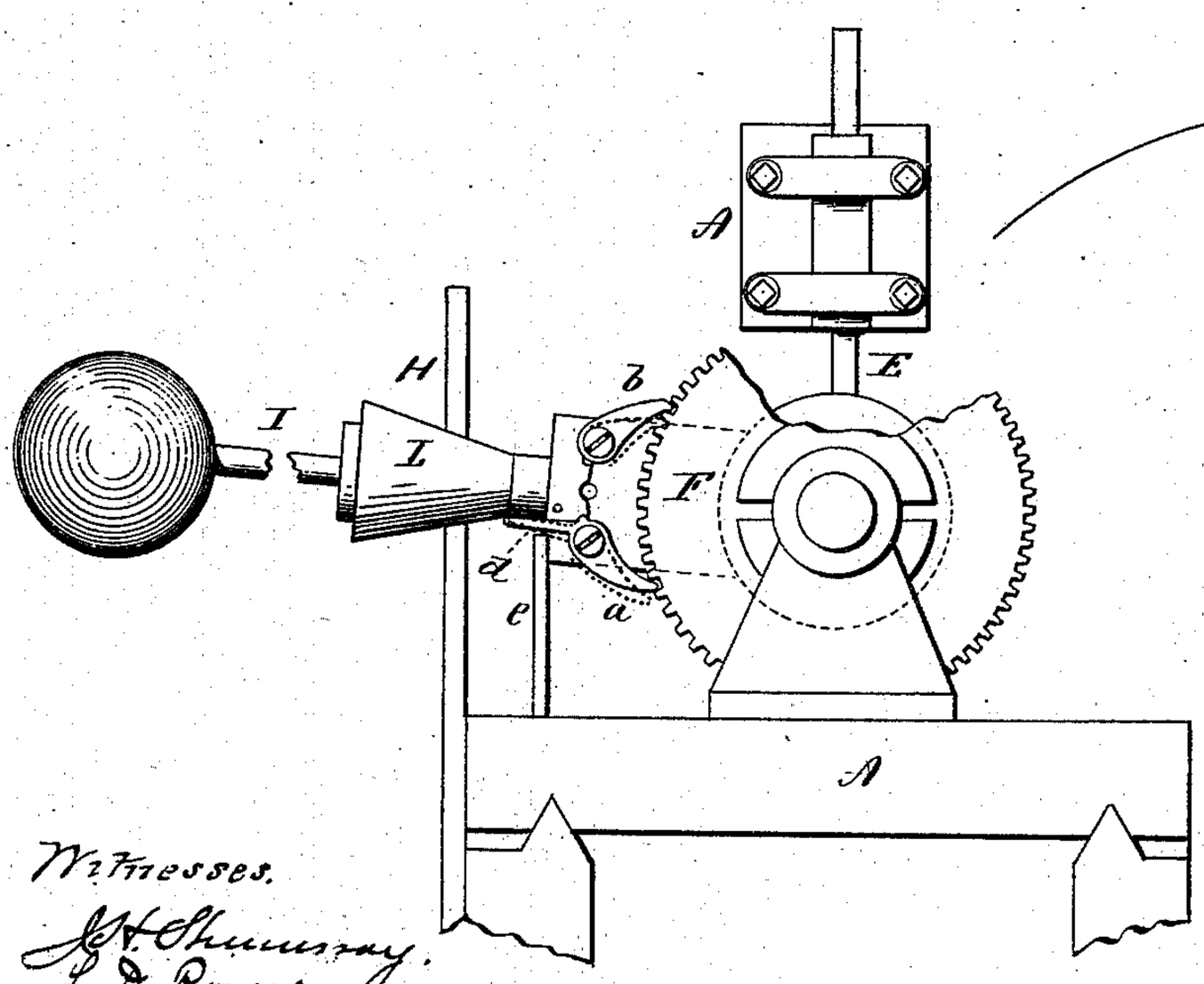
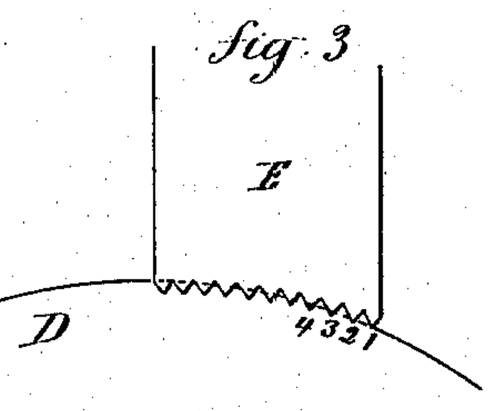


fig. 3



Witnesses.
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(No Model.) 2 Sheets—Sheet 2.

