

No. 712,537.

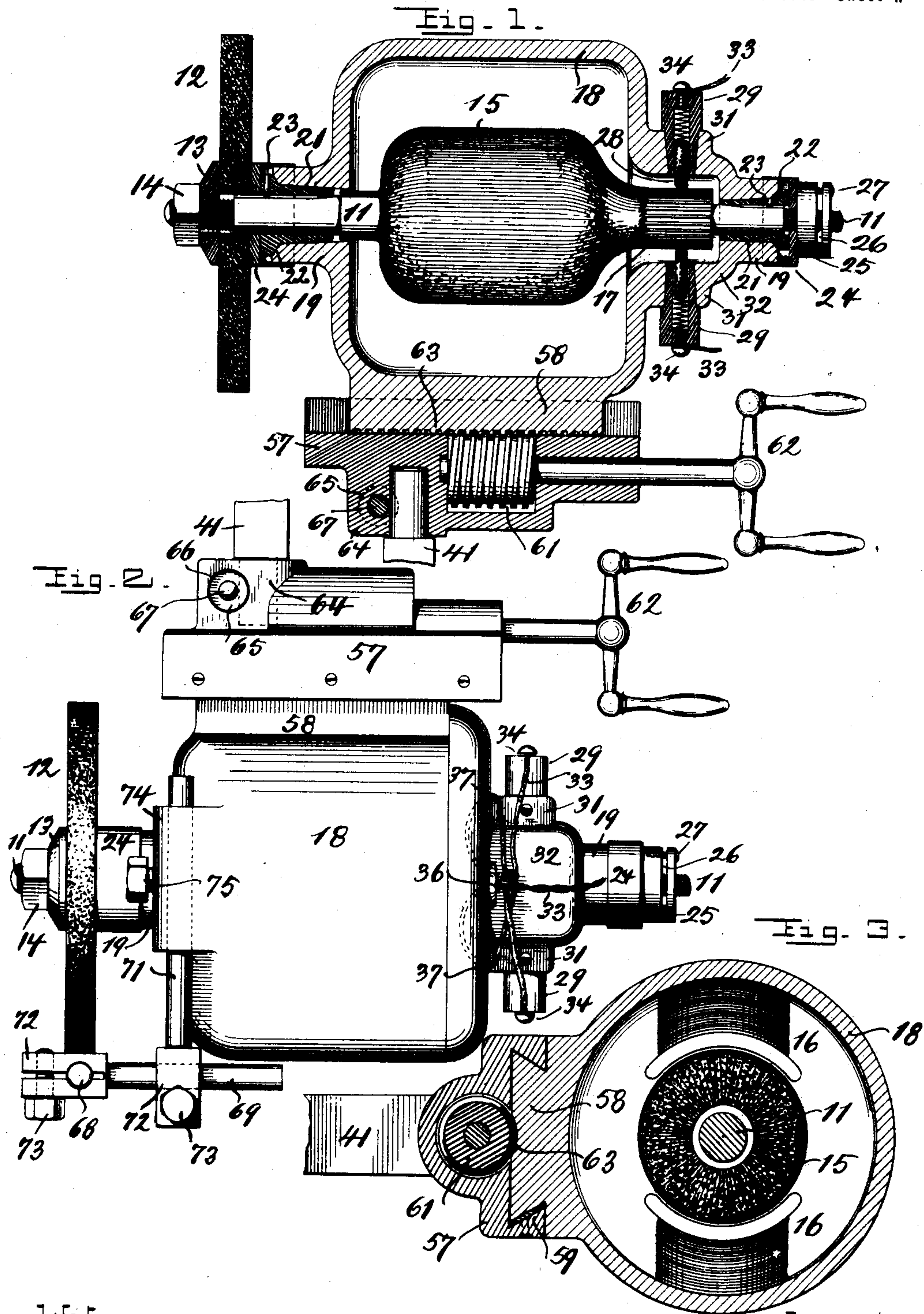
Patented Nov. 4, 1902.

