Sept. 12, 1933. W. LAW 1,926,779

ROTARY TABLE GRINDING MACHINE

Filed Feb. 6, 1928 2 Sheets-Sheet 1

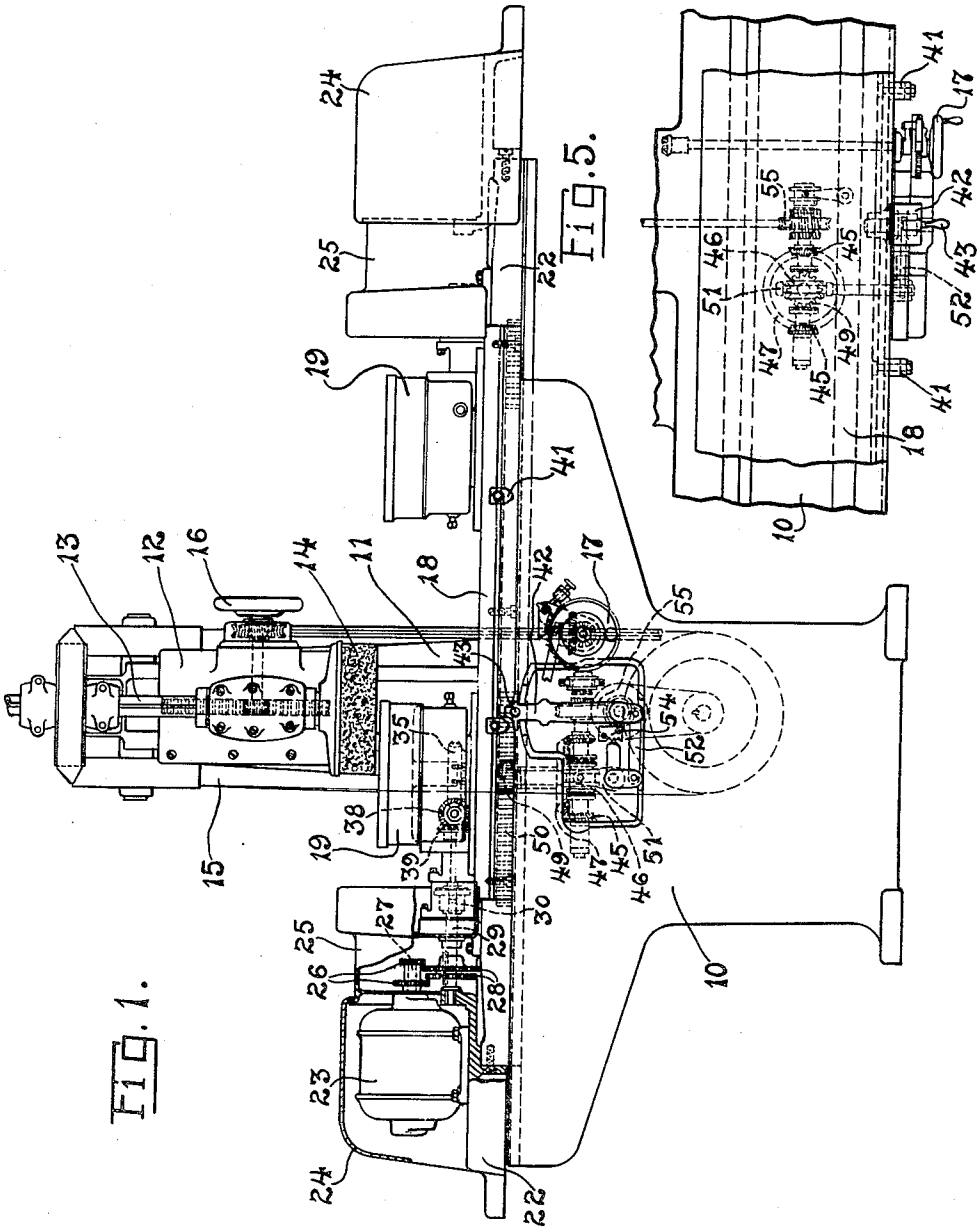


Fig. 1.

Fig. 5.

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Filed Feb. 6, 1928 2 Sheets-Sheet 2

Fig. 2.

