

No. 639,774.

Patented Dec. 26, 1899.

A. S. ROBINSON.

MACHINE FOR GRINDING CUTTER BARS OF MOWING MACHINES.

(Application filed Oct. 15, 1897. Renewed Nov. 6, 1899.)

(No Model.)

3 Sheets—Sheet 1.

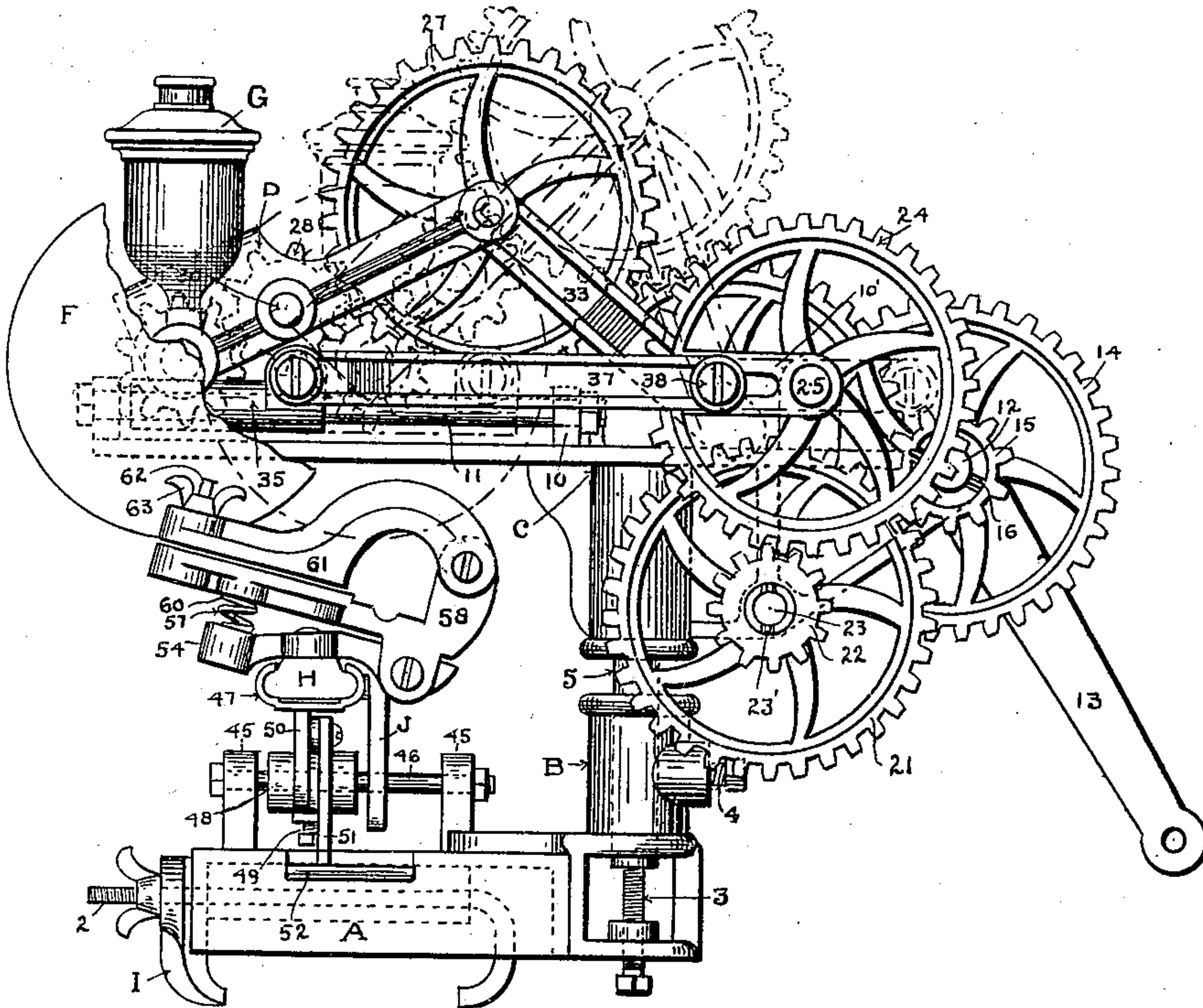


Fig. 2.