C. S. HISEY.
ELECTRIC GRINDING DEVICE.

(Application filed May 7, 1902.)

(No Model.)

2 Sheets—Sheet 1.



Witnesses
H. C. Robinson
Arthur Kline

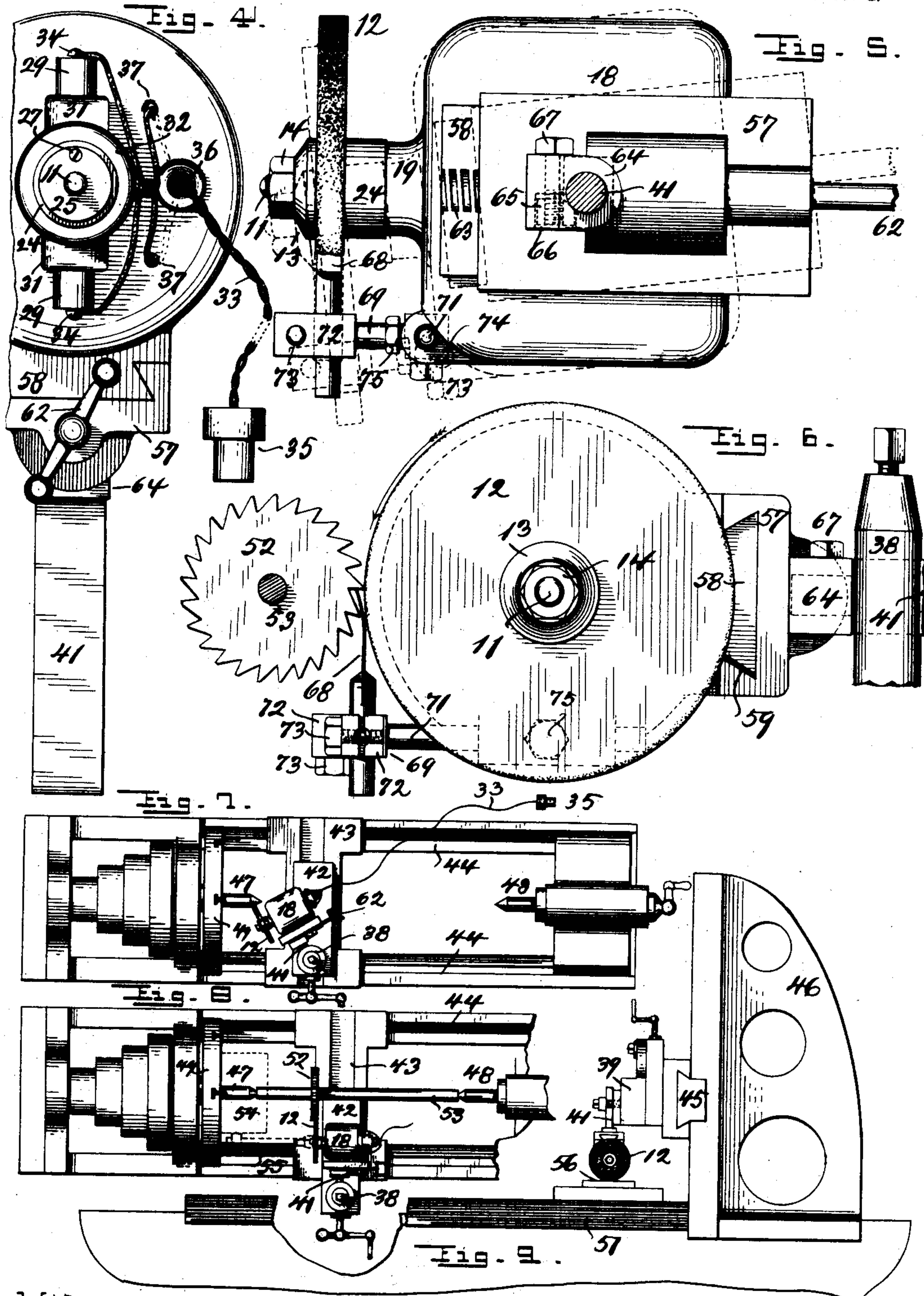
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UNITED STATES PATENT OFFICE.

