No. 850,068. PATENTED APR. 9, 1907.

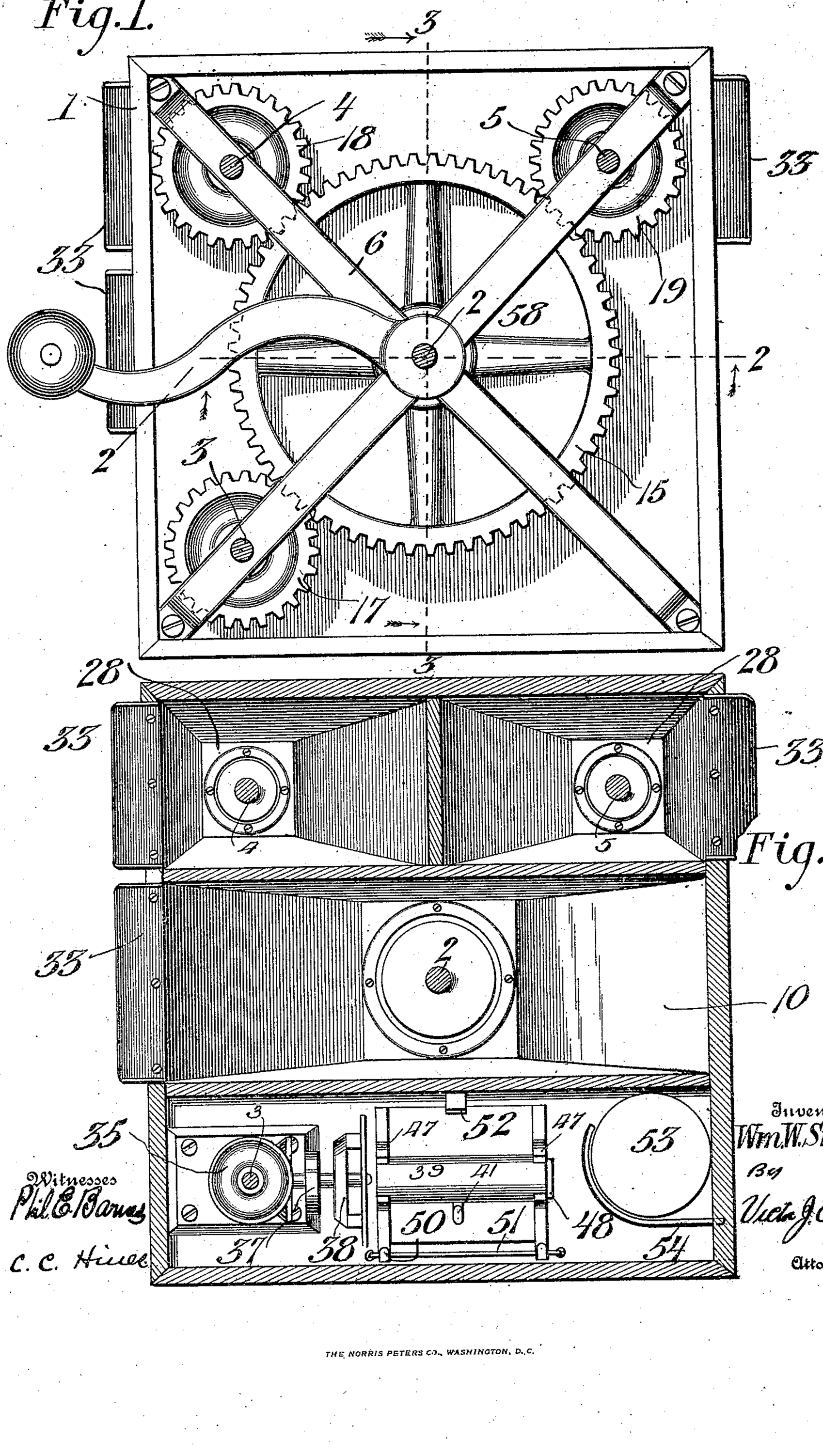
W. W. SMITH.

