(No Model.) 3 Sheets—Sheet 1.

F. E. NORTON.

METAL PLANING MACHINE.

No. 539,078. Patented May 14, 1895.

Fig. 1.

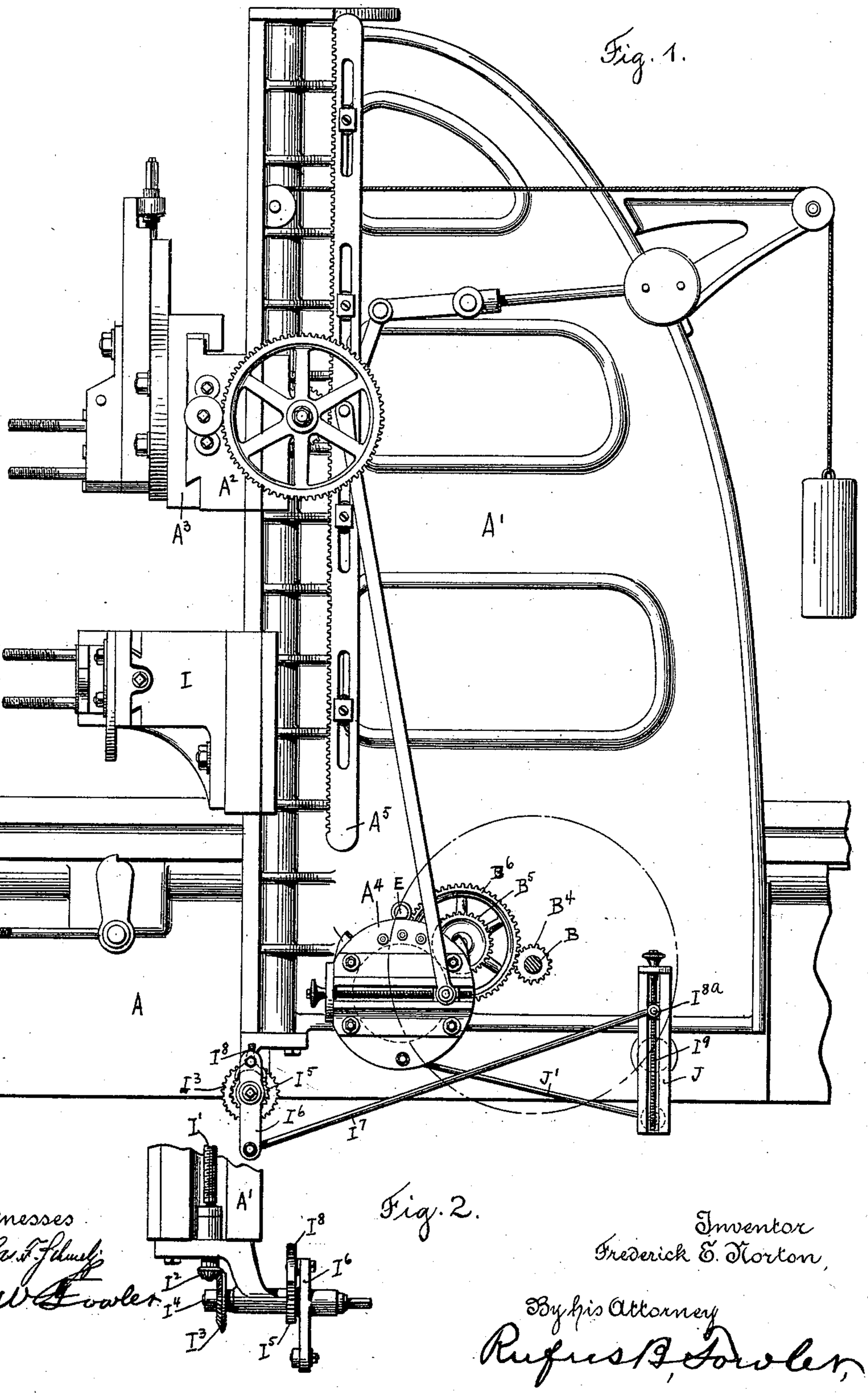

Fig. 2.

