

No. 626,502.

Patented June 6, 1899.

W. D. NEVILLE.
MULTIPLE BORING MACHINE.

(Application filed July 16, 1898.)

(No Model.)

3 Sheets—Sheet 1.

Fig. 2.

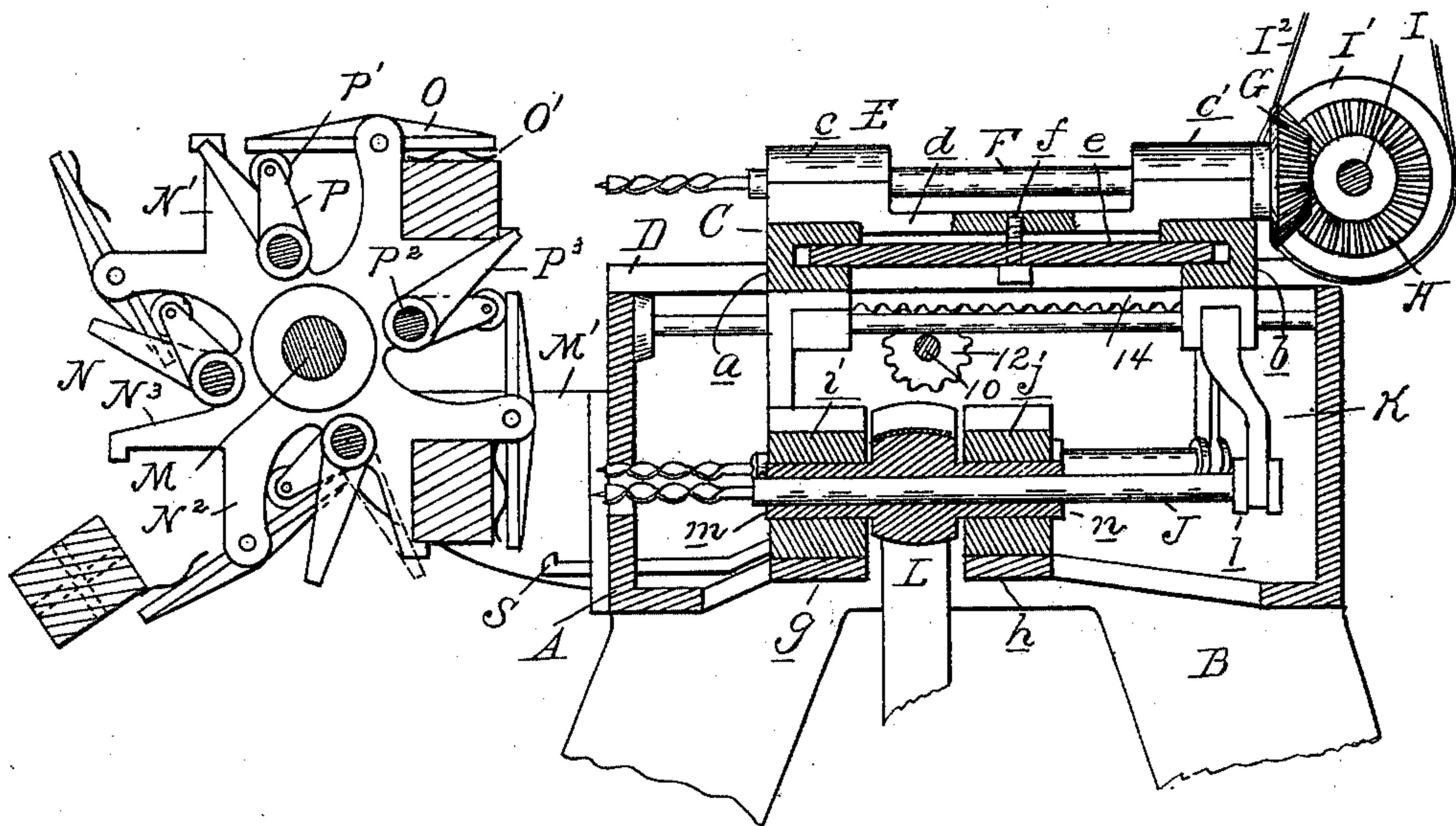
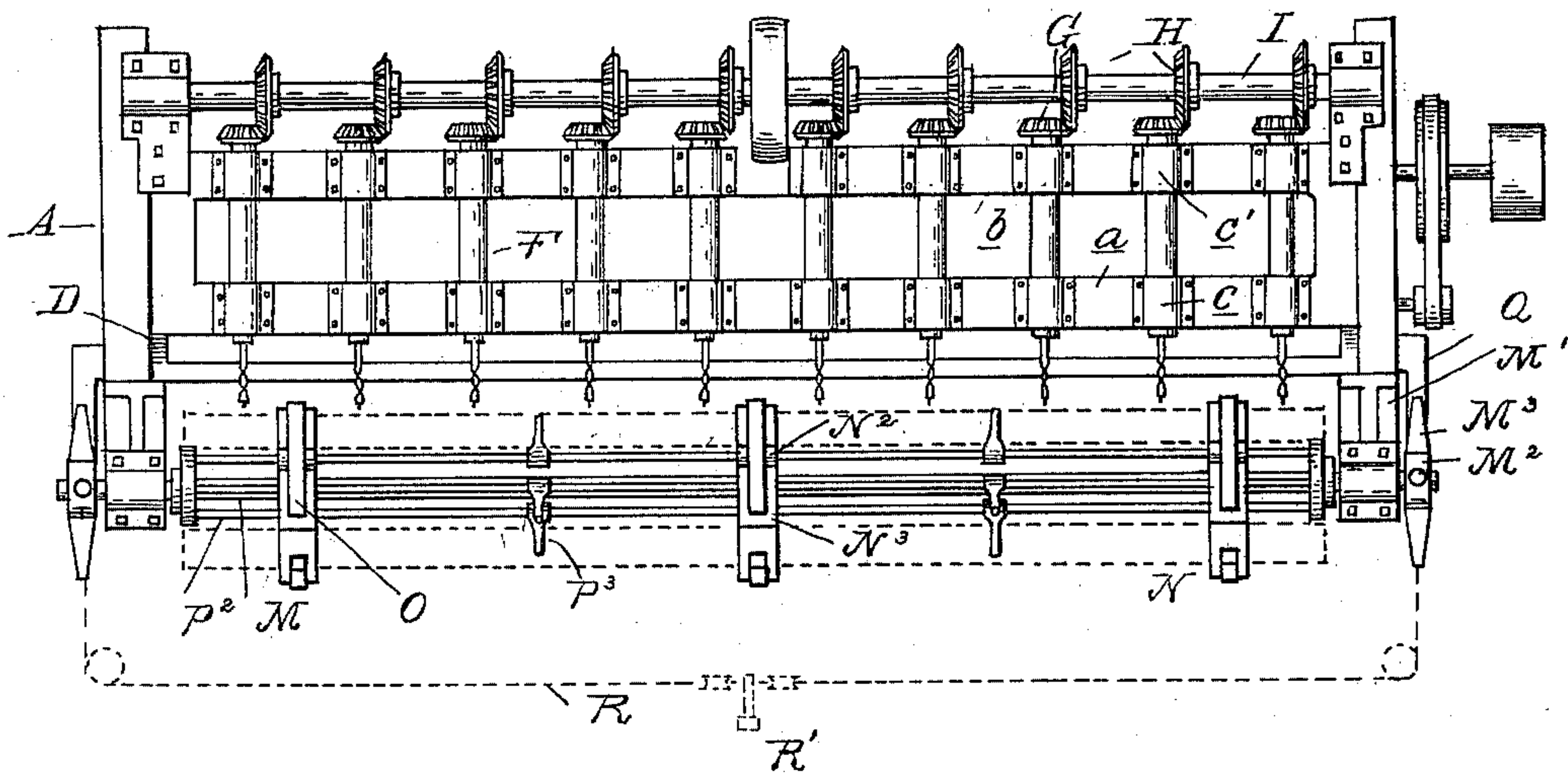