GRINDING AND GRATING APPARATUS.

APPLICATION FILED NOV. 7, 1906.

4 SHEETS—SHEET 1.

Fig. 1.



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4 SHEETS—SHEET 2.

Fig. 2.

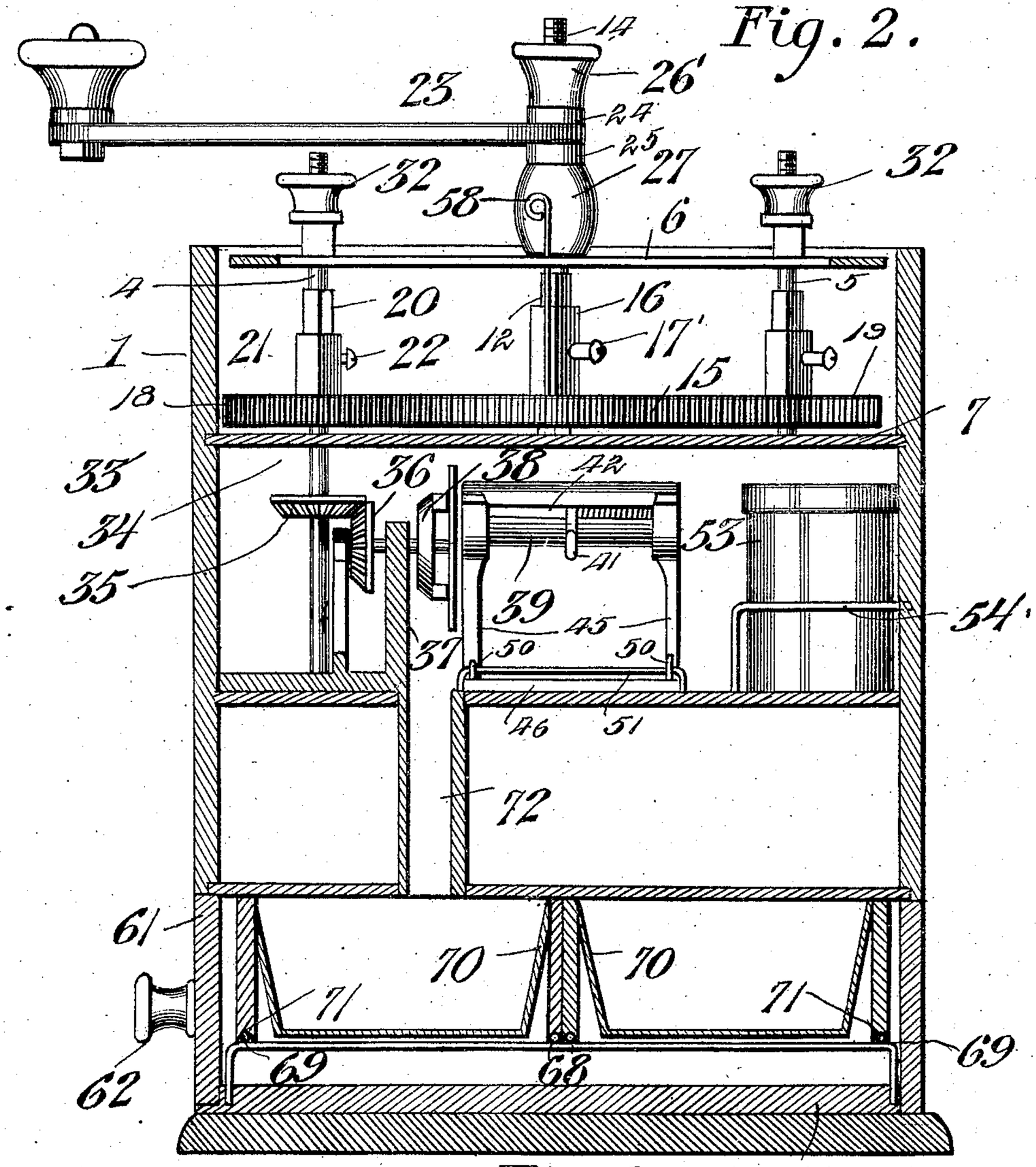


Fig. 8.