C. MOORE.

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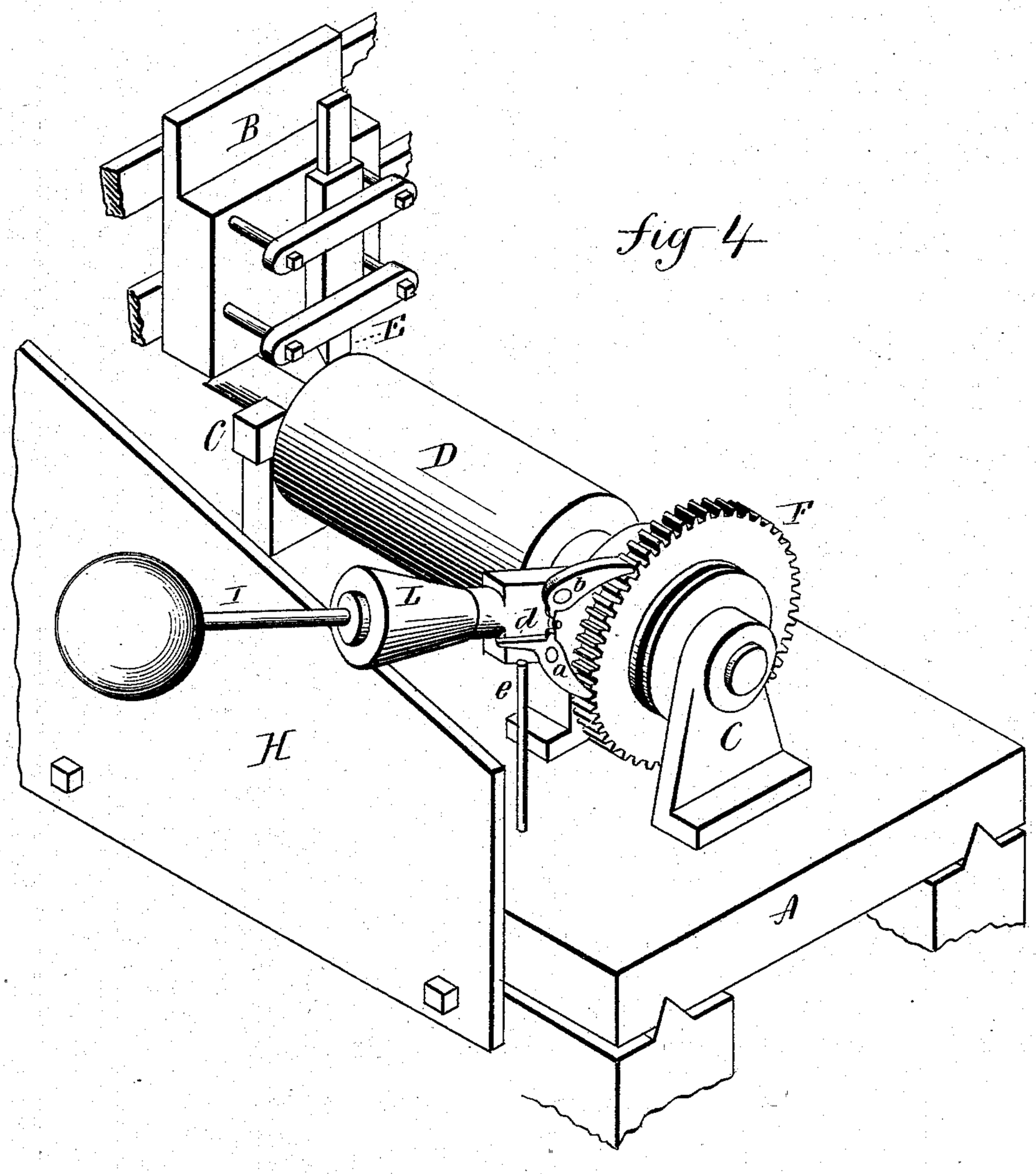
fig 4



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UNITED STATES PATENT OFFICE.