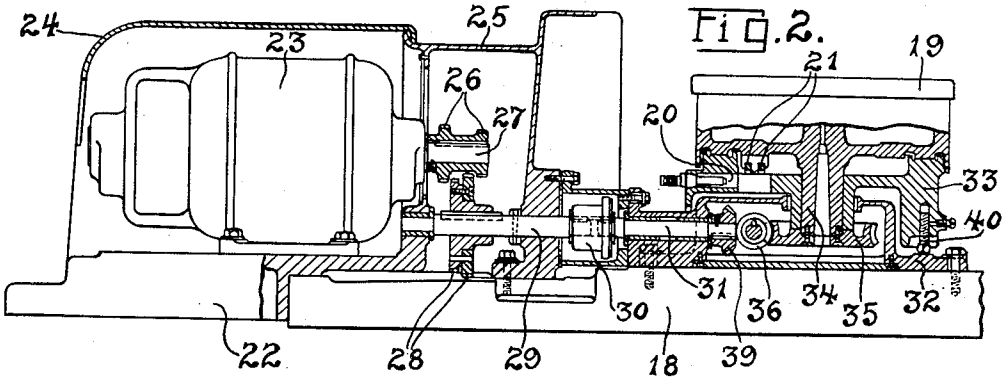


Fig. 3.

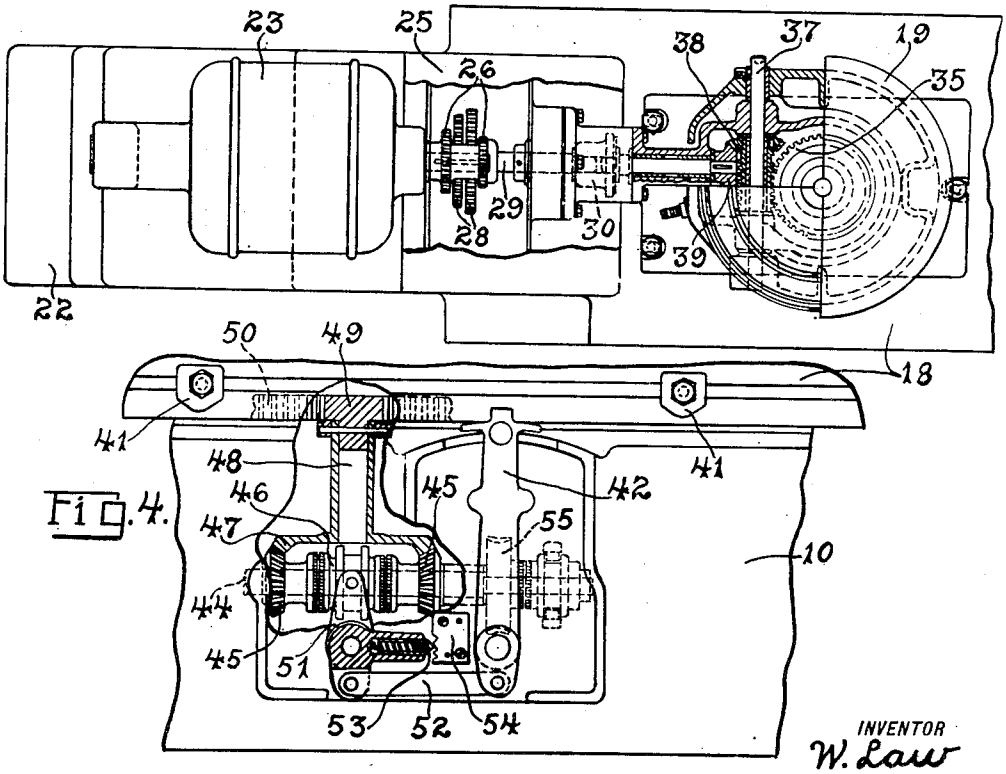


Fig. 4.

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ROTARY TABLE GRINDING MACHINE

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Application February 6, 1928. Serial No. 252,336

5 Claims. (Cl. 51—131)

This invention relates to surface grinding machines of the vertical type and particularly to one provided with rotatable work supporting tables on a reciprocating table of the machine.

An object of the present invention is to provide an auxiliary rotatable table adapted to be mounted upon the slidable or reciprocating table of a surface grinding machine so that it is adapted to be readily mounted on the table or removed therefrom.

A further object of the invention is to provide driving means for an auxiliary rotating table which may be permanently mounted on the slidable table and so positioned that they will not interfere with the normal operation of the machine when used with the reciprocating table.

A further object of the invention is to mount two of these rotatable work supporting tables on the slidable table suitably spaced apart and adapted by slidable movement of the main or reciprocating table to be brought into operative relation with an abrasive wheel rotatable upon a fixed axis.

Another object of the invention is to provide housings permanently mounted on the slidable or reciprocating table and forming end walls or guards at opposite ends of the work supporting portions of the slidable table, the driving means, preferably in the form of a motor, being mounted within and enclosed by this housing.

A still further object of the invention is to provide driving connections between this driving means or motor within the housings and the rotatable table extending through the walls of the housing, a detachable connection adapted for ready attachment to the rotating table being provided for the rotatable table extending to within the space between the two motor housings.

Another feature of importance is that means is provided operated by a lever to move the reciprocating table between opposite extreme operative positions to alternately position the auxiliary table in operative relation to the abrasive wheel.