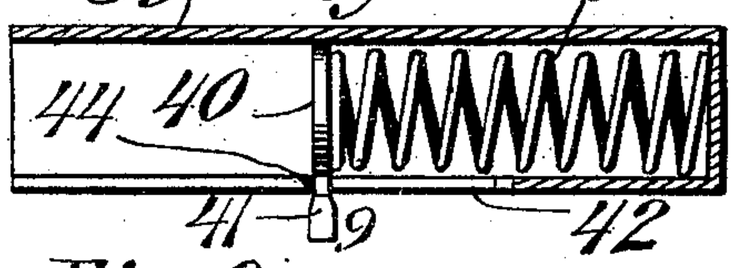
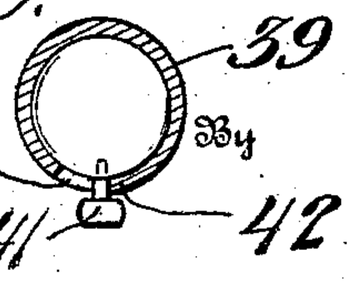


Fig. 9.



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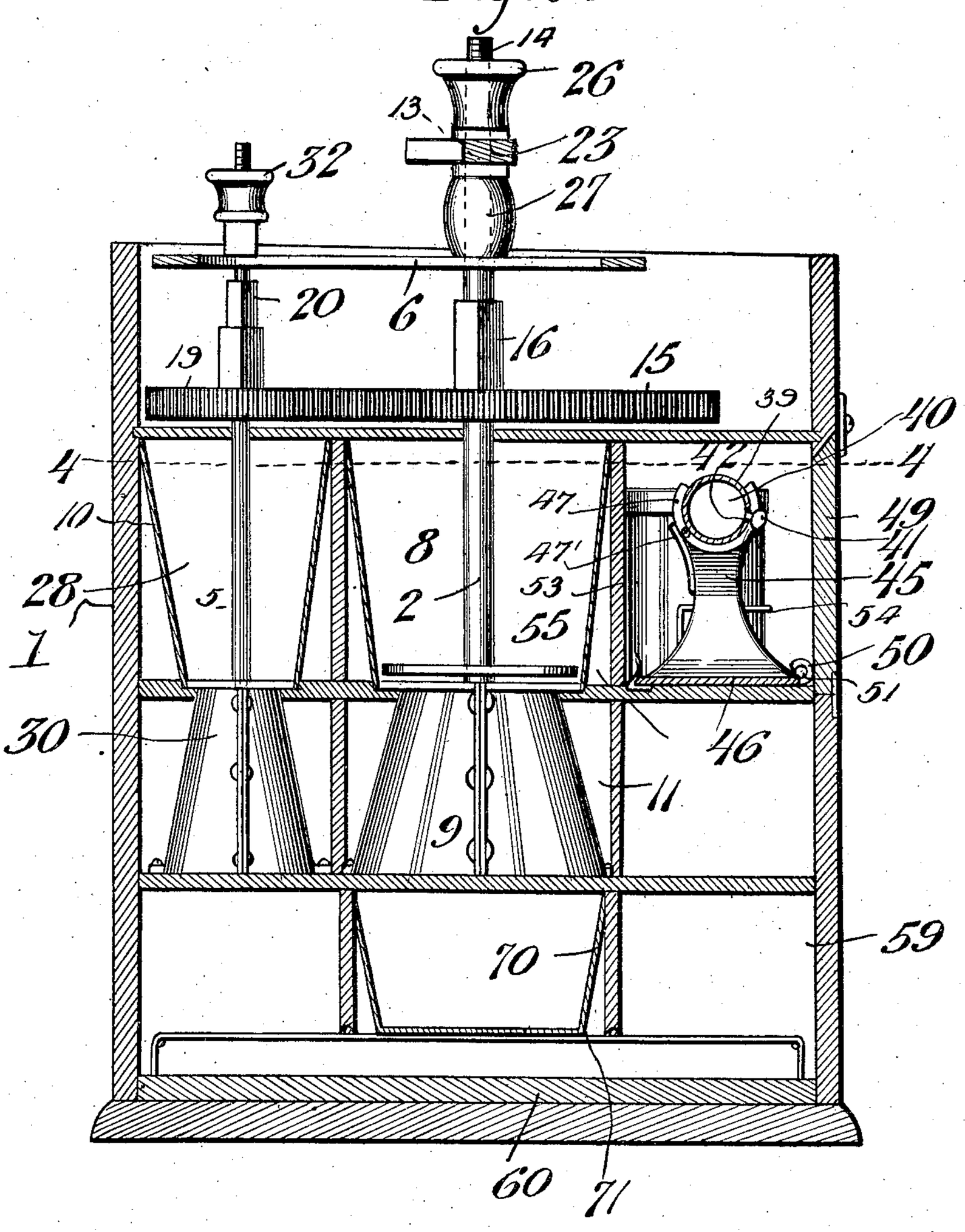
4 SHEETS—SHEET 3.