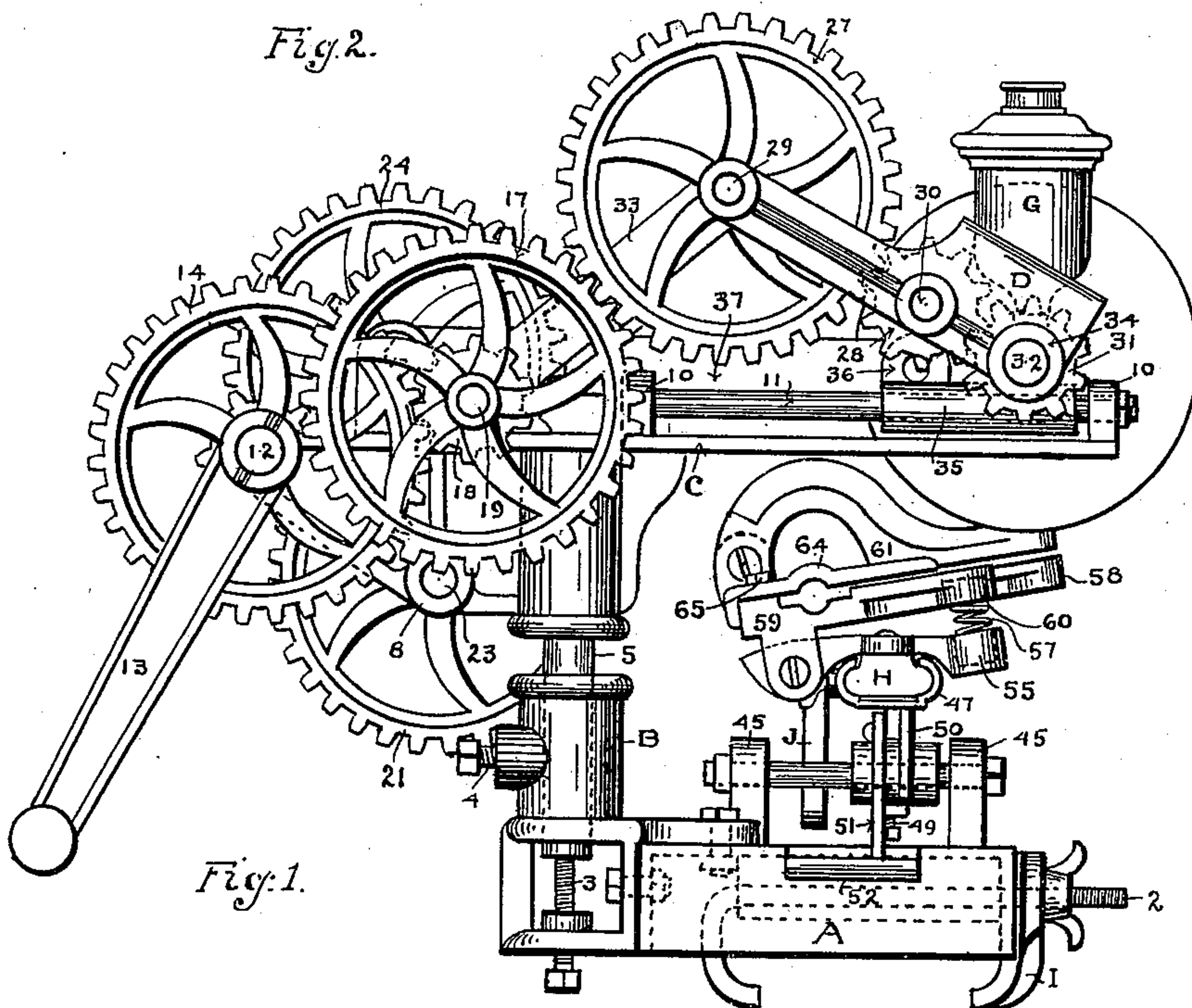


Fig. 1.

Witnesses.

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3 Sheets—Sheet 2.