CHARLES S. HISEY, OF DAYTON, KENTUCKY, ASSIGNOR TO THE HISEY-WOLF MACHINE CO., OF CINCINNATI, OHIO.

ELECTRIC GRINDING DEVICE.

SPECIFICATION forming part of Letters Patent No. 712,537, dated November 4, 1902.

Application filed May 7, 1902. Serial No. 106,251. (No model.)

To all whom it may concern:

Be it known that I, CHARLES S. HISEY, a citizen of the United States, and a resident of Dayton, in the county of Campbell and State of Kentucky, have invented a certain new and useful Electric Grinding Attachment for Machine-Tools; and I do declare the following to be a full, clear, and exact description thereof, attention being called to the accompanying two sheets of drawings, with the reference-numerals marked thereon, which form also a part of this specification.

This invention relates to certain features and improvements connected with electrically-operated grinding-wheels.

The leading feature is the adaptability of the device for use in connection with machine-tools, to which it serves as a grinding attachment, the tool-holding parts of the latter serving to support the attachment, while the work-supporting parts of the particular machine-tool serve to hold the work to be ground. The grinding attachment, while being so held by the tool-holding device of the machine-tool—that is, by the device holding the cutting-tool thereof—is thus equally capable of all the adjustments of such cutting-tool and may also be detached or placed in position with equal facility as such cutting-tool or moved from one machine for attachment to another.

Other features relate to the construction of the device, as will appear more fully hereinafter.

In the following specification and particularly pointed out in the claims following is found a full description of the invention, together with its operation, manner of use, and construction, which latter is also illustrated in the accompanying two sheets of drawings, in which—

Figure 1 is a longitudinal section of the grinding attachment. Fig. 2 is a side elevation of the same. Fig. 3 is a cross-section. Fig. 4 shows a view of the rear end, where the current is received. Fig. 5 is another side view, one showing the device at right angles to the view shown in Fig. 2. Fig. 6 shows the front or operative end, where the grinding-wheel is located. This view also shows the device attached to the tool-post of

a lathe and used for grinding the rotary cutter of a milling-machine. Figs. 7 and 8, in top views of a lathe, show the attachment at reduced scale and applied to various uses. In the first figure it is used to grind and reshape one of the lathe-centers. Fig. 8 shows the device put to the same use as illustrated in Fig. 6. It also shows in dotted lines possibility of the additional use of surface and internal grinding. The position of the attachment itself would of course be different at that time and adapted to such particular use. Fig. 9, in a side view of a planer, shows still another use of the grinding attachment.

The grinding attachment consists, substantially, of an electric motor, on the armature-shaft 11 of which is mounted the grinding-wheel 12, which may be the usual emery-wheel. The same is detachably held in place by a washer 13 and superposed nut 14 and may be exchanged, the same as in the ordinary emery-grinder, with others of different size as to diameter or face, as required. The electrical part of the attachment may be of any approved style and does not constitute any part of the invention, except to the extent that it may require modification to adapt it to its combination with the grinding device. 15 indicates the armature thereof the field-magnets, and 17 the commutator. The parts are supported in a frame, preferably in shape of a closed housing 18, at opposite ends of which bearings 19 are provided for the armature-shaft 11. This latter does not rest directly in these bearings, however, but in cones 21, fitted on a taper thereinto. This taper is a double one—that is, the larger part of it is on a flat angle to form an extended bearing-surface. Near the outer ends it is more abrupt and forms a shoulder 22, which prevents the cone from slipping in too far, so as to wedge. These cones are caused to rotate with shaft 11 by means of pins 23, and the object of their use is to take up the wear between the bearing-surfaces of the shaft-journals, which they readily do when driven farther in to follow up such wear. A proper support to insure the smooth running of the armature-shaft is thus always maintained. The bearings are closed by dust-caps 24, which, together with cones 21, are held in position by