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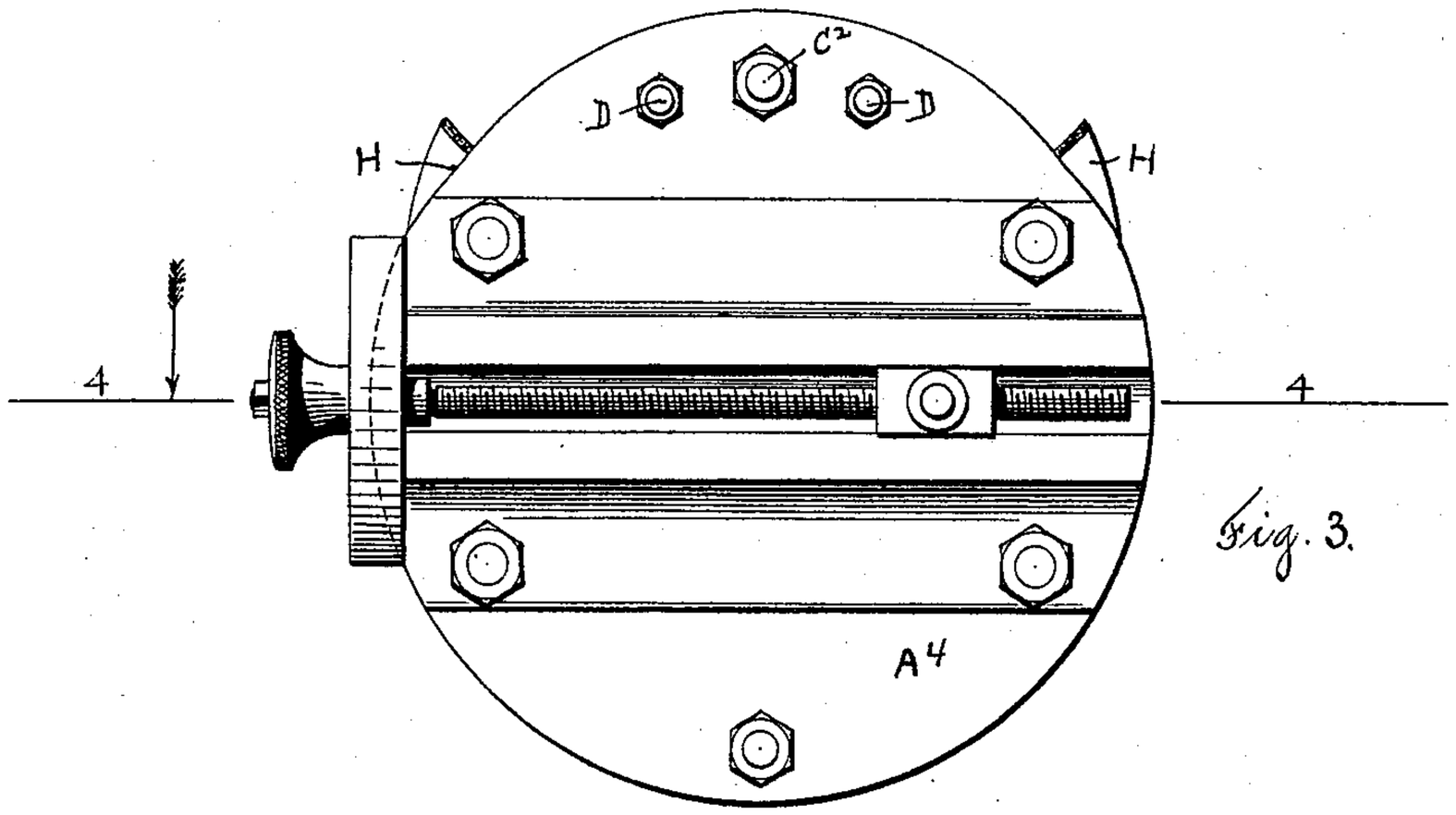

Fig. 3.