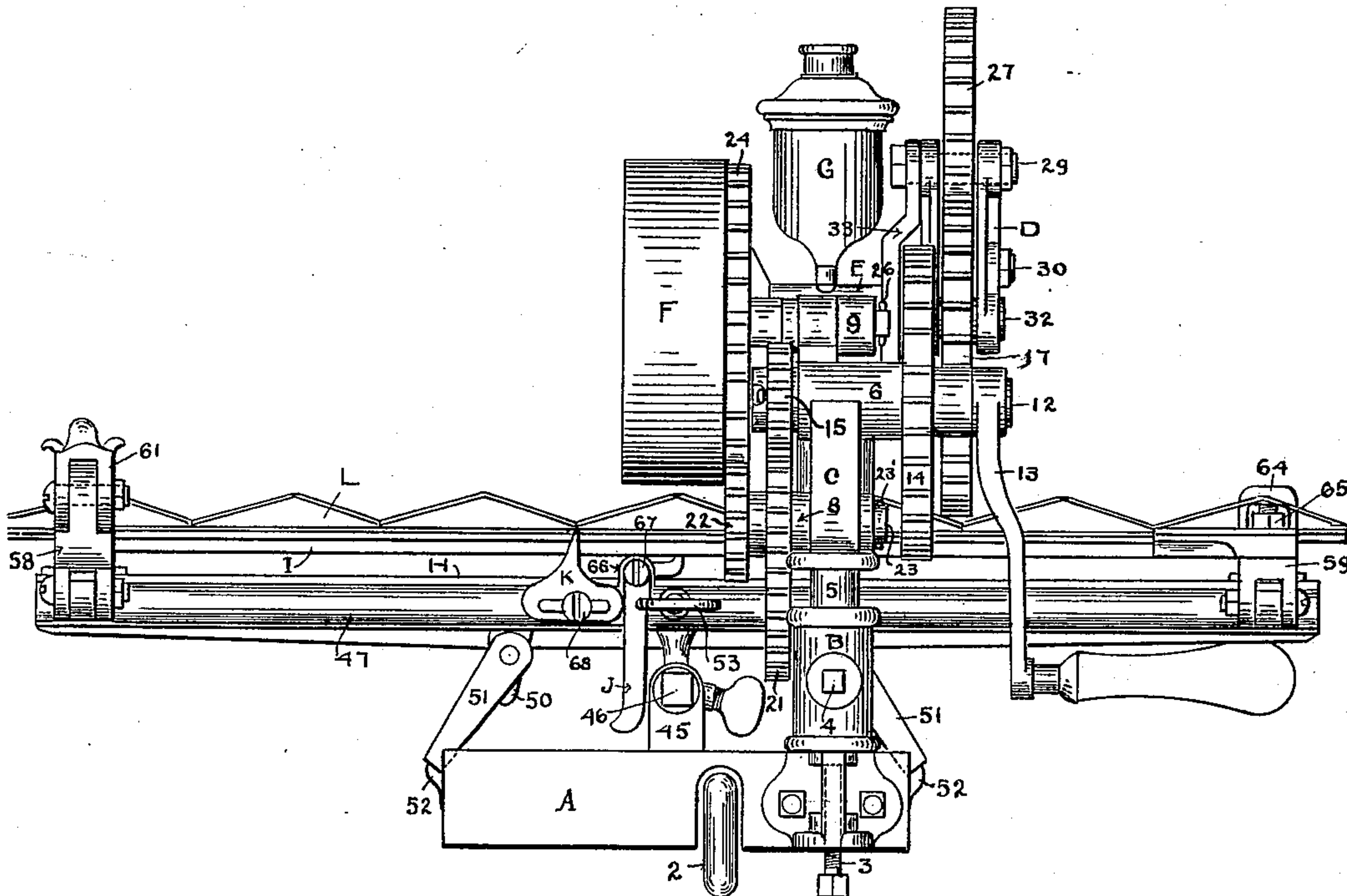


Fig. 3.

