No. 847,463.

PATENTED MAR. 19, 1907.

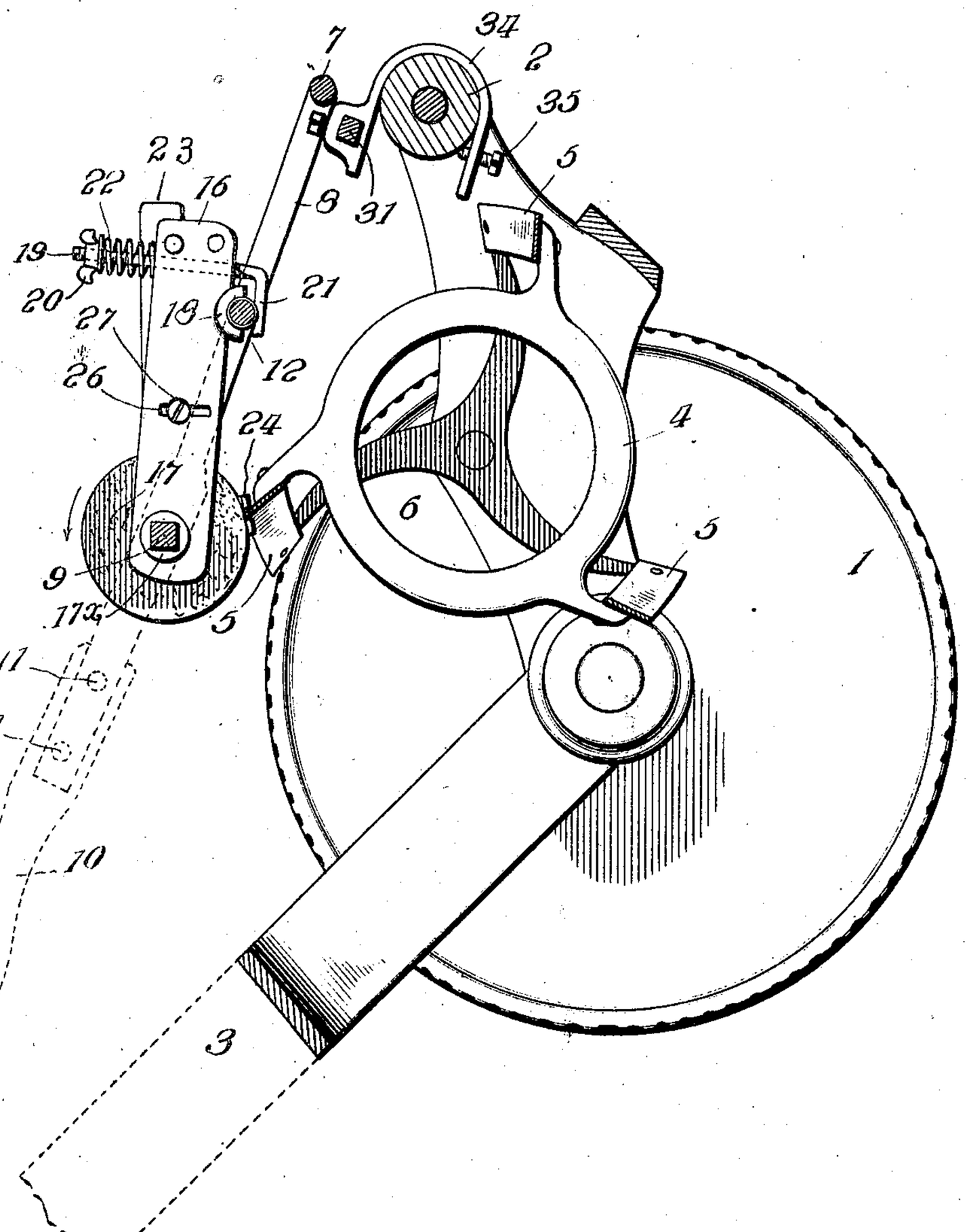
A. S. BUSSELLE & J. W. PEDIGO.