Fig. 1.



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Fig. 3.

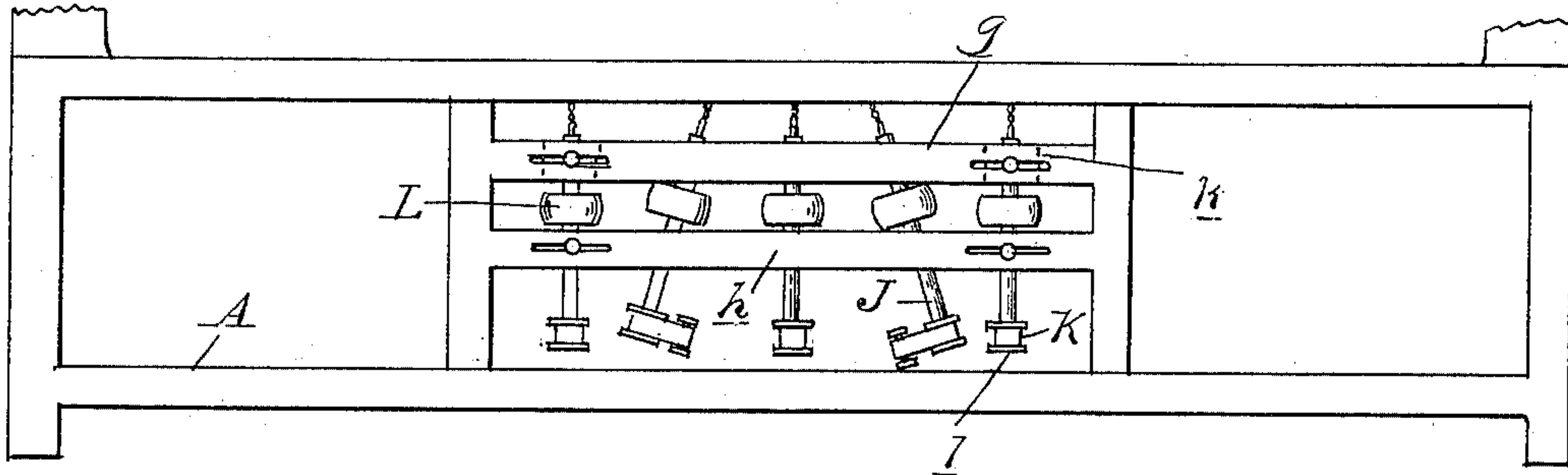


Fig. 4.

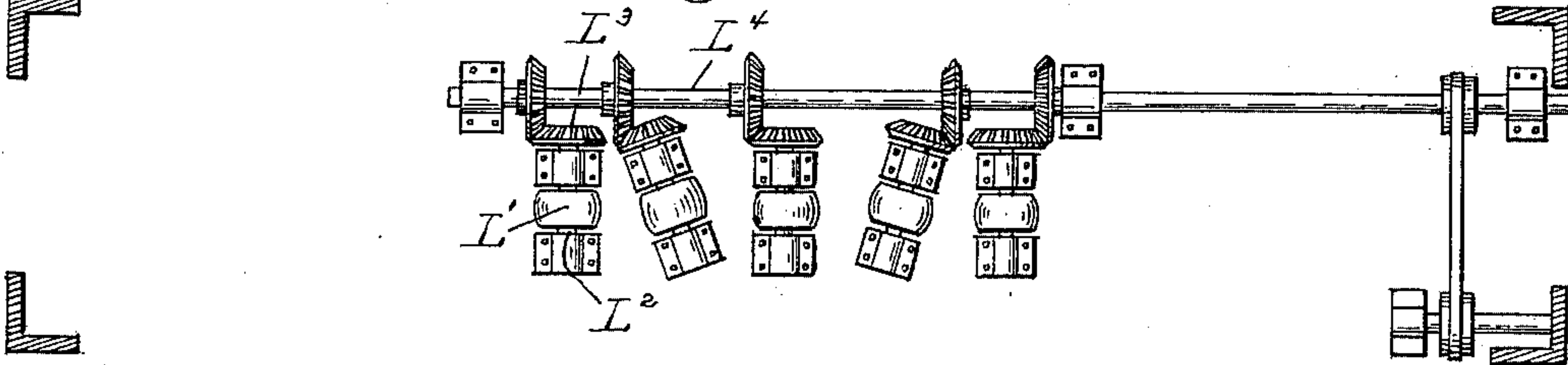
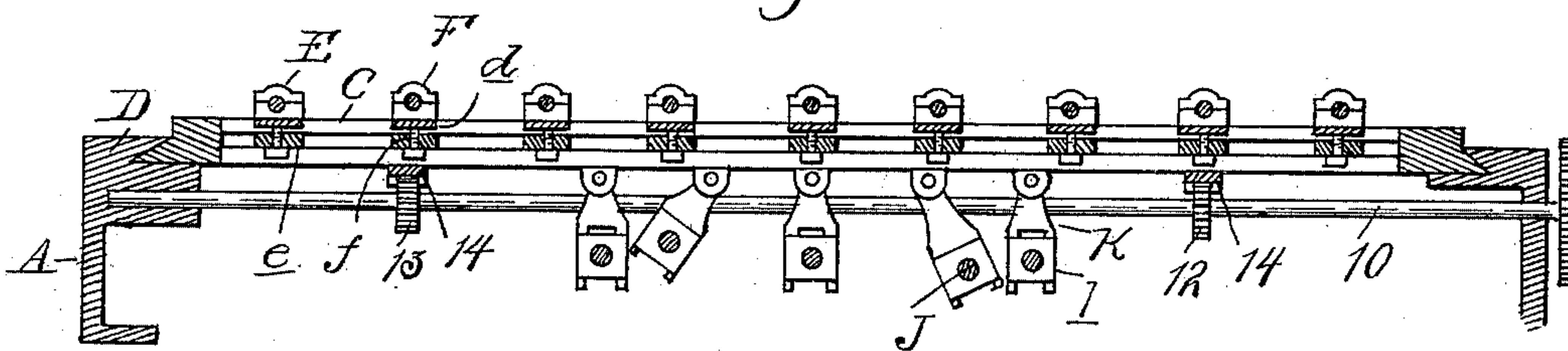