With these and other objects in view my invention consists in the features of construction and operation set forth in the following specification and illustrated in the accompanying drawings.

In the accompanying drawings annexed hereto and forming a part of this specification, I have shown my invention embodied in a standard form of vertical surface grinding machine, but it will be understood that the invention can be otherwise embodied and that the drawings are not to be construed as defining or limiting the scope of the invention, the claims appended to this specification being relied upon for that purpose.

In the drawings:

Figure 1 is a front elevation of a complete vertical surface grinding machine provided with the present invention, parts being shown in section to more clearly show their construction.

Fig. 2 is a front vertical section through a portion of the table and one of the rotating tables.

Fig. 3 is a plan view of the same.

Fig. 4 is a front sectional view of the actuating means for the slidably mounted table, and

Fig. 5 is a plan view of the actuating mechanism for this table.

In the above mentioned drawings I have shown but one embodiment of the invention which is now deemed preferable, but it is to be understood that changes and modifications may be made within the scope of the appended claims without departing from the spirit of the invention.

Briefly, and in its broadest aspect, my invention comprises the following principal parts: First, a base; second, a table slidably mounted thereon and adapted to be reciprocated between opposite operative positions; third, an abrasive wheel rotatably mounted and adjustable toward and from one or the other of the tables when in its operative position; fourth, extension brackets on the opposite outer ends of the slidably mounted table; fifth, motors mounted thereon; sixth, guard members fixed at each end of the slidable table and preferably having speed reducing or changing means therein; seventh, motors mounted on the brackets and enclosed within suitable casings; eighth, driving connections including the speed changing devices connecting the motors respectively with the tables mounted within their casings and extending through the guard members; ninth, rotatable work supporting tables or chucks removably mounted on the slidable table and adapted to be detachably attached respectively to the driving connections.

Referring more in detail to the figures of the drawings, I provide a base 10 with a column 11 on which is mounted a head 12 vertically adjustable along the column 11. Within the head 12 is a rotatable spindle 13 having an abrasive wheel 14 on its lower end adapted to be rotated at high speed by any suitable means, such as the belt 15 shown in Fig. 1. In the present embodiment of the invention, that is, when the rotatable tables or chucks are employed, the head 12 and wheel 14 are adapted to be manually lowered toward work to be ground by means of a hand wheel 16

at the side of the head 12 or by means of a hand wheel 17 on the front of the base 10 connected through suitable shafting to the head 12. As all of the above described parts are old and well-known and are clearly shown in patent to Hanson, No. 915,174, granted March 16, 1909, further description of them is not thought to be necessary.

Mounted for slidable or reciprocable movement on the base 10 is a horizontal table 18 on which may be mounted two suitably spaced work supporting and rotating tables or chucks 19. These tables 19 preferably and as shown are in the form of magnetic chucks upon which the work may be directly mounted, current for energizing the chucks 19 being supplied through flexible connections to conductors 20 within the body member of the chuck 19 and connected to the rotatable member by means of slip rings 21.

In order to rotate the chucks or tables 19, brackets 22 are secured to the opposite ends of the table 18, a motor 23 being fixed permanently to each. As the constructions for rotating each table 19 is similar but oppositely disposed on opposite ends of the table 18, but one of these will be described. Enclosing the motor 23 is a suitable casing 24 completely protecting it from the coolant or spray produced during the grinding operations. Also at opposite ends of the table 18 are end guard members 25 forming housings through which extend connecting means between the motor 23 and the table 19. These driving connections within the housings or guard members 25 preferably and as shown comprise a pair of pinions 26 mounted on the armature shaft 27 of the motor 23. Either one of these pinions 26 is adapted to engage one or the other of the pair of gears 28 slidably mounted on a driven shaft 29 rotatably mounted within the housing 25. This driven shaft 29 extends completely through the housing or guard member 25 and at its inner end is provided with a flexible detachable connecting member 30 for connection to the driving shaft 31 of the chuck.

As shown in Figs. 2 and 3 the chuck or work supporting and rotatable table 19 comprises a supporting member 32 adapted to be detachably attached to the upper horizontal surface of the table 18. To this supporting member 32 is pivotally mounted the body member 33 of the chuck 19 within which is mounted the central hub 34 of the chuck 19 to which is secured a worm gear 35. This worm gear 35 is in mesh with a worm 36 on a transverse shaft 37 provided with a bevel gear 38 directly keyed thereto. In mesh with the bevel gear 38 is another bevel gear 39 on the driving shaft 31 for the chuck or rotating table 19. As it is desired to slightly adjust the chuck 19 angularly the body member 33 is pivotally connected to the base or bracket member 32 for the chuck about the axis of shaft 37 so that by adjustment of a special screw 40 the position of the rotating member can be slightly altered.