GRINDING MACHINE.

APPLICATION FILED OCT. 30, 1906

2 SHEETS—SHEET 1.

FIG. 1.



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2 SHEETS—SHEET 2.

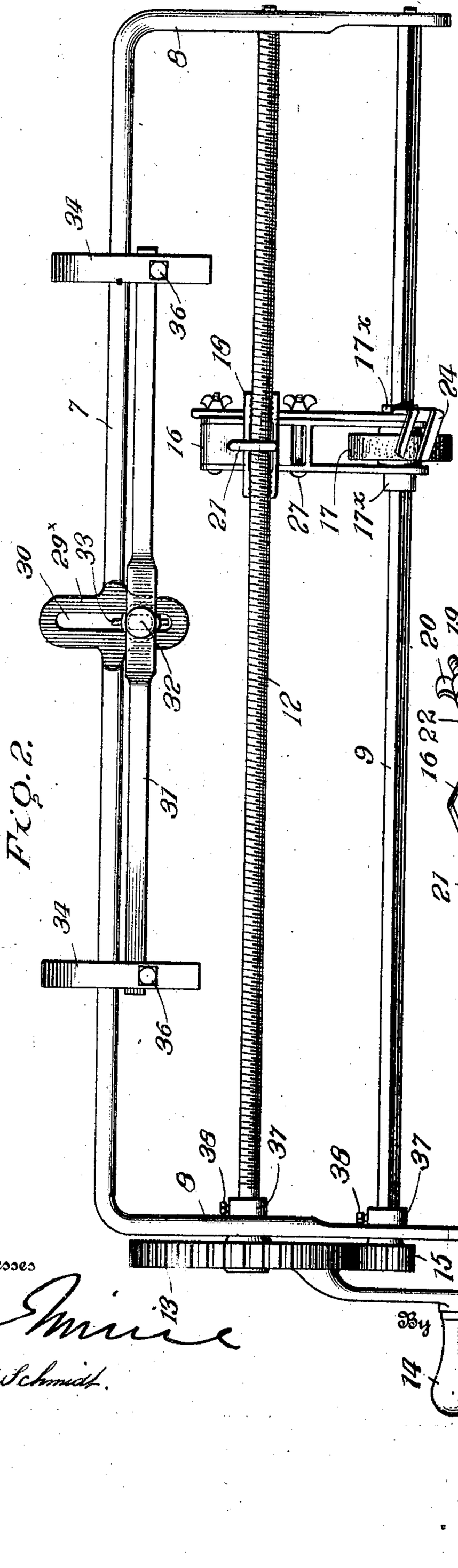

FIG. 2.

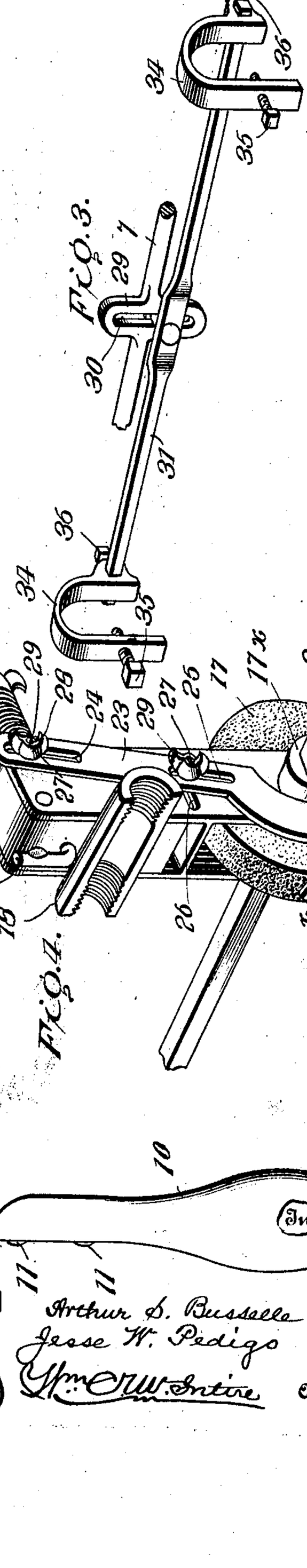

FIG. 3.