CHARLES MOORE, OF ANSONIA, CONNECTICUT, ASSIGNOR TO THE FARRELL FOUNDRY AND MACHINE COMPANY, OF SAME PLACE.

MACHINE FOR GROOVING METAL ROLLS.

SPECIFICATION forming part of Letters Patent No. 249,382, dated November 8, 1881.

Application filed November 26, 1880. (No model.)

To all whom it may concern:

Be it known that I, CHARLES MOORE, of Ansonia, in the county of New Haven and State of Connecticut, have invented a new Improvement in Machines for Grooving Metal Rolls; and I do hereby declare the following, when taken in connection with the accompanying drawings and the letters of reference marked thereon, to be a full, clear, and exact description of the same, and which said drawings constitute part of this specification, and represent, in—

Figure 1, a side view; Fig. 2, an end view; Fig. 3, a diagram illustrating the operation; Fig. 4, a perspective view.

This invention relates to an improvement in apparatus for grooving "chilled rolls." Grooved chilled rolls are now used to a very great extent for grinding wheat and for like purposes. The grooves are made longitudinally, and in some cases spirally, on the surface of the roll, and being necessarily narrow a very large number of grooves is required in each roll. The surface of chilled rolls is as hard as it is possible to make cast-iron, and so hard that it is with great difficulty that it can be cut. In cutting a groove it must, therefore, be done by making numerous very slight cuts, because the cutter will not stand a very great depth of cut.

The method practiced before my invention for grooving chilled rolls was to arrange the roll on the bed of the planer, so that it would move with the bed beneath the tool-stock, in the usual manner for planing metal, with a single cutter set in the tool-stock adjusted so as to make a slight cut in the line where the groove was to be formed. The rotating movement was imparted to the roll at one extreme or the other of its longitudinal movement, so that the cutter would make the first cut of all the grooves in the roll, and when such first cuts had been made the tool was adjusted to cut a little deeper, and then a second cut made in all the grooves, and so on until all the grooves were completed; or the roll was moved back and forth beneath the tool-stock without rotation, the cutter being set at each movement until the individual groove was complete, then the roll was turned one step and the second groove made by successive resettings of the cutter, and so on. The last method was that most generally practiced; but it is impossible to make perfect uniformity of work by either process.

The object of this invention is to perform the work without the adjustment of the tool for each of the several cuts necessary in making a groove; and the invention consists in the apparatus as hereinafter described, and particularly recited in the claims.

A represents the platen of an iron planer, and B the cross-head or tool-stock, of the usual construction, not necessary to be fully shown or described in this application.

On the platen bearings C C are arranged to support the roll D, its axial line parallel with the line of movement of the platen, so that the roll may be rotated in said bearings.

E is the cutting-tool, (shown enlarged in Fig. 3.) Its lower edge is formed with teeth or series of cutters 1, 2, 3, 4, &c., the points of the cutters being equidistant from each other throughout the series, the last of the series being the shape of the completed grooves in the roll. This cutter is set in the tool-stock in such relative position to the surface of the roll that the first cutter of the series will take the surface of the roll to the depth of the first cut to be made in forming the groove, and the last the full depth of the groove to be cut, as seen in Fig. 3, the intermediate cutters varying in depth of cut from first to last—that is, gradually increasing from the first to the completed groove. After the first complete cut has been made, as in Fig. 3, a new complete groove will be finished at each cut.

To impart the rotating feed to the roll at the termination of each cut a toothed wheel, F, is arranged in connection with the shaft of the roll, and to this a pawl, *b*, is applied, to operate to turn the wheel F one or more teeth, as the case may be.

In the illustrations a device is shown for imparting to the roll a rotation during its reciprocating movement, so that the cuts are made spirally on the surface of the roll, as seen in Fig. 1, and the pawl *b* for the rotating feed is operated by the same apparatus, as here represented.