nuts at the ends of shaft 11. At one end such is done by nut 14, which holds the grinding-wheel in place. At the other end a nut 25 is used. One of them—it may be the latter—
 5 serves also as a lock-nut, the locking feature being obtained by having a split 26 in said nut near one side of it. A screw 27 passes through this thinner part of the nut and traversing split 26 is seated in the other part
 10 thereof. By turning this screw farther into its seat the thread in the thinner part of the nut is caused to bear with one-sided pressure against the male thread on shaft 11 engaged within, thereby preventing the nut from turn-
 15 ing voluntarily.

Current to rotate the armature, its shaft, and the grinding-wheel thereon is supplied to the former through commutator 17 by brushes 28, held in contact with the former by
 20 spring-pressure, and carried in insulating-plugs 29, which are seated in bosses 31, projecting from a lateral extension 32 of the housing. 33 represents the wires which carry the current, connection being made by contact-
 25 ing binding-screws 34. The branches necessary for the field are also taken from these wires inside of the housing, and outside all wires are bunched and twisted into one cable of suitable length which carries at its free end
 30 a contact-plug 35, constructed the same as the plug of an incandescent lamp. This plug is of standard size to fit the socket of the usual incandescent lamp, the intention being to make connection in this way—that is, by
 35 inserting plug 35 into an incandescent-lamp socket. An extra socket may be provided for such purpose, or one of the lamps may be detached for the time being and temporary connection made. Of course when the posi-
 40 tion of the attachment is not changed very often, or not at all, a connection more or less permanent may be established. In order to prevent any pull of the wire on binding-screws 34 during the manipulation of the
 45 grinder, the cable is first passed through an opening 36 in the housing, then opened and spread inside the individual wires, one each passing out again through holes 37. Outside they are once more crossed or twisted on each
 50 other before being connected to the binding-screws 34.

The attachment is held in position by the tool-holding devices of the particular machine-tool on which it is intended to be used at
 55 the time—as, for instance, by the tool-post 38 of a lathe, as shown in Figs. 6, 7 and 8, or by the tool-holder or head 39 of a planer, as shown in Fig. 9—the same as if it were a tool. For such purpose it is provided with a shank
 60 41, having flat parallel sides and of dimensions equal to the usual lathe or planer-tool, so that it fits like these and may be readily connected and clamped in place or detached. It is clear that after being so attached the
 65 grinder is susceptible of the various adjustments which the particular tool would be and the place of which is taken now by its shank 41.

Thus, for instance, on the lathe the grinder may be adjusted in a direction at right angles to the general feed by means of the cross-feed
 70 device 42 on the carriage 43. Then, again, both are subject to the general adjustment of carriage 43 on the ways or so-called “Vs”
 44 of the lathe-bed.

On the planer the grinder is susceptible of
 75 the individual adjustment of tool-head 39, also of the latter on the cross-rail 45, and all of these devices by means of rail 45 on the standards or housing 46 in a vertical direction. The work to be ground is likewise sus-
 80 ceptible to the movements of the work-holding devices of these particular machine-tools which are, in case of the lathe, the lathe-centers 47 and 48, or a chuck 49 and the table 51
 85 in case of the planer.

In Fig. 7 the grinder is used in truing up and repointing the lathe-center itself, which has to be done from time to time on every lathe and no actual work is done. In this connection the use of my attachment is of
 90 great advantage, since it permits the grinding of these lathe-centers while they remain in position on the lathe.