The rotating table 19 and its base or bracket member 32 are directly mounted upon the work supporting surface of the slidable table 18 by means of bolts extending into slots on this table. By this means the chuck 19 as a whole may be readily removed or placed in position upon the table 18.

In order to reciprocate the table 18 to bring either of the rotating tables 19 into operative relation with the wheel 14, the traversing or reciprocating mechanism usually employed in surface grinders may be made use of. These are or may be similar to those described in patent to Hanson 915,174 granted March 16, 1909. However, instead of reversing the table 18 continuously at each end of its stroke as when the machine is used without the rotating tables, the table 18 is brought to a stop by engagement of a dog 41 with a vertical lever 42. Oscillation of the lever 42 manually by a handle 43 provided thereon serves to move the slidable table 18 to its opposite operative position whereupon another dog 41 engages and oscillates the lever 42 to its mid position.

To actuate the table 18 a constantly driven shaft 44 is employed having oppositely disposed bevel gears 45 rotatably mounted thereon. Between the bevel gears is a clutch member 46 splined to the shaft and adapted to engage either of the bevel gears 45. A bevel gear 47 engages both of said bevel gears 45 and may therefore be rotated in either direction by movement of the clutch member 46. The bevel gear 47 is carried by a shaft 48 having thereon a pinion 49 at its upper end. This pinion engages a rack 50 secured directly to the table 18.

To move the clutch member 46 to its opposite positions it is engaged by a lever 51 pivotally mounted and adapted to be oscillated by the lever 42 through link 52. A spring detent 53 adapted to engage notches in plate 54 mounted on the base retains the clutch member 46 in neutral or either operative position. The shaft 44 may be rotated by a worm wheel 55 thereon similar to that shown in the patent referred to above.

The machine, without the rotatable tables 19 mounted thereon, is adapted to be used in exactly the same manner as any vertical surface grinder to grind work disposed upon the table between the end guards or housings 25 during which the mechanism shown in the above mentioned patent may be employed. To use the machine for work upon the rotating tables or chucks 19, it is only necessary to mount the tables 19 upon the table 18 within the space between the guards or housings 25 and manually actuate the lever 42 as above described. The motors 23 and the driving connections comprising the gears 26 and 28, the shafts 27 and 29 and the connection 30 for the chucks 19 remain permanently in position upon the table 18 beyond the space traversed by the abrasive wheel 14.

What I claim is:

1. Work supporting means for a surface grinding machine comprising in combination, a base, a table slidably mounted thereon having a work supporting portion, a rotatable work supporting table removably mounted on said work supporting portion, a housing at one end of said slidable table permanently secured thereto upon an extension thereof beyond the work supporting portions of said table, a driving motor for said rotatable table within and enclosed by said housing, and gear driving connections between said driving motor and said rotatable table, said connections being permanently mounted in said housing and detachably attached to said rotatable table.

2. Work supporting means for a surface grinding machine comprising in combination, a base, a table slidably mounted thereon having a work supporting portion, a rotatable work supporting table removably mounted on said work supporting portion, a housing at one end of said slidable table permanently secured thereto upon an extension thereof beyond the work supporting surface of said table, a driving motor for said rotat-

able table within said housing, and change speed driving connections between said driving motor and said rotatable table permanently mounted within said housing.

3. Work supporting means for a surface grinding machine comprising in combination, a base, a table slidably mounted thereon having a work supporting portion, a rotatable work supporting table removably mounted on said work supporting portion, a housing at one end of said slidable table permanently secured thereto upon an extension thereof beyond the work supporting surface of said table, a driving motor for said rotatable table within said housing, driving connections between said driving motor and said rotatable table mounted within and extending through said housing, and manually controlled means to move said slidable table into and out of an operative position for said rotatable table.

4. Work supporting means for a surface grinding machine comprising in combination, a base, a table slidably mounted thereon having a work supporting portion, rotatable work supporting tables removably mounted on said work supporting portions and positioned adjacent the opposite ends thereof, housings at opposite ends of said slidable table permanently secured thereto upon extensions thereof beyond the work supporting portion of said table, a driving motor for each of said rotatable tables within said housings, and individual driving connections between each of said driving motors and its rotatable table extending through its housing.

5. Work supporting means for a surface grinding machine comprising in combination, a base, an abrasive wheel mounted thereon, a table slidably mounted thereon having work supporting portions, rotatable work supporting tables removably mounted on said work supporting portions and positioned adjacent the opposite ends thereof, housings at opposite ends of said slidable table permanently secured thereto upon extensions thereof beyond the work supporting portion of said table, driving motors for said rotatable tables within said housings, driving connections between said driving motors and said rotatable tables extending through said housings, and means to move said slidable table from one position to another to bring a rotatable table into operative position with relation to said abrasive wheel.

WILLIAM LAW.