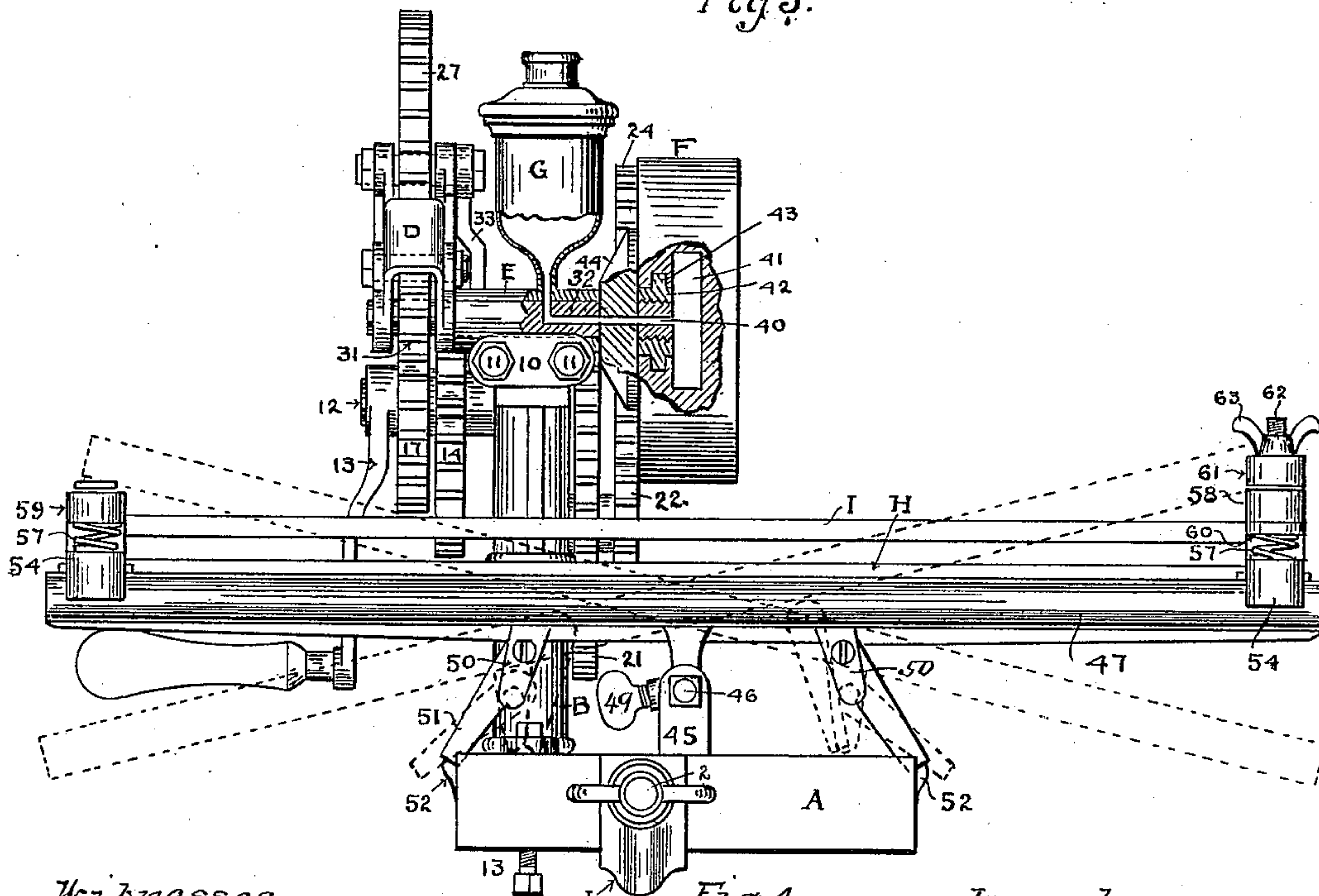


Fig. 4.

Witnesses.
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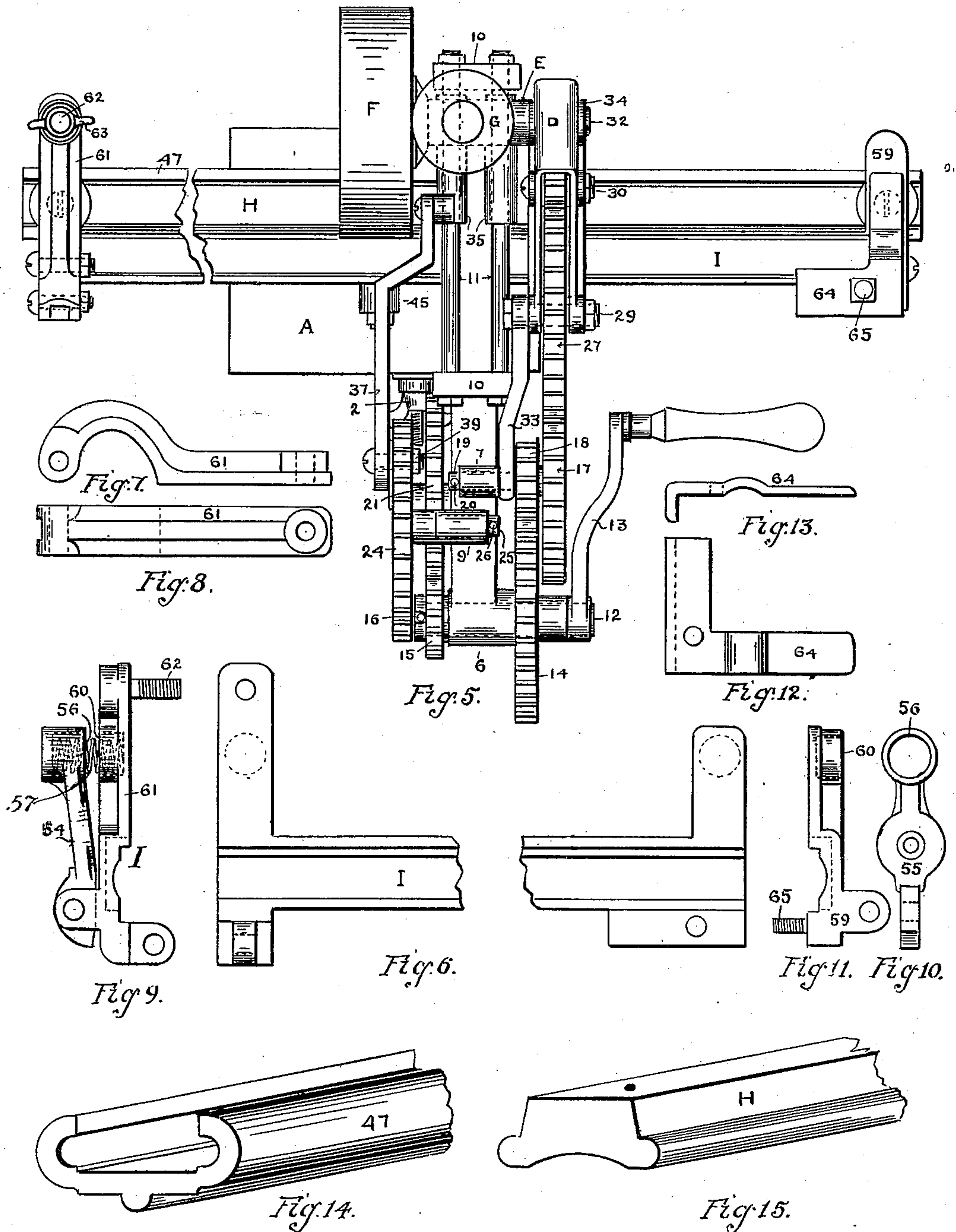
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(No Model.)