Fig. 3.



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4 SHEETS—SHEET 4.

Fig. 5.

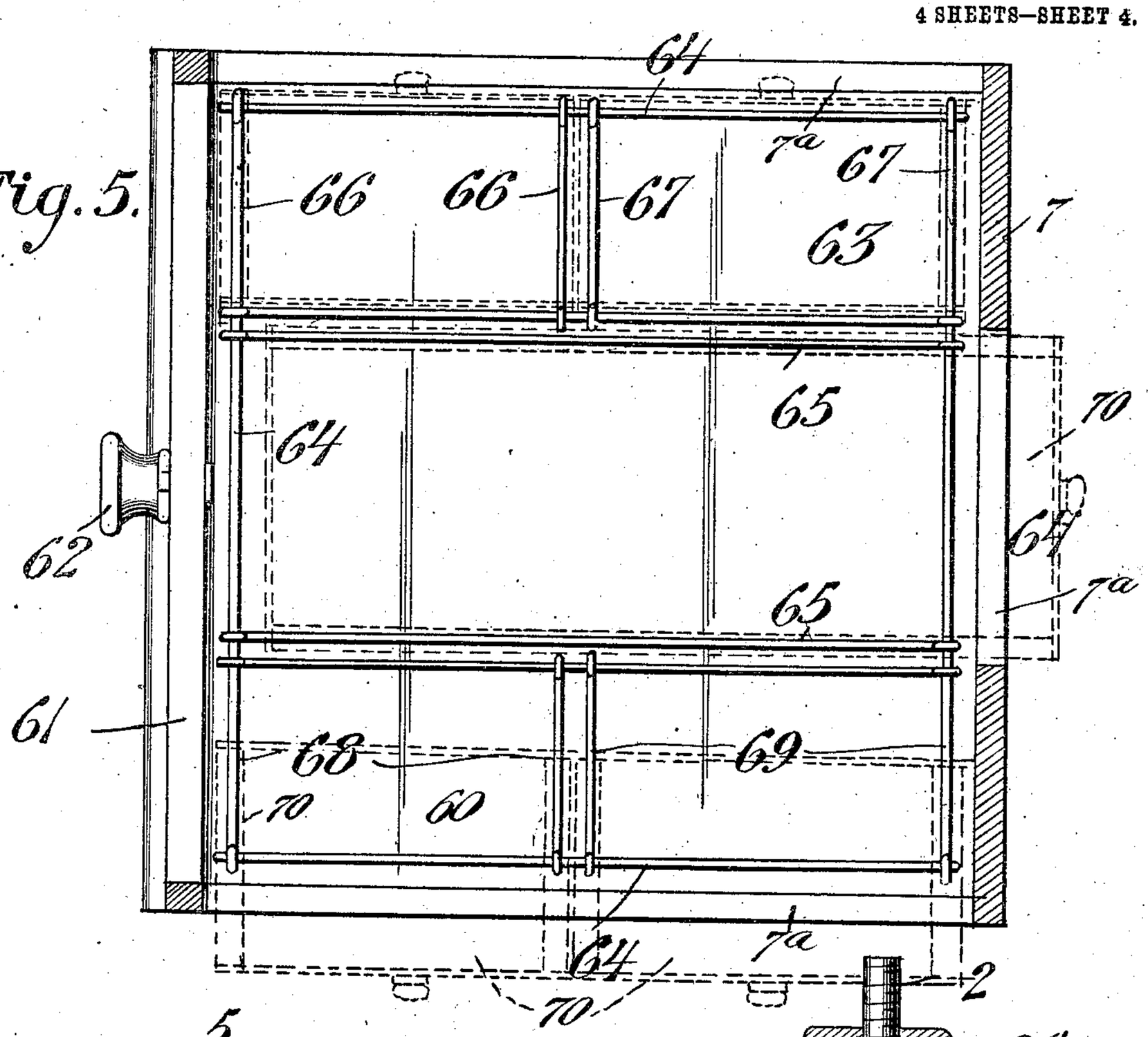