FIG. 4.

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UNITED STATES PATENT OFFICE.

ARTHUR S. BUSSELLE AND JESSE W. PEDIGO, OF CHARITON, IOWA.

GRINDING-MACHINE.

No. 847,463. Specification of Letters Patent. Patented March 19, 1907.

Application filed October 30, 1906. Serial No. 341,270.

To all whom it may concern:

Be it known that we, ARTHUR S. BUSSELLE and JESSE W. PEDIGO, citizens of the United States, residing at Chariton, in the county of Lucas and State of Iowa, have invented certain new and useful Improvements in Grinding-Machines; and we do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

Our invention relates to certain new and useful improvements in grinding-machines especially adapted to sharpening the blades of lawn-mowers, and has for its object to provide a device which, while simple and economic of construction, shall be capable of ready adjustment to lawn-mowers of varying dimensions, uniform in its operation upon each and all of the cutting-blades of a mower, and not requiring skilled labor in its use.

With these ends in view our invention consists in the construction and arrangement of parts, as will be hereinafter and in detail explained.

In order that those skilled in the art to which our invention appertains may know how to make and use our improved device, we will proceed to describe the construction and operation of the same and the manner in which it is used, referring by numerals to the accompanying drawings, in which—

Figure 1 is a central section of a lawn-mower with our improved grinding-machine adjusted thereon and showing the relation, of the grinding-wheel to one of the blades of the mower. Fig. 2 is a longitudinal elevation, on enlarged scale, of the grinding device and looking from front or working face of the machine. Fig. 3 is a perspective view of the adjustable means for securing the frame of the device in proper relation with a lawn-mower, only a portion of said frame being shown; and Fig. 4 is an enlarged perspective view of the grinding-wheel frame with adjustable guide for maintaining said wheel in proper relation to the blade of a lawn-mower, and means for producing the necessary longitudinal feed of the grinding-wheel.

Similar reference-numerals indicate like parts in the several figures of the drawing.

In using our improved machine the lawn-mower 1 is placed in the position shown in Fig. 1, with the usual rear wooden roller 2 upward and the handle 3 resting upon the ground or other support, so that the blade-cylinder 4 may be free to rotate during the feed of the grinding-wheel upon a blade to be sharpened.

5 represents the cutting-blades of the mower, which are usually arranged in slightly helical form and secured at each end to circular cylinder-heads 6.

Having explained briefly the construction and position of the lawn-mower, we will now describe the construction of the grinding-machine, the manner of securing it in position, and its operation.

The frame consists of a longitudinal bar 7, returned at right angles at each end, as shown at 8, the extremity of each of said ends being joined and rigidly held in position by a longitudinal shaft 9, preferably rectangular in cross-section and rotatively mounted in said ends. One of the end portions 8 is extended to constitute a support for a handle 10, which is secured in place by screws 11, although, if thought desirable, the extended portion of the end 8 may itself be fashioned to constitute an integral handle. Intermediate the bar 7 and the shaft 9 and secured to the ends 8 is arranged a shaft 12, which is formed with a feed-thread and journaled at each end in the end portions 8 of the frame and extending beyond one of said ends a sufficient distance to receive a gear-wheel 13, which is keyed thereto and provided with a suitable operating-handle 14. The end of the rotatable shaft 9 below the gear-wheel 13 extends beyond the end 8 and has secured thereto a pinion 15, which meshes with the gear-wheel 13, so that it will be seen that when the gear-wheel 13 is rotated by the handle 14 the shafts 9 and 12 will be correspondingly rotated.