Fig. 5.



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Fig. 7.

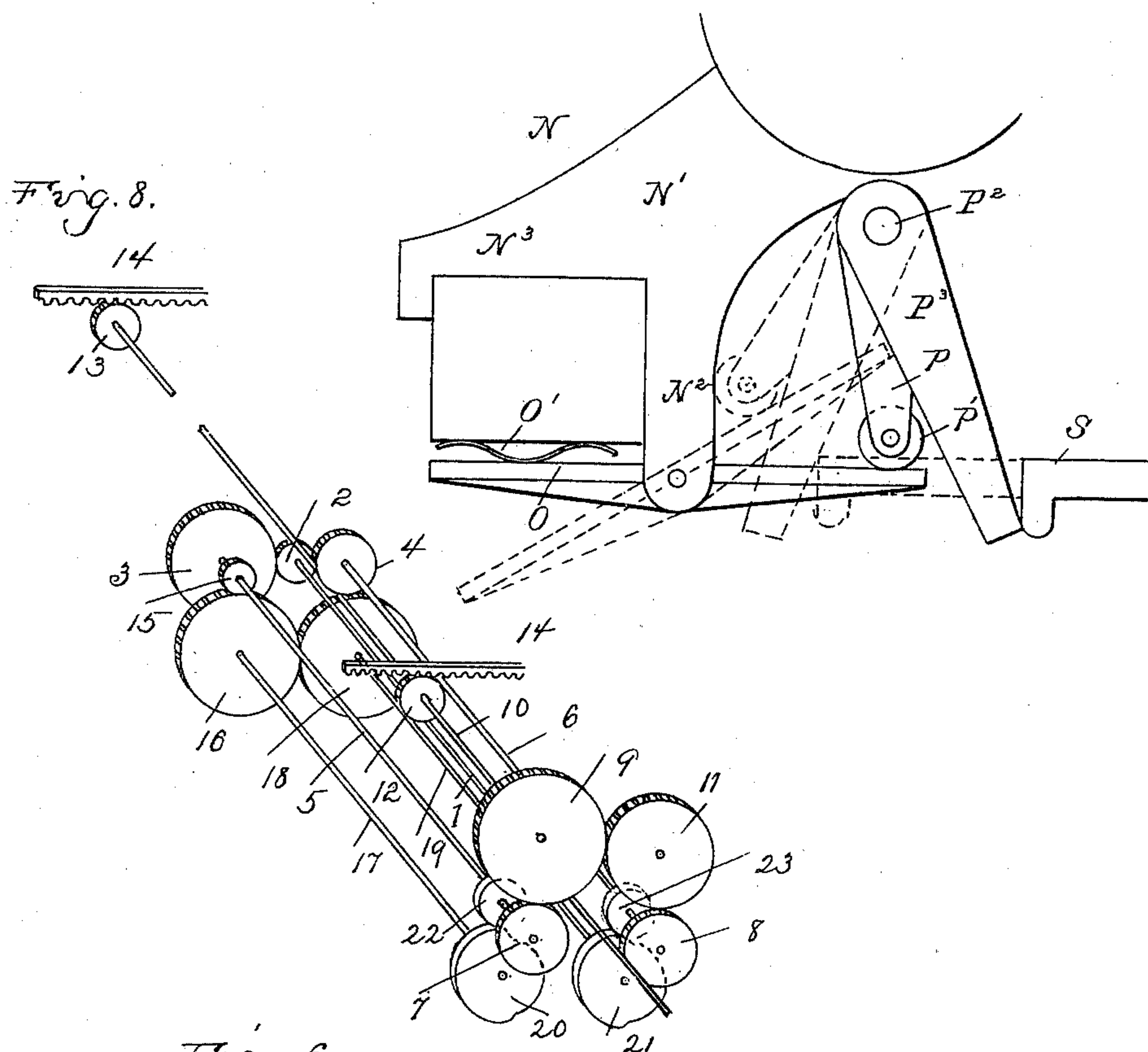