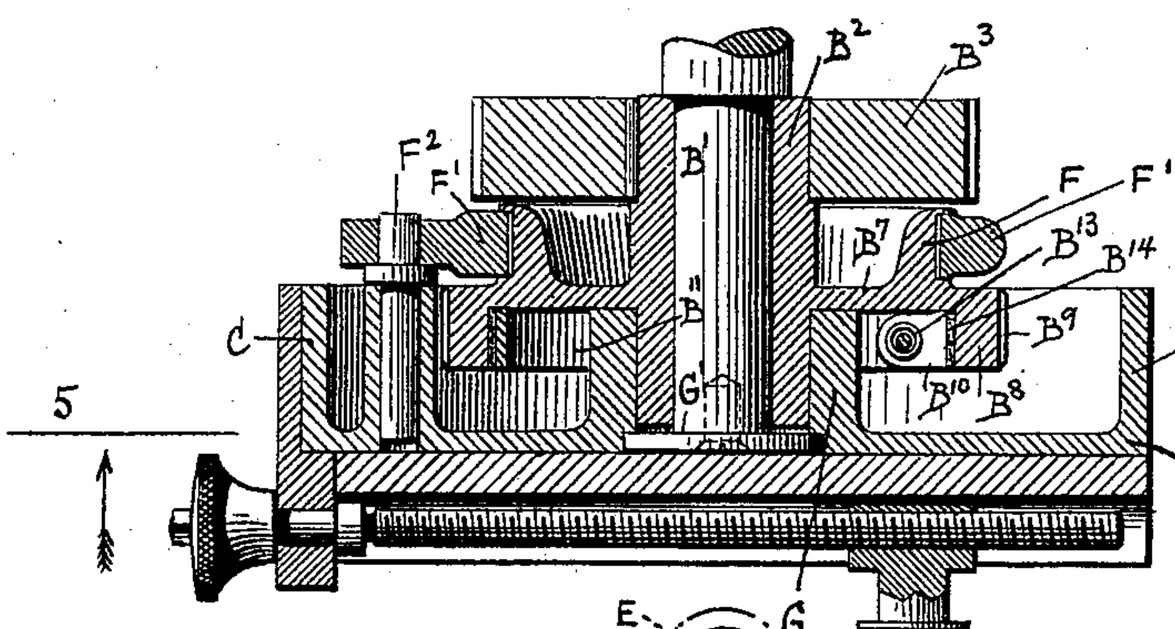

Fig. 4.

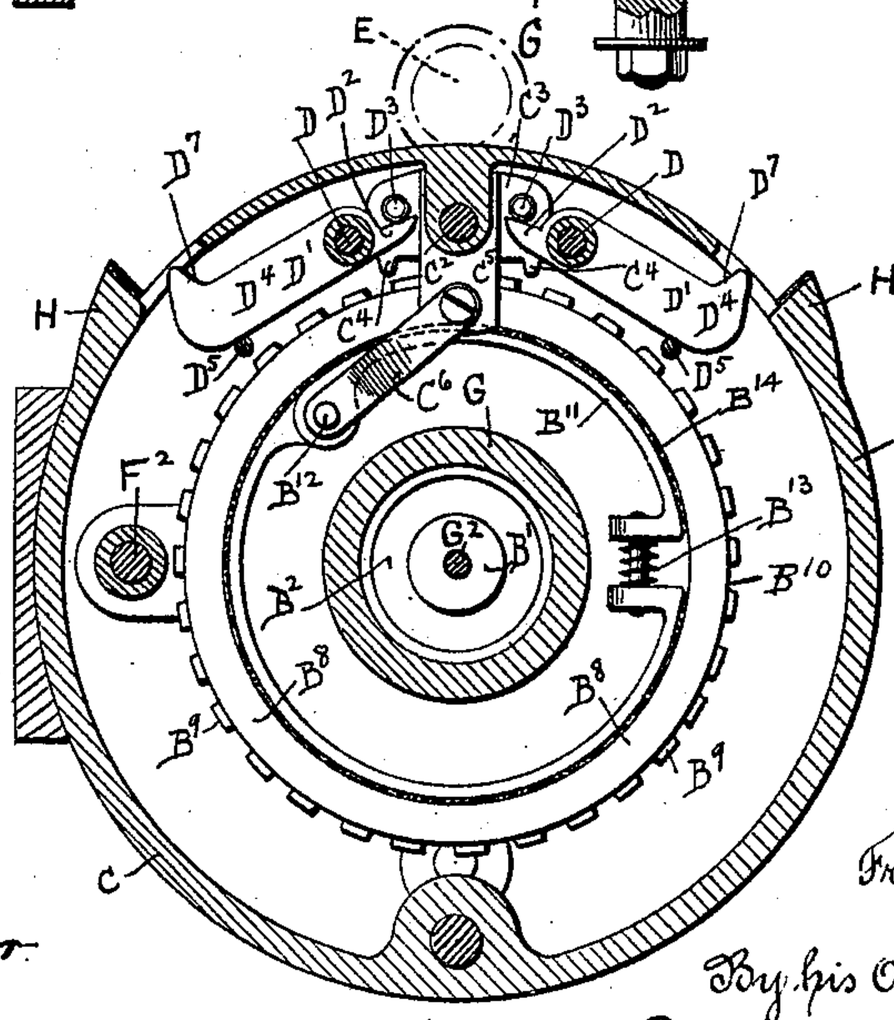

Fig. 5.

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(No Model.) 3 Sheets—Sheet 3.

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METAL PLANING MACHINE.

No. 539,078. Patented May 14, 1895.