3 Sheets—Sheet 3.



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UNITED STATES PATENT OFFICE.

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MACHINE FOR GRINDING CUTTER-BARS OF MOWING-MACHINES.

SPECIFICATION forming part of Letters Patent No. 639,774, dated December 26, 1899.

Application filed October 15, 1897. Renewed November 6, 1899. Serial No. 736,060. (No model.)

To all whom it may concern:

Be it known that I, ALBERT S. ROBINSON, of Albany, in the county of Albany and State of New York, have invented new and useful
5 Improvements in Machines for Grinding the Knives of Cutter-Bars of Reaping and Mowing Machines, of which the following is a specification.

My invention consists in certain novel features of construction and combinations and arrangements of parts and devices, as hereinafter set forth, and pointed out in the claims.

The main object of my invention is to provide a simple and effective machine by means
15 of which the knives of a cutter-bar may be quickly sharpened by grinding while in place on the bar and have their original angles of edges and bevels preserved.

Other objects and advantages of the invention will be fully understood from the following description and claims when taken in connection with the annexed drawings, forming a part of the specification.

In the accompanying drawings, which are
25 herein referred to, Figure 1 is a side elevation of my machine. Fig. 2 is a transverse elevation of the same with the abrading-wheel broken away, showing concealed parts. Fig. 3 is an end elevation with the cutter-bar with
30 its attached knives secured therein. Fig. 4 is a transverse end elevation of the same. Fig. 5 is a plan view of the same. Fig. 6 is an enlarged plan view, broken, of the cutter-bar rest which connects the clamps for securing the cutter-bar when grinding. Figs.
35 7 and 8 are respectively a side elevation and a plan view of one of the two clamps for holding the cutter-bar. Fig. 9 is a vertical side elevation of said clamp. Fig. 10 is a plan view
40 of a part of said clamp. Fig. 11 is a vertical side elevation of the other of said clamps. Figs. 12 and 13 are respectively a plan view and a side elevation of parts of said clamp. Fig. 14 is an enlarged section of the sliding-bar socket. Fig. 15 is the sliding bar, to which
45 are attached cutter-bar rest and clamps.

Like marks of reference indicate like parts throughout the several views.

As illustrated in the drawings, A designates
50 the bed-plate of my machine, which is preferably made of iron and is provided with sta-

tionary jaw 1 and adjustable clamp bolt and nut 2, by which the machine can be temporarily secured to a convenient part of a mowing-machine or other suitable place where the machine can be held stationary when required
55 for use.

B is a vertical socket which is secured to bed-plate A and provided with adjusting-screw 3 and set-screw 4.
60