Fig. 6.

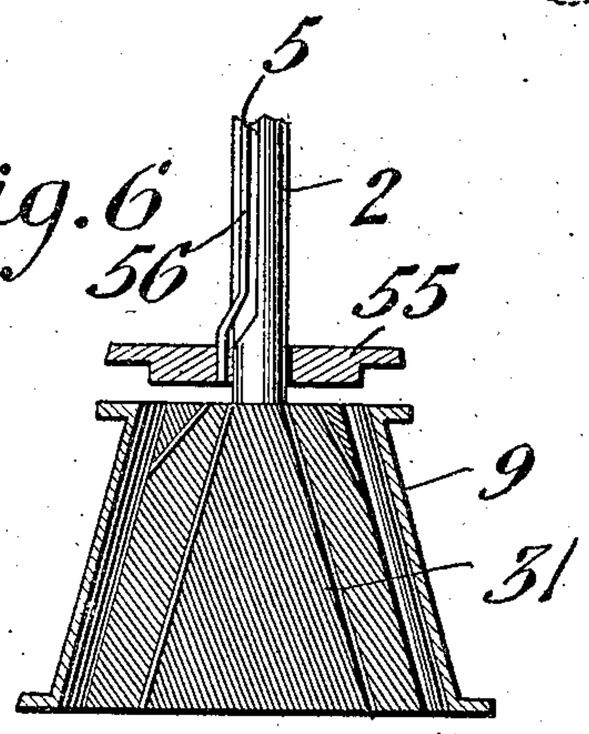
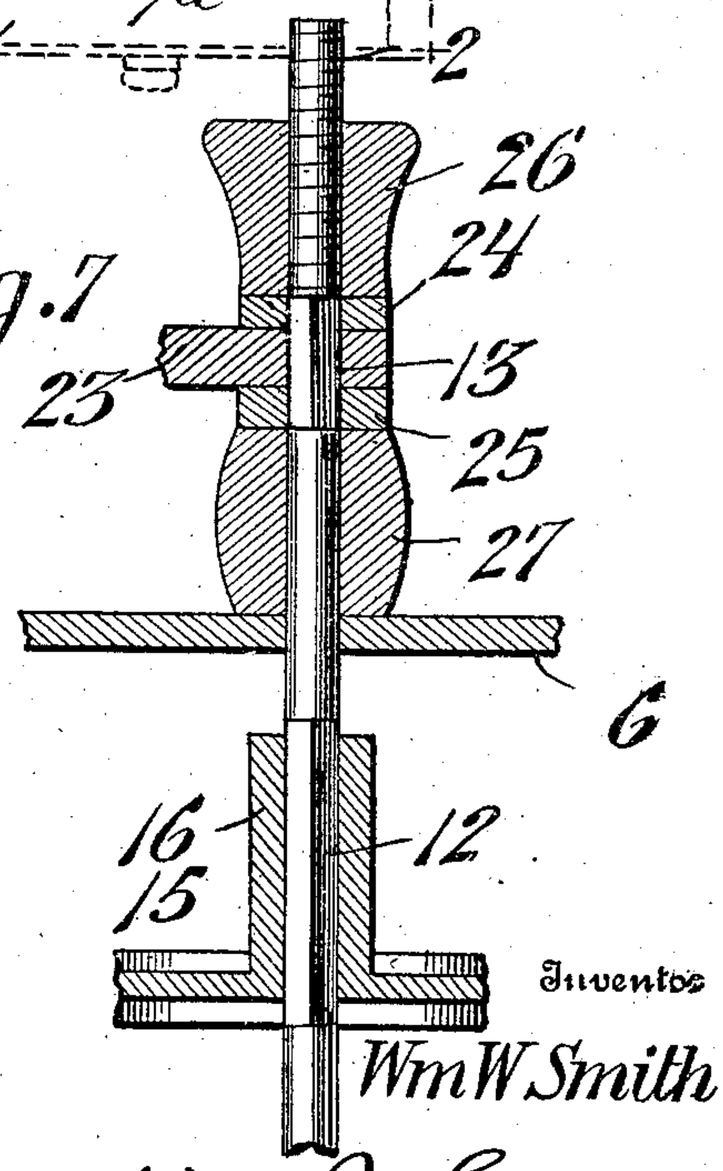