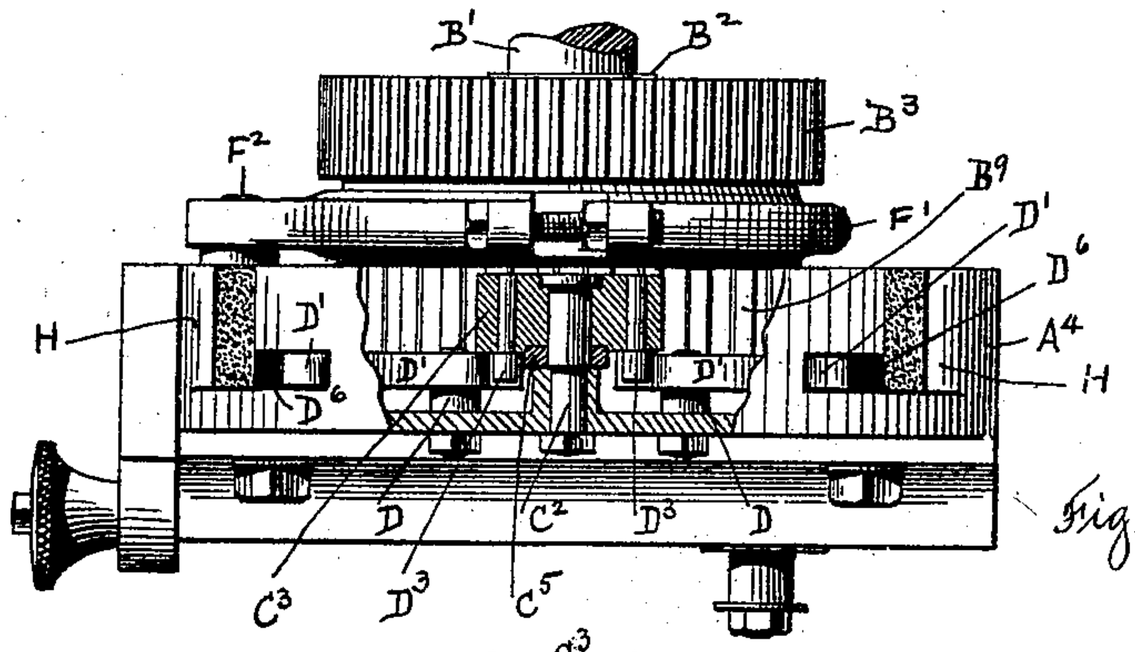

Fig. 6.