C is the frame for supporting the operating mechanism, which is hereinafter described, and is provided with a spindle 5, which fits into and is passed down through vertical socket B, with its lower end resting on adjusting-screw 3. Said adjusting-screw 3 is
65 for the purpose of accurately bringing the face-surface of the abrading-wheel to bear on the bevel edge of the knives in the operation of grinding, as hereinafter specified. On said
70 frame C are arranged journal-bearings 6, 7, 8, and 9 and lugs 10. Said lugs are perforated to receive slide-rods 11, as shown in Figs. 1, 2, and 5. In journal-bearing 6 rotates driving-shaft 12, which is provided at one end
75 with crank 13, next to which is securely fastened spur-wheel 14. At the opposite end of said shaft 12 is mounted pinion 15, which is securely fastened to said shaft and rotates
80 with the same by means of key 16, which key also holds the shaft in journal-bearing 6 and allows said shaft to rotate freely. Rigidly secured to one end of shaft 19 is spur-wheel
17 and pinion 19. Said shaft is passed through and is rotated in journal-bearing 7 and held
85 in place by means of key 20, pinion 18 being in mesh with spur-wheel 14. Spur-wheel 21 and pinion 22 are rigidly secured to shaft 23. Said shaft is passed through and rotates in
90 journal-bearing 8, with spur-wheel 21 in mesh with pinion 15, and held in place by key 23.

24 is a spur-wheel provided with a shaft 25, rigidly secured thereto, and is rotated in journal-bearing 9 and secured in place by key 26 through outer end of said shaft, with said
95 spur-wheel in mesh with pinion 22, and is provided with slotted crank-arm 10'.

D is a journal-bearing case in which is secured spur-wheel 27 and pinion 28, which are
100 loosely mounted on journals 29 and 30 and are in mesh with each other and pinion 31, which is rigidly secured to shaft 32 and freely

revolves in journal-bearing case D. Spur-wheel 27 is connected and made to properly mesh with spur-wheel 17 by means of connecting-rod 33, one end of which is mounted on shaft 19, and its opposite end is mounted on shaft 29, by which means it admits of being actuated in either direction, keeping the said spur-wheels in perfect mesh with each other.

E is a journal-bearing in which revolves shaft 32. To one end of said shaft is secured abrading-wheel F. The opposite end of said shaft is passed through journal-bearing 34 of journal-bearing case D. Rigidly secured to said shaft 32 and within said journal-bearing case is pinion 31, which meshes with pinion 28 and holds journal-bearing case D in position with journal-bearing E. Journal-bearing E rests upon and has securely attached thereto on its under side slide-bearings 35, which operate on slide-rods 11. One of said slide-bearings is provided with lug 36, to which is pivoted one end of pitman 37. The opposite end of said pitman is pivoted to slotted crank-arm 10' of spur-wheel 24. By this means, when in operation, journal-bearing E and slide-bearings 36, together with abrading-wheel F, water-cup G, which is hereinafter described, and journal-bearing case D, are caused to move backward and forward on slide-rods 11, imparting an automatic movement to same, as shown in full and dotted lines in Fig. 2. Length of said backward-and-forward movement is regulated by adjusting pitman 37 in the slotted arm 10' of spur-wheel 24 by means of pivot-stud 38, which stud is firmly secured at any desired position in slotted arm 10 by means of bolt and nut 39. A water-cup G surmounts the journal-bearing E and has an open communication with the bore of said journal-bearing. The shaft 32 has a passage 40, whose inner end is formed at an angle to the line of said passage and is open at the periphery of said shaft to form a water-inlet opening, which by the rotation of the shaft 32 will be brought into intermittent communication with the opening in the lower end of the water-cup G, and the outlet-opening of said passage will form a constantly-open communication with a water-chamber 41, formed in the center of the abrading-wheel F. Said abrading-wheel is provided with a screw-threaded metal attaching device 42, made in said abrading-wheel, and is rigidly held in place by flange or web 43, and extends from the outer surface of said wheel to the wall of water-chamber 41 for the purpose of attaching the abrading-wheel F to shaft 32. The opposite wall of said water-chamber is made solid and has no opening or outlet. Said shaft is provided with a screw-thread cut on its end to receive the said attaching device, and by screwing abrading-wheel F tight against collar 44 it is firmly held in place, thereby preventing any possibility of a leakage of water therefrom, as shown by parts broken away in Fig. 4. The abrading-wheel F is made porous, so that

the water from the chamber 41 will percolate through the pores and ooze from every part of the surface of the periphery of said wheel, and the water so supplied will prevent the friction produced by said wheel in its operation of grinding from heating and drawing the temper from the knives, and it should be understood that by centrifugal force generated by the rapid rotations of the abrading-wheel G the water will be thoroughly diffused through all parts of the latter, so that no portion of its surface can remain in a dry condition.

Attached to the upper surface of bed-plate A are vertical bearings 45, in which operates rocking shaft 46. On said shaft is mounted slide-bar socket 47 by means of journal-bearing 48. The slide-bar socket and journal-bearing can be moved to any desired position upon rocking shaft 46 and is secured in place by means of set-screw 49. To the under side of slide-bar socket 47 is rigidly attached stops 50. Pivoted to said stops are supports 51. The object of said stops and supports are for securely holding slide-bar socket at angles, as shown by dotted lines in Fig. 4, also in a horizontal position, as shown in Fig. 3, by said supports resting in socket 52, attached to the side of bed-plate A. The slide-bar socket can be moved from the horizontal position to either of the angles shown by dotted lines in Fig. 4 by means of rocking shaft 46 and securely held in place by one of the stops 50, resting on the upper surface of bed-plate A, while the support pivoted to the oppositely-located stop is drawn up and also rests on said bed-plate, as shown by dotted lines in Fig. 4.