Fig. 7.



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UNITED STATES PATENT OFFICE.

WILLIAM W. SMITH, OF KITTYTON, TENNESSEE.

GRINDING AND GRATING APPARATUS.

No. 850,068. Specification of Letters Patent. Patented April 9, 1907.

Application filed November 7, 1905. Serial No. 286,255.

To all whom it may concern:

Be it known that I, WILLIAM W. SMITH, a citizen of the United States of America, residing at Kittyton, in the county of Unicoi and State of Tennessee, have invented new and useful Improvements in Grinding and Grating Apparatus, of which the following is a specification.

This invention relates to improvements in grinding and grating apparatus, and particularly to grinding-mills, the main object of the invention being to provide a mill wherein a number of different substances—such as coffee, cinnamon, pepper, cloves, allspice, &c., and nutmegs—may be simultaneously or separately ground or grated without intermixing.

Another object is to provide simple and effective means whereby the grinding devices may be thrown into and out of action, also to provide improved means whereby the ground substance or substances may be readily removed.

Still another object is to provide a combination-mill which may be inexpensively manufactured and sold and forms a convenient article for household use.

With the above and other objects in view the invention consists of the novel construction and combination of parts hereinafter fully described and claimed, reference being had to the acompanying drawings, in which—

Figure 1 is a top plan view of my improved mill and grater, the upper ends of the shafts appearing in horizontal section. Figs. 2 and 3 are vertical sections taken on the lines 2 2 and 3 3 of Fig. 1. Fig. 4 is a horizontal section taken on line 4 4 of Fig. 3. Fig. 5 is a horizontal section through the casing, showing the sliding drawer support or shelf with some of the drawers partially withdrawn. Fig. 6 is a vertical section through the feed-valve, shell, and burs of the coffee-grinder, showing the adjacent end of the main shaft in elevation. Fig. 7 is a section through the devices upon the upper end of the main shaft. Fig. 8 is a longitudinal section through the holder of the nutmeg-grater. Fig. 9 is a cross-section on line 9 9 of Fig. 8.