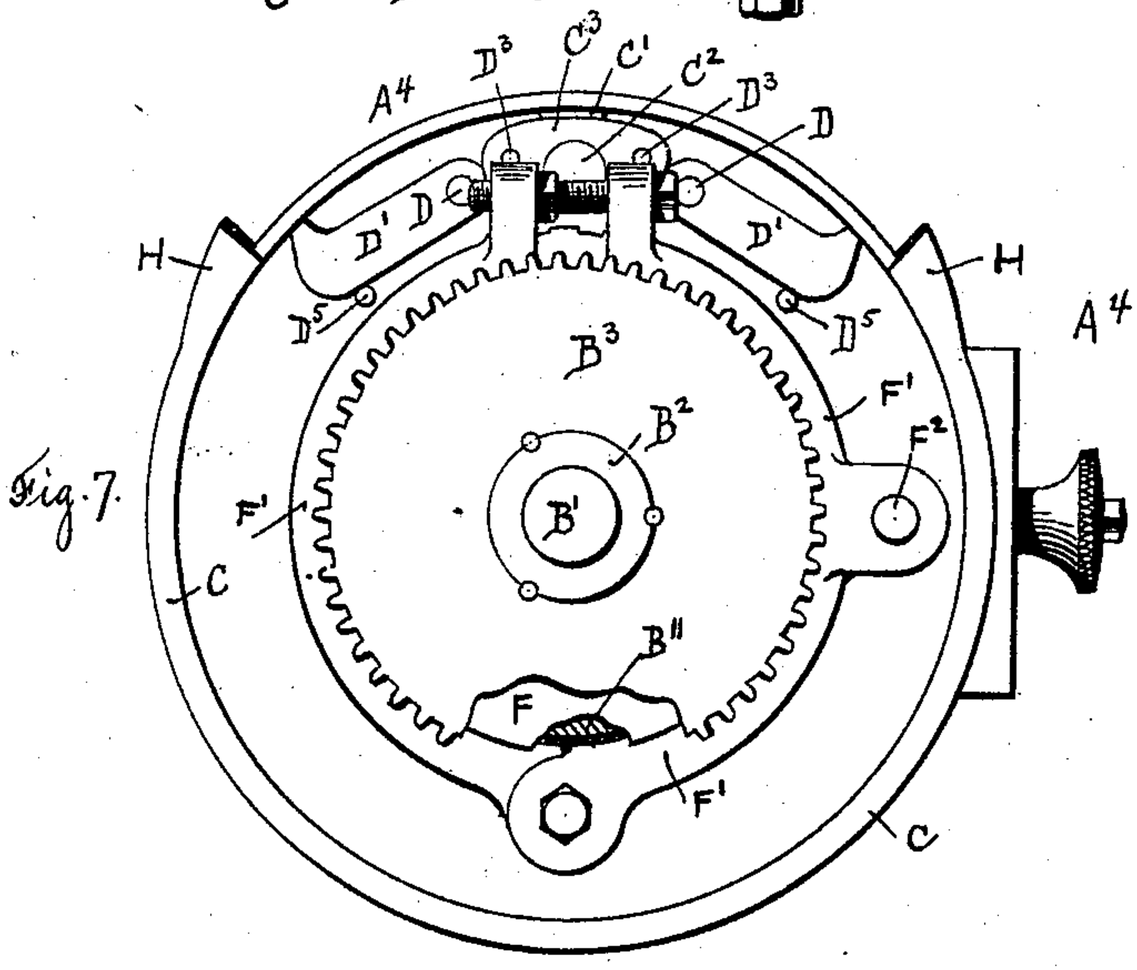

Fig. 7.

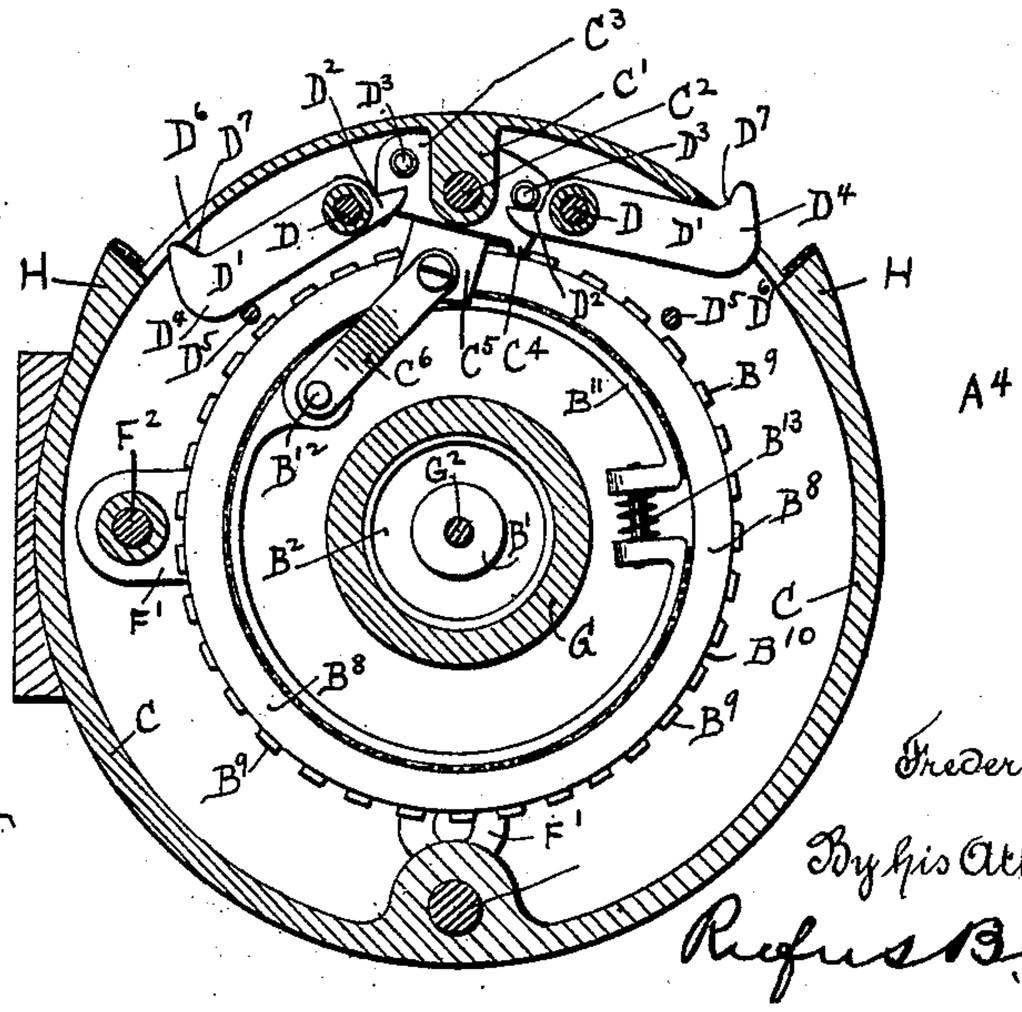

Fig. 8

A4

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UNITED STATES PATENT OFFICE.

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METAL-PLANING MACHINE.

SPECIFICATION forming part of Letters Patent No. 539,078, dated May 14, 1895.

Application filed February 24, 1893. Serial No. 463,519. (No model.)

