Sept. 26, 1933. H. L. MYERS 1,928,390

PLANETARY TYPE SURFACING MACHINE

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Fig. 1.

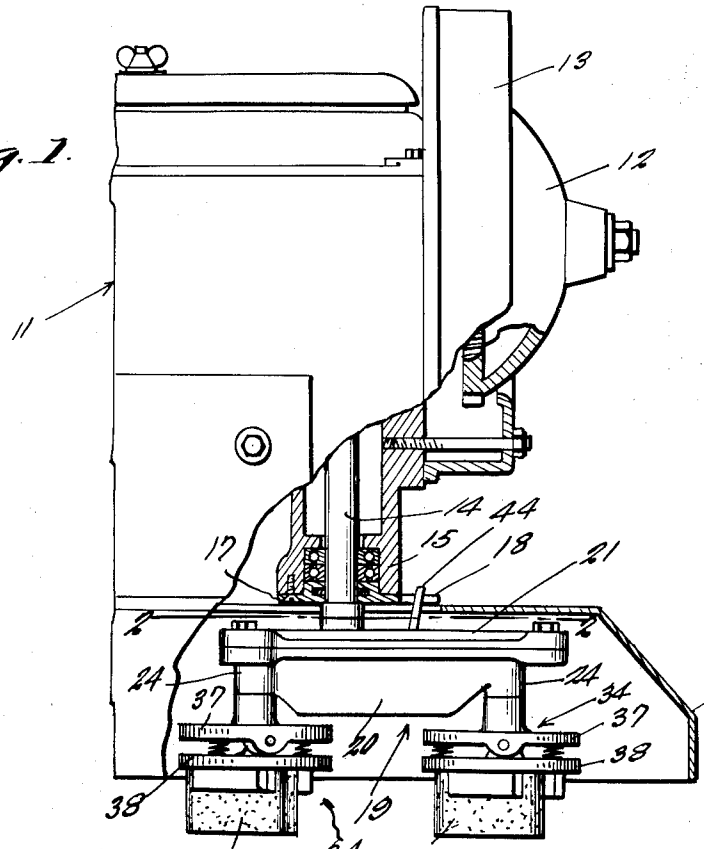


Fig. 5.

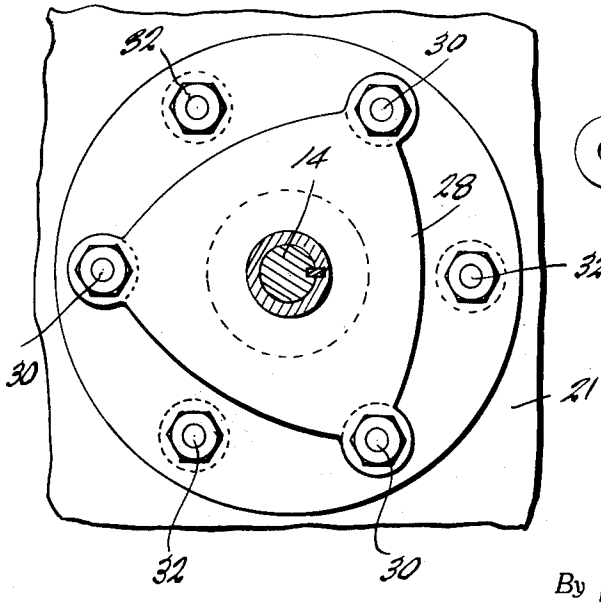
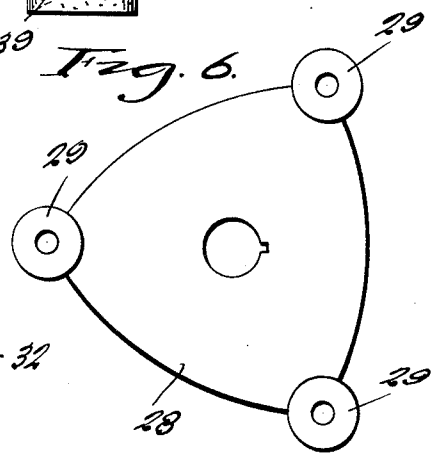


Fig. 6.



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Fig. 3.