Referring now more particularly to the drawings, the numeral 1 designates the box or casing of the mill, within which are mounted a series of vertical shafts 2, 3, 4, and 5, which shafts are mounted at their lower ends in the manner hereinafter described and are journaled at their upper ends in the central portion and three of the arms of an X-shape brace or spider-support 6, suitably fixed at the ends of the arms thereof to the top wall or cover 7 of the box.

Below the top wall or cover the box is divided interiorly into a plurality of chambers or compartments by vertical and horizontal partitions, and the main shaft 2 extends centrally therein and passes downward through a hopper 8 and enters a grinding shell or casing 9, said hopper and shell being arranged, respectively, one above the other in compartments 10 and 11. The shaft 2 is provided above the wall 7 with rectangular portions 12 and 13 and a threaded portion 14 and carries a master gear-wheel 15, having a sleeve 16, engaging the portion 12 and adapted to be fixed from sliding movement thereon by a set-screw 17′. The gear 15 is in mesh with gears 17, 18, and 19, arranged upon the respective shafts 3, 4, and 5, each of which shafts is provided with a polygonal portion 20, slidably engaged by a sleeve 21, formed on the gear thereon, which sleeve carries a set-screw 22 to secure the gear in adjusted position. Each gear-wheel on the shafts 3, 4, and 5 is therefore mounted to rotate with its shaft and by means of its sliding connection therewith may be thrown into and out of meshing engagement with the master gear-wheel 15.

The rectangular portion 13 of the shaft 2 is adapted to receive the correspondingly-apertured end of an operating-crank 23, above and below which are arranged retaining-washers 24 and 25. Above and below these washers are disposed sleeves 26 and 27, the former having a threaded engagement with the shaft, while the latter is loose thereon and between the washer 25 and spider 6, whereby the crank 23 may be clamped in position and the shaft adjusted vertically to regulate the action of the grinding-burs carried thereby, as hereinafter described.

The shafts 3 and 5 extend downward vertically through hoppers 28 and 29 and into a shell 30, corresponding in construction with the shell 9, and suitably connected to the lower end of each of the shafts 2, 3, and 5 is a grinding bur or cone 31, which may be of a construction common in mills of this char-

acter and arranged to operate according to the respective directions of rotation of the shafts. These burs are adjustable in their shells in the customary manner to regulate the grinding action thereof by vertically adjusting the shafts, the shaft 2 being adjustable, as previously described, through the medium of the sleeve or nut 26, while the upper ends of the shafts 4 and 5 are similarly threaded to receive adjusting-nuts 32 for a similar purpose. Chutes or conductor-plates 33, leading from inlets in the sides of the box, are provided for the introduction of the substances to be ground into the hoppers; but any other means of introducing such substances may be used.

The shaft 4 is suitably journaled at its lower end in the bottom wall of a compartment 34 and carries a beveled gear 35, meshing with a similar gear 36, mounted upon one end of a horizontal shaft 37, the opposite end of which carries a vertically-arranged grating head or disk 38. Arranged with its open end facing this disk is a tubular holder 39, adapted to contain a nutmeg, ginger, or other article or substance to be grated. In this holder is arranged a follower 40, having an outwardly-projecting finger-piece 41, sliding in a longitudinal slot 42, formed in the tube and adapted to be forced forward to feed the nutmeg in constant contact with the grating-disk 38 by a coiled spring 43, disposed between said follower and the closed end of the holder. The slot 42 has a communicating lateral notch or offset 44, into which the shank of the finger-piece 41 may be projected to lock the follower in retracted position when it is desired to refill the holder with the substance to be grated.