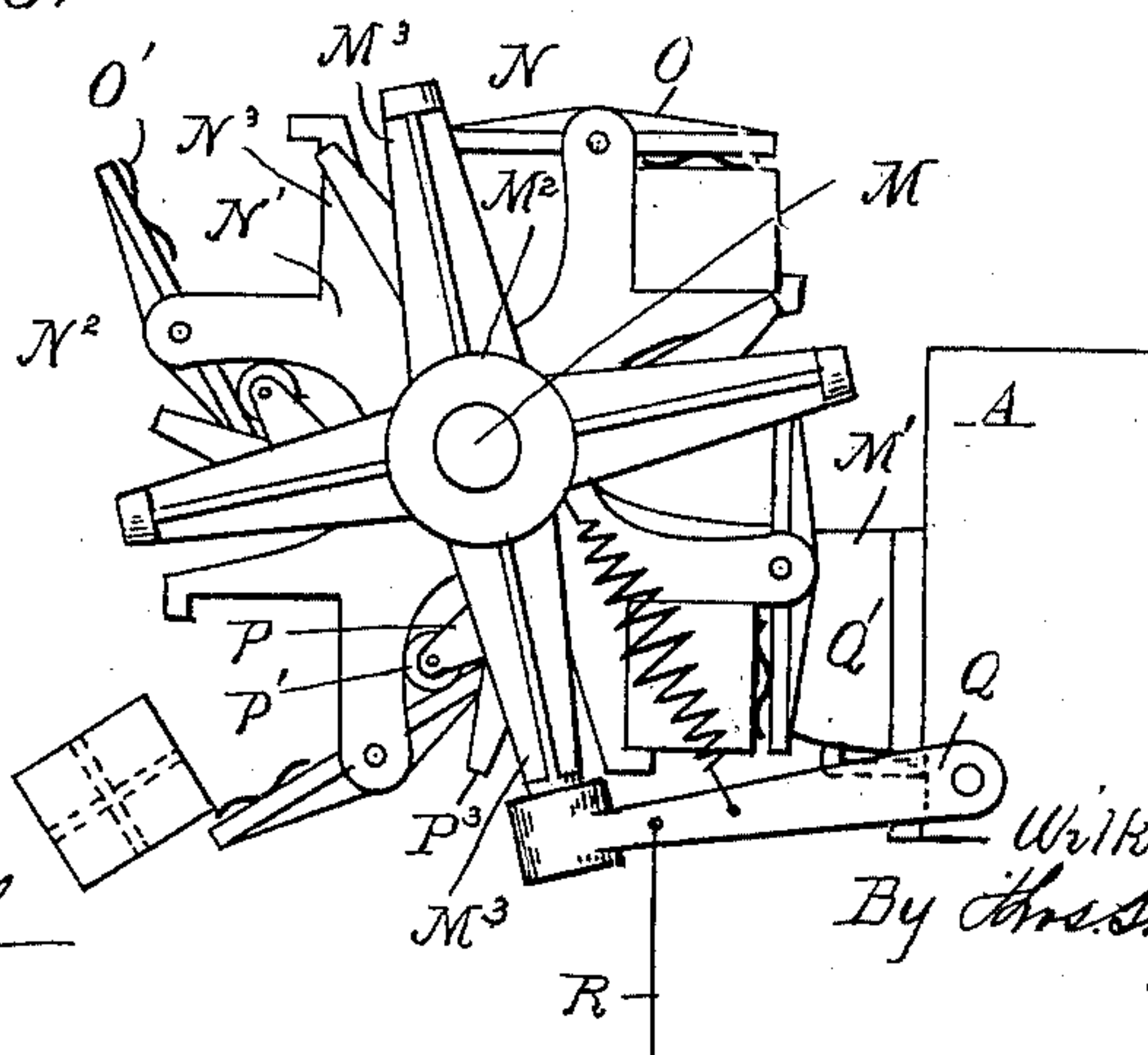


Fig. 6.



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UNITED STATES PATENT OFFICE.