16 is the grinding-wheel frame which is bifurcated at its lower end and within which the grinding-wheel 17, with a cylindrical hub $17^{\times}$ is rotatively mounted. The hub is cored out to fit and slide longitudinally upon the shaft 9 and above the grinding-wheel, and to its frame 16 is rigidly secured in any suitable manner an interiorly-threaded box 18, so located as to embrace the screw-threaded feed-shaft 12, as clearly shown in Fig. 2. Above the threaded box 18 is rotatively mounted in the frame 16 a rod 19, screw-threaded at one end to receive a milled nut 20 and bent at right angle at its opposite end, as shown at 21, and preferably formed on its inner side to enter and traverse within the thread of the feed-shaft 12. A coiled spring

22, surrounding the rear end of the rod 19 is located between the back of the frame 16 and the milled nut 20 and serves to hold the threaded box 18 in contact with the feed-bar 12 when the end 21 of the rod 19 is forced outward and turned down and in contact with the opposite side of the feed-shaft 12, as clearly shown in Fig. 2.

23 is a flat metal arm having at its lower extremity a horizontal bifurcated guide $24^{\times}$, adapted to embrace the cutting edge of the lawn-mower blade, as clearly shown in Fig. 1. The arm 23 is formed with vertical slots 24 and 25 and the frame 16 is provided with a transverse slot 26. A headed screw 27 passes through the slot 26 in the frame 16 and through the vertical slot 25 of the flat arm 23, and a similar screw 28 passes through the upper part of said frame and through the upper vertical slot 24 of the arm 23 and on the threaded end of both of these screws are winged nuts 29. From this construction it will be seen that the arm 23 can be adjusted vertically and can then be vibrated upon the screw 28 and thus adjusted transversely so as to properly bring the bifurcated lower end $24^{\times}$ of said arm in proper relation with the blade of the lawn-mower, as shown in Fig. 1.

From the construction heretofore described it will be seen that the bar 7, with its returned ends 8, the shaft 9, and the feed-shaft 12 constitute a rigid rectangular frame, and in order that said frame with its attached devices may be adjusted vertically as a whole the bar 7 is formed with a central transverse part $29^{\times}$, slotted as shown at 30, (see Fig. 2) and is adjustably secured to an auxiliary frame or bar 31 by means of a screw-bolt 32 and winged nut 33, and this auxiliary frame constitutes the means for attaching the main frame and its devices to the lawn-mower by means of the hooks 34, adapted to embrace the roller 2 and secured in place by set-screws 35. In order that this auxiliary frame may be thus secured to rollers 2 of varying length, the hooks 34 may be longitudinally adjustable upon said frame and secured in any desired position by set-screws 36. The shafts 9 and 12 are made removable from the frame by the employment of collars 37 and set-screws 38, which when released permit said shafts to be withdrawn through the end portion 8, and the withdrawal of the shaft 9 will also permit the grinding-wheel frame 16 and its devices to be removed for repair or substitution of parts when necessary.

Having described the general construction of our improved device and not wishing to be limited in the details of construction which may be varied in many particulars without departing from the spirit of our invention, we will now describe the operation of the same. When it is desired to sharpen the cutting-blades of a lawn-mower, the latter is placed in the position shown in Fig. 1, with the wooden roller 2 upward, and so that the blade-cylinder or heads 4 is free to rotate. The auxiliary frame is then secured to the roller 2 by means of the hooks 34 and set-screws 35, and the main frame is then vertically adjusted by means of the screw 32 and wing-nut 33. The grinding-wheel frame 16 is then brought into feeding relation with the feed-shaft 12 through the medium of the box 18 and rod 19. The arm 23 of the grinding-wheel frame is then adjusted so that the bifurcated extremity $24^{\times}$ will embrace the cutting edge of the blade 5, and being held in such relation by means of the handle 10 the gear-wheel 13 is rotated, and as a result thereof the shafts 9 and 12 are rotated, and the grinding-wheel is accordingly rotated and in consequence of the slidable hub $17^{\times}$ and the feed induced by the threaded shaft 12 the grinding-wheel is caused to travel longitudinally during its rotation. The bifurcated extremity of the flat arm 23 embracing the cutting edge of the blade also travels longitudinally, and as the blade-cylinder is free to rotate it is obviously continuously presented to the grinding action of the wheel 17. The pitch of the feeding-thread of the shaft 12 and the relation of the gear-wheel 13 and pinion 14 are such that the grinding action of the wheel 17 may be effective and uniform throughout the entire length of the cutting-blade. When one blade has been thus sharpened, the rod 19 of the grinding-wheel frame is moved so as to release the end 21 from the thread of the shaft 12 and is then turned up into the position shown in Fig. 4, and the frame is then free to be moved back upon the rod 9 to the starting position. The blade-cylinder is then rotated, and the next blade to be sharpened is brought into proper relation with the bifurcated extremity $24^{\times}$ of the arm 23, and the operation is repeated.