The operation is as follows: H is an inclined

plane, stationary on the bed of the machine, as seen in broken lines, Fig. 1. From the shaft of the roll a lever, I, extends outward over the inclined plane, as seen in Figs. 2 and 4, and is provided with an anti-friction roll, L, which rides upon the said incline, so that as the roll moves longitudinally the lever rides up the incline plane H, and in so doing the pawl *b* engages with a tooth of the wheel F, and carries the wheel and roll and turns it to the extent of the rise of the incline plane H, and on the return of the lever I down the incline, aided, if necessary, by a weight on the lever, as shown, or otherwise, the pawl *a*, also in engagement with the wheel F, returns the wheel to the same extent of the rotation when running in opposite direction, so that the tool will stand at the place of beginning when the return movement of the roll is completed.

In this machine the feed for each new groove may be made as follows: A tail-piece, *d*, extends from the rear end of the pawl *a*, and just before the extreme return movement of the roll is completed the tail-piece *d* strikes a stop, *e*, stationary on the bed A, beneath said tail-piece, on which the tail-piece rests, while the lever I continues its movement down the incline, and which forces the outer end of the tail-piece to rise and the pawl *a* to turn outward from the wheel F, as seen in broken lines, Fig. 2, thus detaching the lever I from the wheel F and permitting the lever to stand at rest, while the pawl *a* is disconnected, and in this operation the pawl *b* falls back or escapes from the tooth with which it has been engaged, and so as to take a new tooth when the lever begins its next ascent or rising movement, as seen in broken lines, Fig. 2. This change of the pawls *a b* occurs entirely after the roll has passed back from beneath the cutter, so that on the next advance movement of the roll the pawl *b* will have risen, because of the incline plane H, its one tooth or feed before the cutters will next strike the roll; hence a feed of one tooth—that is, one groove of the roll—is made at the termination of each complete longitudinal movement of the roll. This illustration of the rotating feed of the roll at the termination of each reciprocating movement, as also its rotation during the reciprocating movement, is sufficient to enable those skilled in the art to apply other and equivalent devices for performing the same.

While it is preferable to make each succeeding cutter of the tool slightly deeper than the next preceding, they may be arranged in pairs or triplets—that is to say, the first pair or triplets to form two or three cuttings to the same depth, and each succeeding two or three increasing the depth. In that case the rolls will be fed two or three grooves at each time; but in practice the best work will be found by making each deeper than the next preceding. In case of making the grooves parallel with the axis, as required in some cases, the feed may be made by the same apparatus shown in the drawings by having the incline terminate before the tool strikes the roll and then run in a horizontal line during the cutting.

It will be understood from the foregoing that I do not limit my invention to the particular device by which the reciprocating movement is imparted to the roll or to the devices for producing the feed; but

What I do claim is—

1. In a machine for grooving rolls, the combination of the following elements: first, a carriage having a longitudinal reciprocating movement imparted to it, arranged to support and give to the roll to be grooved a corresponding longitudinal reciprocating movement; second, a stationary tool consisting of a series of cutters arranged in a line substantially transverse to the axis of the roll, and in such relation to the surface of the roll as to cut successively deeper from the first of the series to the last, the last of the series completing the groove began by the first; third, mechanism, substantially such as described, to impart an intermittent rotation to the roll at one extreme of its reciprocating movement, the combination of said elements being substantially as described.

2. In a machine for grooving rolls, the combination of the following elements: first, a carriage having a longitudinal reciprocating movement imparted to it, arranged to support and give to the roll to be grooved a corresponding longitudinal reciprocating movement; second, a stationary tool consisting of a series of cutters arranged in a line substantially transverse to the axis of the roll, and in such relation to the surface of the roll as to cut successively deeper from the first of the series to the last, the last of the series completing the groove began by the first; third, mechanism, substantially such as described, to impart a rotating movement to said roll during its reciprocating movement; fourth, mechanism, substantially such as described, to impart an intermittent rotation to the roll at one extreme of its reciprocating movement, the combination of said elements being substantially as described.

CHARLES MOORE.

Witnesses:
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F. E. HOADLEY.