WILKINSON D. NEVILLE, OF BAY CITY, MICHIGAN, ASSIGNOR TO THE WALWORTH & NEVILLE MANUFACTURING COMPANY, OF SAME PLACE.

MULTIPLE BORING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 626,502, dated June 6, 1899.

Application filed July 16, 1898. Serial No. 686,115. (No model.)

To all whom it may concern:

Be it known that I, WILKINSON D. NEVILLE, a citizen of the United States, residing at Bay City, in the county of Bay and State of Michigan, have invented certain new and useful Improvements in Multiple Boring-Machines, of which the following is a specification, reference being had therein to the accompanying drawings.

10 My invention relates to multiple boring-machines especially designed for the boring of cross-arms for telegraph-poles; and it is the object of my invention to obtain a machine in which the boring of all the holes for the insulator-pins, together with the angular holes for the securing-bolts and brace-rods, is accurately performed without further attention from the operator than the placing of the arms in the holder.

20 The invention consists in the peculiar construction of a machine comprising two gangs of augers or drills reciprocating in substantially parallel planes and a rotary work-holder adapted to successively present different sides of the work to be operated upon by the augers of the different gangs; further, in the peculiar construction of the reel or rotary work-holder, and, further, in the peculiar construction, arrangement, and combination of parts, as more fully hereinafter described and claimed.

35 In the drawings, Figure 1 is a plan view of my machine. Fig. 2 is a cross-section thereof. Fig. 3 is a bottom plan. Fig. 4 is a horizontal section below the bed, showing a plan of the drive connections for the lower spindles. Fig. 5 is a longitudinal section. Fig. 6 is an end elevation. Fig. 7 is a cross-section showing the means for tripping the work-holders to release the work therefrom. Fig. 8 is a diagram perspective of the reciprocating mechanism for the slide.

40 A is a suitable frame or bed mounted upon standards B and supporting the operating parts of the machine.

50 C is a reciprocating table or slide secured in transverse guides D at the opposite ends of the bed. Upon this slide are mounted in bearings E a number of transversely-arranged parallel drill-spindles F, the bearings E being adjustably secured in position on the slide,

so that the spacing of the spindles may be varied according to the requirements of the work. To the rear end of each spindle is secured a bevel gear-wheel G, which gears mesh with bevel-gears H, secured to a longitudinal shaft I, journaled in bearings on the slide.

60 In order to facilitate the ready adjustment of the spindles upon the slide, I preferably construct the latter in the form of a rectangular frame having the parallel longitudinal bars *a* and *b* grooved upon their inner side. Each of the bearings E comprises the separated boxes *c* and *c'*, connected by the cross-bar *d*, which is adapted to fit in the space between the bars *a* and *b*, the boxes resting on said bars.

70 *e* is a cross-bar or clamping-plate having its ends engaging the groove in the bars *a* and *b* and secured to the bar *d* by a clamping screw or bolt *f*, all so arranged that by tightening the screw *f* the boxes will be firmly clamped upon the bars *a* and *b* in any position to which they have been adjusted. The gears H may be correspondingly adjusted upon the shaft I and are secured in position thereon by keys, set-screws, or in any other suitable way.

80 Below the plane of the spindles F are secured in bearings upon the body a second gang of drill-spindles J. These spindles are preferably arranged in planes parallel to the plane of the upper spindles, but are not all parallel to each other, as some of the spindles are for the purpose of boring angular holes. In the drawings I have shown the central and the outer spindles of the lower gang as parallel to each other and to the upper gang and the two intermediate spindles as arranged at opposite angles and respectively above and below the plane of the central spindle, this arrangement being for the purpose of boring the holes for the securing-bolts and brace-rods of telegraph cross-arms. The bearings in which these spindles are journaled are secured to the longitudinal separated bars *g* and *h* of the bed, which latter is in the form of a rectangular frame open in the center. The bearings for the central and angular spindles consist of the stepped boxes *i* and *j*, secured to the bars *g* and *h*, and the bearings for the outer spindles are formed by the boxes *k*,

longitudinally adjustably secured to said bars *g* and *h*.

The spindles *J* are adapted to be longitudinally reciprocated in their bearings simultaneously with the reciprocation of the slide *C*, carrying the upper gang, and to this end I provide depending arms *K* on the slide *C*, which engage with grooved collars *l* on the spindles *J*. To provide for the angular movement of the spindle, as well as for the adjustment of the positions of the outer spindles, I connect the arms *K* to the slide by a hinge or pivotal joint, which permits them to swing in a cross plane to the axis of the spindles.