It will be understood that when our improved grinding-machines are constructed with reference to their use upon machines of unvarying dimensions and relation of parts, the auxiliary frame 31 may be omitted and the hooks 34 in such case will be secured directly to the bar 7 of the frame. It will also be readily understood that when our improved grinding-machine is employed to sharpen the blades of lawn-mowers in which the stationary blade is flat that the cutting edge of such stationary blade may also be successfully ground without making any change in the grinding-machine.

Having described the construction and operation of our improved grinding-machine, what we claim as new, and desire to secure by Letters Patent, is—

1. In combination with a frame provided with means for pendent attachment to the wooden roller of a lawn-mower; a grinding-wheel mounted upon a rotatable shaft and longitudinally movable thereon; a rotatable

feed-shaft mounted in the frame above the grinding-wheel; means intermediate the grinding-wheel and the feed-shaft for moving the grinding-wheel longitudinally upon its shaft; means for rotating the grinding-wheel shaft and the feed-shaft; and means connected with the grinding-wheel frame for embracing the edge of the lawn-mower blade and conveying the same into proper relation with the grinding-wheel, substantially as hereinbefore set forth.

2. In a grinding-machine such as described, and comprising a frame adapted to pendent attachment with the wooden roller of a lawn-mower; a rotatable feed-shaft and a rotatable grinding-wheel shaft mounted in said frame; a grinding-wheel mounted in a frame mounted upon the grinding-wheel shaft and longitudinally movable thereon; and adapted for connection with the feeding-shaft, and adjustable means for connecting the grinding-wheel frame with the cutting-blades of a lawn-mower, substantially as hereinbefore set forth.

3. In a grinding-machine such as described, in combination with a frame carrying the grinding and feeding devices, an auxiliary frame adjustably connected with the grinding-mechanism frame, and adapted to be secured to the wooden roller of a lawn-mower in the manner hereinbefore set forth.

4. In a grinding-machine such as described, in combination with a frame carrying the grinding and feeding devices, an auxiliary frame adjustably connected with the grinding-mechanism frame and provided with adjustable means for attachment with the wooden roller of a lawn-mower, substantially as set forth.

5. In a grinding-machine such as described, the grinding-wheel frame longitudinally and vibratively connected with the driving-shaft and provided with means for connection with a feeding-shaft and, means for presenting the cutting edge of a lawn-mower blade to the action of the grinding-wheel, adapted to vertical and vibrative adjustment, substantially as and for the purpose set forth.

6. In a machine such as described in combination with the grinding-wheel frame, a vertically and vibratively adjustable arm secured to the grinding-wheel frame and, terminating in a bifurcated lower extremity adapted to embrace the cutting edge of a lawn-mower blade, substantially as and for the purpose set forth.

7. In a machine such as described provided with means for vibrative connection with the wooden roller of a lawn-mower and embodying a grinding-wheel, and means for rotating and longitudinally feeding said wheel mounted in a frame, a handle suitably located upon said frame, for holding the grinding-wheel and its frame in operative relation to the cutting-blade of a lawn-mower, substantially as hereinbefore set forth.

In testimony whereof we have signed our names to this specification in the presence of two subscribing witnesses.

ARTHUR S. BUSSELLE.
JESSE W. PEDIGO.

Witnesses:
FRED DUNSHEE,
H. B. BLANCHARD.