H is the slide-bar, which operates in slide-bar socket 47. Said slide-bar can be adjusted at any desired point on slide-bar socket and held in position by thumb-screw 53. Rigidly attached to the upper surface, at or near the end of slide-bar H, are clamp parts 54 and 55, which are each provided at its outer end with socket 56, in which rests spiral spring 57. At the opposite end of clamp parts 54 and 55 is hinged cutter-bar rest I, at one end of which is located arm 58 and at the opposite end arm 59. On the under surface of said arms are sockets 60, made to conform with sockets 56, for the purpose of holding and keeping in place spiral spring 57. Hinged to one end of arm 58 is clamp part 61, which is perforated at or near its outer end to admit of said clamp part being closed down on cutter-bar when in position on cutter-bar rest I to hold said cutter-bar rigidly in position by means of bolt 62 and nut 63. On the upper surface of arm 59 is loosely mounted clamp part 64, which is made to close down on and more securely hold in position cutter-bar when grinding by means of bolt and nut 65.

J is a hand-lever loosely mounted on and near the center of slide-bar socket 48 by means of bearings 66 and bolt 67.

K is a slotted indicating-pointer attached to the side of slide-bar socket 48 and held in place by means of screw 68 and can be adjusted in relation to the face of the abrading-wheel, so that when the cutter-bar socket is at either angle the edge of said abrading-wheel will be at the outer edge or dividing-line of the knives on the cutter-bar and in position for grinding, and in which position the abrading-wheel passes over the bevel-cutting edge of the knife, grinding from one edge of the face-surface of said abrading-wheel to the opposite edge, by which operation the face-surface of said abrading-wheel will always remain in perfect condition. Abrading-wheel F is rotated and moved backward and forward through intermediate gearing by means of power being imparted to hand-crank 13.

L is a section of a cutter-bar used in mowing-machines with a series of knives attached.

My invention is operated in the following manner: A cutter-bar L is placed on cutter-bar rest I when the same is in a horizontal position and is held in place by clamp mechanism and is adjusted for grinding by shifting slide-bar H so that indicating-pointer K is at the dividing-line between the knives of said bar and held in place by thumb-screw 53. The slide-bar is then tilted at the angle provided by the stops. The bevel edge of the knife is thus made to come in perfect contact with the face of the abrading-wheel and is held close up to the same by means of the spiral springs 57. Should said springs at any time prove not strong enough, then the necessary friction can be obtained and the bevel edge of the knives can be brought in closer contact with the abrading-wheel by raising the cutter-bar by means of the hand-lever J. The backward-and-forward movement of the abrading-wheel grinds the knife from heel to point, retaining the original bevel until the knife is worn out. After grinding one edge of the knife the slide-bar socket 47 is tilted to the opposite angle and the same process is gone through. Then the slide-bar socket is returned to its horizontal position and the slide-bar is shifted so that the indicating-pointer is at the next dividing-line between the knives and then tilted to the angle, and the several operations above described should be continued until each cutting edge of all the knives have been properly sharpened. The slide-bar socket can be adjusted on the rocking shaft 46 by means of the set-screw, so that the knives, which are partially covered by the knuckle-joint rib at one end of the cutter-bar, can be perfectly ground. By this mechanism the knives are all ground uniform, and the face of the abrading-wheel is kept perfectly level by the manner in which it grinds until the abrading-wheel is worn out.

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

1. In a machine for grinding knives of cutter-bars, the combination of a bed-plate A,

provided with a stationary clamp-jaw for adjustably carrying a frame-support C and sockets 52 arranged on the oppositely-located vertical sides of said bed-plate, in which rest supports 51 and vertical bearings 45, of a rocking shaft 46 as and for the purposes set forth.

2. In a machine for grinding knives of cutter-bars, the combination of a bed-plate provided with a clamp-jaw and an adjustable clamp bolt and nut, a vertical socket for adjustably carrying a frame-support C, and sockets arranged on the oppositely-located vertical sides of said bed-plate, in which rest supports 51, vertical bearings and a rocking shaft, of a sliding-bar socket 48 adjustably mounted on said rocking shaft and provided with stops 50 and supports 51 and an adjustable indicating-pointer K, substantially as and for the purposes set forth.