To all whom it may concern:

Be it known that I, FREDERICK E. NORTON, a citizen of the United States, residing at Worcester, in the county of Worcester and State of Massachusetts, have invented a new and useful Improvement in Metal-Planing Machines, of which the following is a specification, reference being had to the accompanying drawings, in which—

Figure 1 represents a side elevation of so much of a metal-planing machine as is required in order to show the nature and operation of my present invention. Fig. 2 is a front view of the lower end of the screw-threaded shaft and connected actuating mechanism by which the side head is raised and lowered. Fig. 3 is a front view, on a larger scale, of the oscillating crank-disk by which the mechanism for feeding the tool upon the cross-head is actuated. Fig. 4 is a sectional view of the same and its connected parts shown upon line 4 4, Fig. 3. Fig. 5 represents a front view of the connected actuating mechanism by which the crank-disk is oscillated, the disk being shown in section on line 5 5, Fig. 4. Fig. 6 is a top view of the oscillating crank-disk with part of its rim broken away in order to disclose a portion of the connected actuating mechanism. Fig. 7 is a view of the back or rear side of the crank-disk; and Fig. 8 is a sectional view, shown in Fig. 5, but with the operating parts of the mechanism represented in a different position.

Similar letters refer to similar parts in the different figures.

My present invention relates to that part of a metal planing machine, known as the feeding mechanism by which the cutting tool is fed to the work with an intermittent motion corresponding with the reciprocating movement of the table.

That part of the mechanism directly concerned in moving the tool slide along the cross-head, forms no part of my present invention, which relates particularly to the actuating mechanism by which the actuating crank-disk is oscillated in correspondence with the reciprocating motion of the table and also to the intermediate mechanism by which the oscillation of the crank-disk is made to impart an intermittent feeding motion to what is known as the side-head.

Referring to the accompanying drawings, A denotes the bed of a metal planer, A′ one of the vertical posts upon which is supported a cross-head A^2, along which a slide A^3 is fed in the usual and well known manner by a screw threaded rod, or shaft, to which an intermittent rotation is imparted, by means of an oscillating crank-disk A^4, and the connected reciprocating rack A^5, operatively connected with the screw threaded shaft by a train of gearing in the usual manner.

B denotes the main reversible driving shaft to which a reciprocating rotary motion is imparted in the manner common in machines of this class.

The crank-disk A^4 oscillates about a stud B′ held by the bed of the machine and is operatively connected with the reversible shaft B by mechanism forming the subject of my present invention and having for its object to cause the crank-disk A^4 to be moved alternately in opposite directions so as to impart a reciprocating motion to the rack A^5 and to cause this movement of the crank-disk to be positive and certain.

Turning upon the stud B′ is a sleeve B^2 carrying a gear B^3, which is connected with the reversible shaft B, in the present instance by means of the pinion B^4, Fig. 1, and the intermediate gears B^5 and B^6.

Projecting radially from the sleeve B^2 is a web B^7 supporting the annular rim B^8, which is provided upon its outer surface with teeth B^9 on the inside with a frictional surface.

The web B^7, rim B^8, and teeth B^9 form a toothed wheel B^{10} rotating upon the stud B′, with a reciprocating rotary motion corresponding with the motion of the reversible main driving shaft B, with which the toothed wheel B^{10} is connected by the gear B^3 and intermediate gears B^5 and B^6, as described.

Within the rim B^8 I place an expansible friction ring B^{11}, preferably made in two parts, hinged together by a pivotal pin B^{12}, and having their free ends forced apart by a spring B^{13}, so as to bring the outer surface of the ring into frictional contact with the inner friction surface of the rim B^8 and the frictional resist-

ance can be increased by interposing a strip of leather, or similar material B^{14}.

The crank-disk A^4 is provided with a flange C, provided with a lug C′, extending radially inward and carrying a stud C^2 upon which is pivoted a tilting block, or rocker plate, C^3 provided at its opposite lower corners with teeth C^4, C^4, adapted to alternately engage the teeth B^9 as the rocker plate is tilted in opposite directions.

Extending inward from the rocker-plate C^3, is an arm C^5 connected with the expansible friction ring B^{11} by means of a link C^6.

Pivoted upon studs D, D, held in the crank-disk A^4 are the dogs D′, D′, which are levers having their shorter arms D^2 extending beneath the studs D^3 carried by the rocker-plate C^3.

The long arms D^4 of the levers rest by gravity against studs D^5, D^5, held in the crank-disk A^4, except as the levers are alternately rocked upon their pivotal studs by the action of the rocker-plate C^3.

The flange C is provided with slots, or openings, D^6, D^6, to allow the ends of the long arms D^4, D^4, to project beyond the flange C, when one, or the other of the dogs is rocked, as shown in Fig. 8.