L are pulleys feathered upon the spindles *J* between the separated journal-boxes therefor and preferably provided with the opposite extending sleeves *m* and *n*, passing through said journals.

The slide *C* is provided with mechanism for reciprocating it, with an interval of rest after each reciprocation while the slide is in its rear position. This I have shown in diagram in Fig. 8 as comprising the following construction: 1 is a shaft extending longitudinally beneath the bed and journaled in suitable bearings thereon. 2 is a gear-wheel on this shaft, which meshes with the gears 3 and 4 on the parallel longitudinal shafts 5 and 6, respectively. The opposite ends of the shafts 5 and 6 are respectively provided with gear-wheels 7 and 8 and are journaled in movable bearings, which permit of said gear-wheels being thrown in or out of mesh, respectively, with a gear-wheel 9 on a shaft 10 and with an intermediate gear-wheel 11, meshing with said gear 9. 12 and 13 are pinions on the shaft 10, which engage with transverse racks 14 on the under side of the slide *C*. 15 is a gear-wheel on the shaft 5, meshing with a gear-wheel 16 on a shaft 17. 18 is a gear-wheel meshing with the gear-wheel 16 and mounted upon shaft 19. 20 and 21 are cams on the shafts 17 and 19, respectively, which bear against the rolls 22 and 23 on the shafts 5 and 6, all so arranged that when motion is imparted to the shaft 1 it will be transmitted through the medium of gear-wheels 2, 3, 15, 16, and 18 and shafts 17 and 19 to the cams 20 and 21. These are so timed as to cause the gear-wheels 7 and 8 to be alternately thrown into mesh with the gear-wheels 9 and 11, with an interval in which both sets of gears are out of mesh. When the gear-wheels 7 and 9 are in mesh, motion will be transmitted to the shaft 10 and pinions 12 and 13 thereon in a direction to cause the racks 14 to be fed forward, and when the gear-wheels 8 and 11 are in mesh the racks will be moved in the reverse direction.

In front of the bed is arranged a rotary work-holder or reel, which is of the following construction:

M is a shaft extending longitudinally of the bed and journaled in forwardly-extending brackets *M'* at the opposite ends of the bed.

Upon this shaft are mounted the heads *N*, there being preferably three heads arranged near the ends and at the center of the shaft. Each head is provided with a number of radial arms *N'*, having angular bearings at their outer ends adapted to receive the work and clamping arms or levers for holding the work in said bearings. In the construction shown in the drawings each head is provided with four of the arms *N'*, which have L-shaped bearings formed by the arms *N*² and *N*³.

O is the clamping-lever, which is pivotally secured to the arm *N*² and is provided at its outer end with a flat spring *O'* for bearing against the work.

P are rock-arms, one for each lever, carrying at their free ends antifriction-rolls *P'*, adapted to bear against the inner ends of the levers *O* and clamp them against the work. These rock-arms are secured to rock-shafts *P*², extending longitudinally and journaled in bearings on the head, the corresponding arms of each head being secured to the same shaft and each shaft being provided with an operating-handle *P*³.

At the outer ends of the shaft *M* are secured the spider-heads *M*², having radial arms *M*³.

Q are latch-arms pivotally secured to the bed and having sockets at their outer ends adapted to engage with the ends of the arms *M*³ when in their lowermost position, springs *Q'* serving to draw and hold them in such engagement. To simultaneously disengage said latch-arms, I provide means which in the drawings are shown as consisting of the flexible connections *R*, passing downward beneath the floor and connected to a foot-lever *R'* in front of the machine.

The upper spindles are driven through the medium of the shaft *I*, which is provided with a pulley *I'*, connected by a belt *I*² with a counter-shaft above, the length of the belt being sufficient to permit of the reciprocations of the slide. The lower spindles are driven by belts connecting the pulleys *L* with pulleys *L'* on the counter-shafts *L*² below, which shafts are respectively parallel with their correspondingspindles. These shafts are connected by bevel-gears *L*³ with a longitudinal shaft *L*⁴, which is driven by a belt connection with any suitable source of power.