3. In a machine for grinding cutter-bars the combination of a bed-plate provided with a stationary clamp-jaw and an adjustable clamp bolt and nut, a vertical socket for adjustably carrying a frame-support C and sockets arranged on the oppositely-located vertical sides of said bed-plate, in which rest supports 51, vertical bearings and a rocking shaft, a sliding-bar socket, adjustably mounted on said rocking shaft and provided with stops and supports, an adjustable indicating-pointer, of a sliding bar H fitted to be adjustably moved longitudinally on said sliding-bar socket and carries a cutter-bar rest I provided with means substantially as specified for adjustably holding a cutter-bar, and spiral springs 57 as and for the purposes specified.

4. In a machine for grinding knives of cutter-bars, the combination of a bed-plate provided with a stationary clamp-jaw and an adjustable clamp-bolt and nut, a vertical socket for adjustably carrying a frame-support and sockets arranged on the oppositely-located vertical sides of said bed-plate in which rest supports, vertical bearings and a rocking shaft, a sliding-bar socket adjustably mounted on said rocking shaft and provided with stops and supports, an adjustable indicating-pointer, a sliding bar H fitted to be adjustably moved longitudinally in said sliding-bar socket and carries a cutter-bar rest provided with means substantially as specified for adjustably holding a cutter-bar and spiral springs, of a hand-lever J arranged to raise said cutter-bar rest to bring the cutting edge of the knife in closer contact with the face-surface of the abrading-wheel as herein specified.

5. In a machine for grinding knives of cutter-bars, the combination with a cutter-bar holder, frame C, provided with the downward-projected spindle 5, abrading-wheel F carried by said frame, of the bed-plate A, vertical socket B secured to said bed-plate and nicely receiving said spindle, adjusting-screw 3, working up through the bottom of said socket and against the lower end of said spindle, and

set-screw 4 working in a side of said socket and against said spindle, whereby the circumferential face of said abrading-wheel may be adjusted in relation to the beveled edge of the knives, held by said cutter-bar holder, as set forth.

6. In a machine for grinding knives of cutter-bars, the combination with a cutter-bar holder, frame C provided with the downward-projected spindle 5, abrading-wheel F carried by said frame, gear mechanism also carried by said frame and adapted to revolve said abrading-wheel, of the bed-plate A, vertical socket B secured to said bed-plate and receiving the said spindle of frame C, adjusting-screw 3 working upwardly through the bottom of said socket and against the lower end of said spindle, and set-screw 4, working through a side of said socket and against said spindle, whereby the said abrading-wheel may be held properly adjusted in relation to the edge of the knife held by said cutter-bar holder and be revolved in contact with the said edge of the knife, as set forth.

7. In a machine for grinding knives of cutter-bars, the combination with a cutter-bar holder, frame C provided with the downward-projected spindle 5, abrading-wheel F carried by said frame, gear mechanism also carried by said frame and adapted to revolve said abrading-wheel, mechanism also carried by said frame and adapted to impart a reciprocating movement to said abrading-wheel while it is being revolved, of bed-plate A, vertical socket secured to said bed-plate and receiving the said spindle of frame C, adjusting-screw 3 working upward through the lower end of said socket and against the lower end of said spindle and set-screw 4, working through a side of said socket and against said spindle, whereby the said abrading-wheel may

be held adjusted in relation to the beveled edge of the knife held by the cutter-bar holder, and be moved reciprocatingly the length of the beveled edge while its circumferential face is being revolved in contact with said beveled edge of the knife, as set forth.

8. In a machine for grinding knives of cutter-bars the combination of a vertical socket, a frame-support having a spindle adjustably fitted into said vertical socket, an adjusting-screw, a set-screw, and the operating mechanism substantially as specified mounted on said frame-support, a journal-bearing case one end of which is mounted on shaft 32, the opposite end connected to shaft 19 of the operating mechanism by means of connecting-rod 33, of a journal-bearing E as and for the purposes specified.

9. In a machine for grinding knives of cutter-bars, the combination with a porous abrading or grinding wheel, containing the centrally-located water-chamber 44 having a solid or closed front end wall, the internal screw-threaded metal piece 42, having its inner end provided with flange 43, and seated centrally in the rear side wall of the said chambered abrading-wheel and clamping it from its chamber side, and the revolving shaft 32 having a screw-threaded end screwing into the said flanged metal piece 42, and collar 44 on said revolving shaft and clamping on the outer side of the rear side wall, of the water-duct 40 made longitudinal and central in the said revolving shaft 32, and the water-cup G intermittently connecting with said water-duct, substantially as and for the purposes set forth.

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Witnesses:

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