Held by the bed of the machine and projecting over the crank-disk A^4, is a fixed stud E, placed in the path of the projecting ends of the dogs D′, which are preferably provided with the inclined surfaces D^7, D^7, and arranged to strike the stud E as the crank-disk is oscillated and cause the dog so engaging the stud E, to be reversed and the rocker-plate C^3 to be disengaged from the teeth B^9, thereby disconnecting the crank-disk A^4 from the driving power.

The operation of the above described mechanism is as follows: A reciprocating rotary motion is imparted to the toothed rim B^8 from the reversible shaft B through the intermediate gearing, carrying the expansible ring B^{11} by its frictional resistance with the inner surface of the rim and causing the rocker-plate C^3 to be rocked upon the stud C^2, thereby bringing one of its teeth C^4 into engagement with the teeth B^9 on the rim B^8. By the engagement of one of the teeth C^4 with the teeth B^9, the oscillating toothed wheel B^{10} and the crank-disk A^4 become positively connected so the rotary motion of the wheel B^{10} will be imparted to the crank-disks A^4, reciprocating rack A^5 and imparting a feeding motion to the cutting tool along the cross-head of the planing machine in the usual and well known manner. The rocking of the plate C^3, as shown in Fig. 8 will cause one of the dogs D′ to be rocked upon its pivotal stud carrying the longer arm of the dog through one of the openings D^6 in the flange C so the projecting inclined surface D^7 will be brought into contact with the fixed stud E, thereby driving the long arm of the dog back within the flange C and disengaging the rocker-plate C^3 from the teeth B^9 and thereby checking the rotary motion of the crank-disk A^4. When the wheel B^{10} is rotated in the opposite direction, the friction ring B^{11} and link C^6 will rock the plate C^3 in the opposite direction, engaging the opposite tooth C^4 with the teeth B^9 and lifting the corresponding dog D′ in the same manner as already described.

It will be seen that the frictional resistance between the rim B^8 and the expansible ring B^{11} is employed solely to rock the plate C^3 and produce a positive connection between the wheel B^{10} and the crank-disk A^4. Projecting from the side of the web B^7 is a friction flange F, inclosed by a friction ring F′, which is connected by a stud F^2 with the crank-disk A^4, thereby producing a frictional connection between the oscillating flange F and the crank-disk A^4, which serves to check the momentum of the crank-disk, when it is disengaged from the driving rim and also to prevent any rebound of the crank-disk which might be caused by the impact of the dogs D′ with the fixed stud E.

The sleeve B^2 turns upon the stud B′ and the hub G of the crank-disk A^4 turns upon the sleeve B^2 and is held in place by a washer G′ and screw G^2. The flange C is provided with the projecting lugs H, H, which serve as stops engaging the fixed stud E and limiting the oscillating motion of the crank-disk.

The side-head I, Fig. 1 is moved vertically upon the post A by a screw threaded shaft I′, Fig. 2, which is rotated, with an intermittent motion, by means of the bevel gears I^2 and I^3, shaft I^4 and a ratchet I^5, which is driven by a pawl I^8 carried upon a rocking lever I^6 and connected by a link I^7 to a lever J, which is capable of an oscillating motion upon a fixed stud held by the bed of the machine.

The link I^7 is pivoted upon a stud I^{8a}, which is capable of adjustment along the lever J by means of the screw I^9. The lever J is operatively connected with the oscillating crank-disk by a link J′. The pawl I^8 is two-pronged, so as to allow the ratchet wheel to be rotated in either direction.

I do not confine myself to the specific mechanism by which power is communicated from the main shaft B to the toothed wheel B^{10}, nor to the specific mechanism by which the rocker-plate C^3 is actuated; the purpose of my invention being to secure a positive, operative connection between an oscillating wheel, and the crank disk A^4 instead of a frictional connection as is commonly used; and the employment in the feeding mechanism of a metal planing machine of a reciprocating wheel and a crank-disk positively connected therewith I deem to be new.

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

1. The combination with the reversible driving shaft of a planer, of a toothed wheel rotated thereby, a crank disk rotating concentrically with said toothed wheel, a stud C^2

carried by said crank disk, a rocker-plate C^3 carried by said stud and provided with teeth C^4, C^4 adapted to alternately engage said toothed wheel and connected means by which said rocker-plate is rocked to bring its teeth alternately into engagement with said toothed wheel and cause said crank disk to be rotated by said toothed wheel, substantially as described.