The holder 39 is supported in the forked end of two standards 45, carried by a bracket 46, each fork having a pivoted arm 47, pressed by a spring 47′ to clamp the holder in position and to be swung outward to permit of its ready removal when occasion requires, and the fork supporting the rear end of the tube is provided with a shoulder 48 to hold the tube from rearward movement under the action of the spring 43. The compartment 34 is provided at one side with a door 49, adjacent to which the holder is arranged, and the bracket 46 is provided at its outer side with hooked portions 50, pivotally engaging a rod 51 and upon which the bracket and holder may be swung outward through the doorway when replenishment of the holder is necessary. The inner end of the bracket is adapted to be engaged by a catch 52 to lock the same in applied position. The nutmegs or other substance to be grated may be stored in a suitable receptacle 53, held against one of the side walls of the compartment by a wire clasp or retainer 54, of any preferred construction.

The mills or grinding devices operated by the respective shafts 2, 3, and 5 may be employed for grinding different substances—such as coffee, cinnamon, cloves, allspice, &c.—and it will be observed that by the described construction of the parts the devices may be adjusted for fine or coarse grinding and that the mills may be operated independently or in unison to grind one or more substances at a time, thus providing an apparatus which is exceedingly convenient for household use.

The grater may be operated independently or in conjunction with the grinding mills or devices, as will be readily understood.

In order to regulate the feed from the hopper 8 to the shell 9, a feed-valve 55 is provided and is adapted to partially or wholly close the discharge end of the hopper. This valve consists of a disk slidably mounted on the shaft 2 and connected with the lower end of an adjusting-rod 56, which slides vertically in a groove 57, formed in the shaft, and projects at its upper end to a point alongside the sleeve 27, where it is provided with a finger-piece 58, by which the valve may be conveniently manipulated.

The box has a base-compartment 59, open at one side thereof and adapted to receive a sliding door or shelf 60, having at one end a front 61, adapted to close the side opening, and carrying a button or knob 62, by which said drawer may be inserted and withdrawn. The base of the drawer supports a rack 63, formed of wire and comprising a rectangular frame 64, provided with pairs of guides 65, 66, 67, 68, and 69, the former arranged centrally and longitudinally of the frame and the others laterally or transversely at the opposite side thereof. These guides serve as supports for a series of receptacles 7, having recessed edges 71 to slide thereon and adapted to be inserted and withdrawn through suitable openings 7^a in the sides of the compartment. These receptacles are equal in number to the grinding devices and grater and are adapted to receive the ground and grated substances discharged therefrom, the material from the grater being discharged into its receptacle through a chute or passage 72. It will be observed that this construction permits either receptacle to be applied and removed independently of the drawer and that by sliding the drawer in or out all the receptacles may be simultaneously inserted or removed, thus making provision for the ready withdrawal of the material ground by any of the sets of devices or all of them when the various devices are used for simultaneous grinding.

The construction and mode of operation of the device will, it is thought, be readily understood from the foregoing description, considered in connection with the accompanying drawings, and its manifold advantages appreciated.

Having thus described the invention, what is claimed as new is—

1. A grinding apparatus of the character described comprising a casing provided with upper and lower compartments, the upper compartments having side chutes or inlets, grinding-shells in the lower compartments, hoppers in the upper compartments communicating with said chutes and shells, main and auxiliary grinding-shafts extending vertically through the compartments, grinding-burs operating in the shells and carried by said shafts, an armed brace secured to the casing and provided with bearings for the upper ends of the shafts, a master gear-wheel on the main shaft, and gears on the auxiliary shafts meshing with said master-gear, said gears being provided with means for throwing them into and out of meshing engagement.

2. In a grinding-mill, a box or casing, a series of grinding devices arranged therein, an insertible and withdrawable support, and receptacles for the ground substances movably mounted on said support and adapted to be inserted and withdrawn therewith or independently thereof.

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

WILLIAM W. SMITH.

Witnesses:
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M. J. TILSON.