The parts being constructed as shown and described, the operation of the machine is as follows: Motion being imparted to the various parts, as described, the spindles of both the upper and lower gangs will be constantly rotated, and at the same time the slide *C* will be reciprocated, moving slowly forward and having a quick return movement, with an interval of rest in its rear position, all of which is accomplished by the mechanism before described. The movement of the slide *C* will impart a similar reciprocating movement to each of the spindles *J* of the lower gang through the medium of the swinging arms *K*. The operator, taking his position in front of

the machine, places the cross-arms or work to be bored in the L-shaped bearings on upper side of the heads N. He then turns the handle P³ on the rock-shaft P², which rocks the arms P, causing the rollers P' to bear against the outer ends of the levers O, moving said levers into a position where they will clamp the work in the L-shaped bearings, the springs O' compensating for any slight inequalities in the size of the work. After the work is securely clamped the operator, pressing his foot upon the lever R', disengages the latch-arms Q from the arms M³ of the heads M² and then gives the work-holder a quarter-turn, the springs Q' causing the latch-arms to automatically engage again with the arms M³ to stop and hold the work-holder. In this position the work is opposite the upper gang of drill-spindles, the augers or bits of which in the forward reciprocation of the slide bore the series of holes for the insulator-pins in the work. While this work is being performed the operator places another arm in the succeeding set of bearings on the work-holder and clamps it, as before described. As soon as the augers are withdrawn the work-holder is given another quarter-turn, which will carry the work just drilled to a position opposite the lower gang of spindles, at the same time turning it so as to present a side to be bored which is at right angles to the side previously bored. In the next forward reciprocation the lower gang of spindles will bore in the work the angular holes for the securing-bolts and brace-rods while the upper gang is drilling the holes for the insulator-pins of the succeeding cross-arm. In the next quarter-turn of the work-holder this cross-arm first engaged will be brought to the disengaging position, where an arm S, secured to the reciprocating slide C, will in the forward movement thereof press against the handle P³ of the rock-shaft P², turning said shaft sufficiently to disengage the locking-arms P from the levers O and allowing the latter to open and drop the cross-arms from the work-holder. To prevent the cross-arms from dropping upon the feet of the operator, I provide suitable guides. (Not shown.)

With my machine the work of boring the cross-arms or other similar work may be performed quickly and with but little labor on the part of the operator; but inasmuch as the reciprocation of the augers is timed the workman is obliged to keep up with the machine, and thus more work will be accomplished than if the time of performing the operation was under his control.

What I claim as my invention is—

1. In a multiple boring-machine, the combination of a reciprocating head or slide, a series of boring-spindles and a common drive-shaft to which each of said spindles is geared carried by said slide, a series of spindles longitudinally slidable in stationary bearings and an actuating connection between said

head and spindles whereby the latter are caused to reciprocate simultaneously with said head.

2. In a multiple boring-machine, the combination with a reciprocating head or slide, of a series of boring-spindles carried thereby, a second series of angularly-arranged boring-spindles longitudinally, slidably secured in stationary bearings and swinging links connecting said angular spindles to said slide and adapted to cause them to reciprocate in said bearings.

3. In a multiple boring-machine, the combination of a reciprocating head or slide, a series of boring-spindles carried thereby, a boring-spindle longitudinally slidable in stationary bearings and angularly arranged in relation to the spindles on said head, and a laterally-movable connection between said head and angular spindle.

4. In a multiple boring-machine the combination of a series of angularly-arranged boring-spindles, bifurcated stationary bearings in which said spindles are longitudinally slidably journaled, a pulley feathered upon each spindle between the bifurcations of its bearing, a series of shafts having pulleys thereon arranged parallel respectively with said angular spindles, and adapted to be belted thereto, a drive-shaft, and bevel-gear connections between said pulley-shafts and drive-shaft.

5. A work-holder comprising separated heads, each having an angle-bearing formed thereon, a clamping-lever pivoted to each head on one side of said angle-bearing and having oppositely-extending clamping and actuating arms and rock-arms on a common rock-shaft journaled in said heads adapted to respectively swing in the path of the actuating-arms of said levers and move the same into their clamping positions.

6. In a rotary work-holder, a head having a series of radial arms bifurcated at their outer ends to form L-shaped bearings, levers pivoted respectively to one of the bifurcations of each radial arm, and having oppositely-extending clamping and actuating arms, and rock-arms pivoted to said heads between said radial arms and adapted to be rocked in the path of said actuating-arms to move said levers into their clamping positions.

7. A rotary work-holder comprising a shaft, heads thereon having L-shaped bearings formed thereon, a clamping-lever pivoted to one arm of each of said bearings, and rock-arms on a rock-shaft common to corresponding L-shaped bearings of the respective heads journaled in said heads adapted to be turned to respectively lock said levers in their clamped position.

In testimony whereof I affix my signature in presence of two witnesses.

WILKINSON D. NEVILLE.

Witnesses:

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G. A. MEYER.