2. The combination with a reversible driving shaft of a planer, of a toothed wheel rotated thereby, a crank disk rotating concentrically with said toothed wheel, a stud C^2 carried by said crank disk, a rocker-plate C^3 carried upon said stud and having teeth C^4, C^4 adapted to alternately engage said toothed wheel, connected means whereby said rocker-plate is rocked on said stud to carry its teeth alternately into engagement with said toothed wheel and connected means by which said rocker-plate is rocked on said stud to carry its teeth out of engagement with said toothed wheel, substantially as described.

3. The combination with the reversible driving shaft of a planer and a toothed wheel rotated thereby, of a crank-disk rotating concentrically with said toothed wheel and operatively connected with tool feeding mechanism, clutching mechanism carried by said crank-disk and adapted to engage said toothed wheel, whereby the rotation of said toothed wheel is positively imparted to said crank-disk, a pivoted lever carried by said crank-disk having one end operatively connected with said clutching mechanism and its opposite end arranged to project beyond the periphery of said crank-disk by the rocking of said plate, and a fixed stud placed in the path of said projecting end, whereby the rotation of the crank-disk will automatically disconnect the clutching mechanism from said toothed wheel, substantially as described.

4. The combination with the reversible driving shaft of a planer, and a toothed wheel rotated thereby, of a crank-disk rotating concentrically with said toothed wheel and operatively connected with tool feeding mechanism, a rocking plate pivoted on said crank-disk and provided with teeth adapted to engage said toothed wheel, connected actuating mechanism by which said plate is rocked so as to cause its teeth to alternately engage said toothed wheel and studs D^3, D^3, projecting from said rocking-plate, levers, or dogs D′, D′, pivoted upon said crank-disk, each of said levers having one of its ends resting against one of said studs and its opposite end projecting beyond the periphery of said crank-disk, and a fixed stud placed in the path of said projecting ends, whereby said toothed wheel and said crank-disk are disconnected automatically by the rotation of said crank-disk, substantially as described.

5. The combination with the reversible driving shaft of a planer, of a toothed wheel rotated thereby, a crank-disk rotating concentrically with said toothed wheel and operatively connected with tool feeding mechanism, clutching mechanism carried by said crank-disk and adapted to engage said toothed wheel, whereby the rotation of said toothed wheel is positively imparted to said crank-disk, a friction wheel rotated by the reversible shaft of the planer and a friction strap engaging said friction wheel, said friction strap and said clutching mechanism being operatively connected, whereby the rotation of said friction wheel will cause the clutching mechanism to engage said toothed wheel, substantially as described.

6. The combination with the reversible driving shaft of a planer, of a toothed wheel rotated thereby, a crank-disk rotating concentrically with said toothed wheel and operatively connected with tool feeding mechanism, a rocking plate pivoted upon said crank-disk and provided with teeth adapted to engage said toothed wheel, a friction wheel rotated by the reversible shaft of the planer, and a friction strap engaging said friction wheel and operatively connected with said rocking plate, substantially as described.

7. The combination with the reversible driving shaft of a planer, of a toothed wheel rotated thereby and provided with a concentric frictional surface, a friction strap engaging the frictional surface of said wheel, a crank disk rotating concentrically with said toothed wheel, a rocking plate pivoted upon the side of said crank disk and having teeth adapted to engage said toothed wheel, a link connecting said friction strap and said rocking plate, whereby the rotation of said toothed wheel will cause the rocking plate to be actuated and brought into engagement with said toothed wheel, substantially as described.

8. The combination with the reversible driving shaft of a planer, of a toothed wheel rotated thereby and provided with a concentric frictional surface, a friction strap engaging the frictional surface of said wheel, a crank-disk rotating concentrically with said toothed wheel, a rocking plate pivoted upon said crank-disk and provided with teeth adapted to engage said toothed wheel, a link connecting said rocking plate and said friction strap, studs projecting from said rocking plate, levers pivoted upon said crank-disk and having one end resting against said studs and with their opposite ends to project beyond the periphery of said crank-disk by the rocking of said plate and a fixed stud placed in the path of said projecting ends, substantially as described.

9. The combination with the reversible driving shaft of a planer, of a wheel rotated thereby, and provided with a friction flange, a crank-disk operatively connected with tool feeding mechanism, a clutching mechanism between said crank-disk and said toothed wheel, whereby the motion of said toothed wheel is positively imparted to said crank-

disk, a stud carried by said crank-disk and a friction strap attached to said stud and engaging said friction flange, whereby the movement of said disk, in advance of said wheel is checked, substantially as described.

10. The combination of a reciprocating crank-disk A^4, oscillating lever J, link J′, rocking lever I^6, link I^7, pawl I^8, ratchet wheel I^5, shaft I^4, feed screw I′, and bevel gears I^2 and I^3, substantially as described.

Dated this 10th day of January, 1893.

FREDERICK E. NORTON.

Witnesses:
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