In Figs. 6 and 8 a rotary cutter 52 of a
 95 milling-machine is being ground. This latter is temporarily supported on a mandrel 53, held between the lathe-centers. In this case no parts of the lathe are in operation, they simply serving as supports for the grinder and the work, which latter is manipulated
 100 by hand. Of course in place of cutter 52 other work may be done which is also held between the lathe-centers, and if required to be rotated the head stock or spindle is operated in such case. Work may also be done
 105 on chuck 49, as shown in dotted lines at 54 in Fig. 8, in which case mandrel 53 would of course be removed and the grinder accordingly adjusted. For internal grinding the
 110 grinding-wheel is carried at the end of an extension-piece 55, mounted at the end of shaft 11, as shown in dotted lines in Fig. 8, nut 14 and washer 13 having first been removed. In Fig. 9 the work, whatever it may be, is indicated by 56 and carried on the planer-table,
 115 by which it is reciprocated underneath the grinder.

In such work as shown in Fig. 7, which does not change its position with reference to the grinding-wheel and where there is no pro-
 120 gressive feed-motion or other movement, it becomes necessary to move the grinding-wheel laterally back and forth to reach with the face thereof all parts of the work to be ground. For such purpose the part which
 125 supports the grinding-wheel—i. e., motor-housing 18—is capable of a motion in an axial direction with reference to the grinding-wheel and independent of the holding-shank 41. The construction whereby this feature
 130 is obtained consists of an intermediate base 57, on one side of which housing 18 is held in a manner to be free for a sliding movement thereon in the direction named. For such

purpose a dovetailed connection is used, the complementary engaging parts of which are contained one in said base 57 and the other on the outside of housing 18, the thickness of which is accordingly enlarged at that particular part, as shown at 58. The usual gib 59 is used here to take up the wear and maintain a snug fit between the parts. Shank 41, therefore, does not directly connect to housing 18, such connection being made indirectly by means of the intermediate base 57, to the other side of which said shank attaches. For so moving housing 18 a screw 61 is used which may be seated in either one of the parts and has no longitudinal movement. As shown, it is seated in base 57 and provided with an operating-handle 62 for rotation. The thread of it projects beyond base 57, so as to be in contact with the contiguous outer surface of the enlarged part 58 of housing 18. This surface contains the complementary female thread 63, (see Figs. 1 and 5,) engaged by screw 61, and whereby the desired movement back and forth of the grinding-wheel is readily obtained.

In addition to all the previously-described possible adjustments of the grinding attachment as a whole on the particular tool-holder and by means of the same there is an additional adjustment possible of the device on its shank and in a rotary direction thereon and with said shank as a center. The possibility of this adjustment is shown in dotted lines in Fig. 5, and by it the range of this device to suit various shapes and positions of work is still more extended. For such purpose the end of shank 41 is round and fitted into the socket-hole of a boss 64 on base 57, which permits one part to turn on the other. After adjustment the parts may be held in position by a set-screw or any other suitable locking device. As shown, I use a nut 65, occupying a socket 66, and which socket communicates with the socket for the end of shank 41, so that said nut may come in contact with said shank. The extent of this contact is increased by cutting off a corner of said nut, as shown. For locking the parts a screw 67 is used to draw this nut tightly against the end of shank 41.

For grinding toothed or serrated work, like milling-machine cutters or reamers, &c., a rest and indexing attachment is provided to insure a correct and even grinding of all the teeth. This device consists of the rest 68, against the upper end of which the teeth are intended to rest, one after the other. Figs. 6 and 8 illustrate the manipulation. After one tooth is ground the cutter is slid laterally on the supporting-mandrel 53, then sufficiently turned and slid back again, so that the next tooth comes to bear on the rest. The position of this latter, as well as mandrel 53, and the grinding-wheel being fixed it is clear that all teeth will be ground to the same extent. For its adjustment rest 68 is carried on an arm 69, which latter is carried on another arm 71. Each one of these has a screw-

clamp 72 on one of its ends to engage each other and rest 68, the position being secured in each case by screws 73. Arm 71 is supported in a boss 74, projecting from housing 18 and adjustably held therein by means of a set-screw 75.

As will be seen, this grinding attachment may be adjusted with the tool-holding device of the particular machine to which it is attached to operate in any position which this former is capable of assuming, thus presenting possibilities of an independent grinding-machine without requiring the various supports and many complicated parts which are necessary in such machines.

Having described my invention, I claim as new—

1. In an electric attachment for machine-tools, the combination of an electric motor, a cylindrical housing for it having part of its side increased in thickness to form the complementary part of a dovetail connection, a base which contains and receives the other complementary part of such connection and on which the motor-housing is mounted in a manner to have a sliding movement, a screw mounted in this base in a longitudinally-fixed position and projecting with part of its periphery beyond the contiguous part of the dovetail connection of the base, a corresponding partial female thread in the other contiguous part of the dovetail connection on the housing which receives and is engaged by said screw, a rectangular shank projecting from the base and of dimensions fitted to be received by the tool-holder of a machine-tool to detachably connect and support the grinding attachment, an armature-shaft supported in the motor-housing, a grinding-wheel mounted on one of its ends and means to connect the motor with a source of current.

2. In an electric grinding device, the combination of an electric motor, a housing for it, an armature-shaft, bearings for it in the housing, a grinding-wheel mounted on one of its ends, nuts, one at each end of the shaft to hold the same in position, one being partly split and slotted in a direction at right angles to its axis, a screw 27 whereby the two parts of this nut may be drawn together to cause them to bind with unequal pressure against the inclosed male thread of shaft 11, thereby locking said nut against voluntary rotation, a shank fitted for attachment to the tool-holder of a machine-tool to support the entire device and means to connect the motor with a source of current.

3. In an electric attachment for machine-tools, the combination of an electric motor, a housing for it, an armature-shaft, bearings for it in the housing, a grinding-wheel mounted on one of its ends, a base on one side of which the motor-housing is mounted with a dovetailed connection and in a manner to be capable of a sliding adjustment thereon, a boss 64 projecting from the other side of this same base and provided with a socket, a rectangu-

lar shank, the round end of which is received by this socket so as to permit rotary adjustment of the base on said shank, the projecting part of which is fitted to be received by the tool-holder of a machine-tool to detachably connect and support the grinding attachment, a socket 66 in boss 64 communicating with the shank-socket therein, a lock-nut 65 in socket 66, a screw 67 whereby said lock-nut may be drawn into locking contact with the round end of the holding-shank and means to connect the motor with a source of current.

4. In an electric attachment for machine-tools, the combination of an electric motor, a housing for it, an armature-shaft, bearings for it in the housing, a grinding-wheel mounted on one of its ends, an indexing-rest 68 projecting from the motor-housing to support toothed work, means whereby the same is supported on the motor-housing in a manner to be adjustable with reference to the grinding-wheel, a rectangular shank of dimensions fitted to be received by the tool-holder of a machine-tool to detachably connect and support the entire device and means to connect the motor with a source of current.

5. In an electric attachment for machine-tools, the combination of an electric motor, a housing for it, an armature-shaft, bearings for it in the housing, a grinding-wheel mounted on one of its ends, an indexing-rest 68 to support toothed work, an arm 69 to support rest 68, another arm 71 to support arm 69, the two arranged at right angles to each other, screw-clamps at the ends of these arms whereby they adjustably engage each other and one of them rest 68, a boss on the end of the motor-housing on which these parts are supported in a manner to render rest 68 adjustable with reference to the grinding-wheel, a rectangular shank of dimensions fitted to be received by the tool-holder of a machine-tool to detachably connect and support the entire device and means to connect the motor with a source of current.

In testimony whereof I hereunto set my signature in the presence of two witnesses.

CHARLES S. HISEY.

Witnesses:

C. SPENGEL,
ARTHUR KLINE.