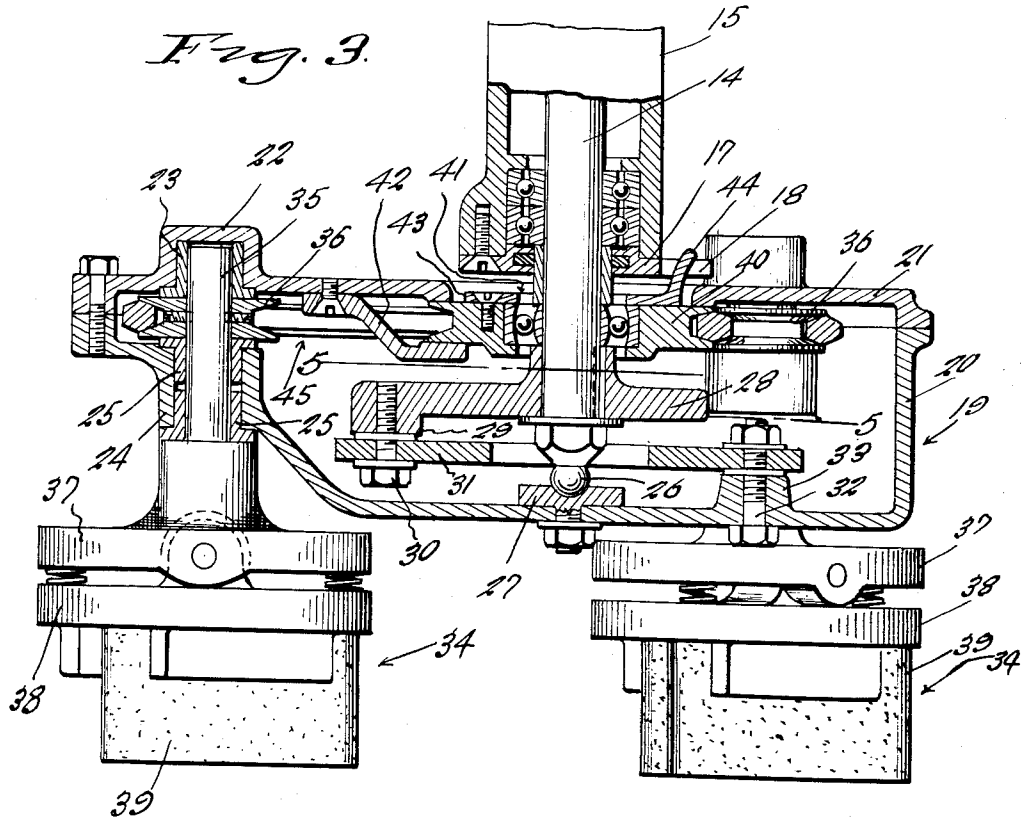


Fig. 2.

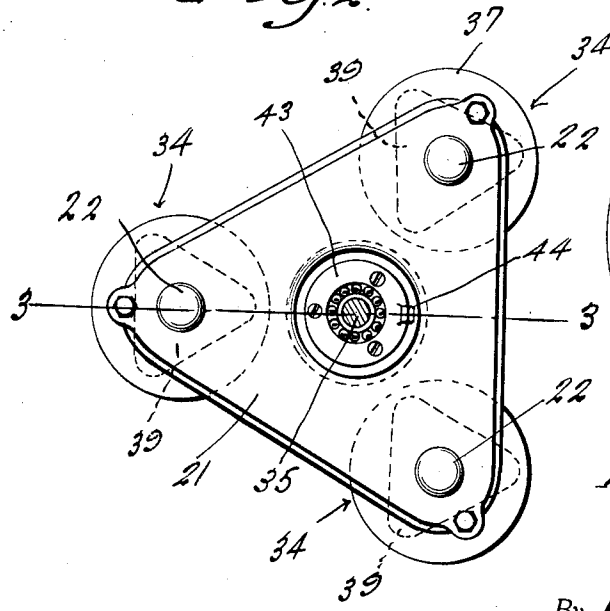
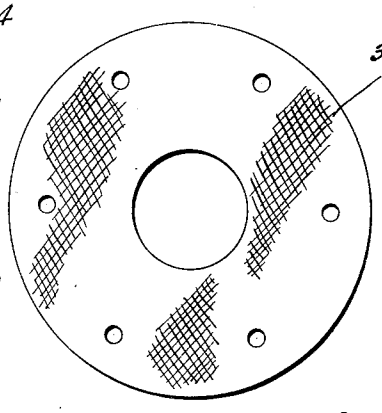


Fig. 10



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Fig. 4.

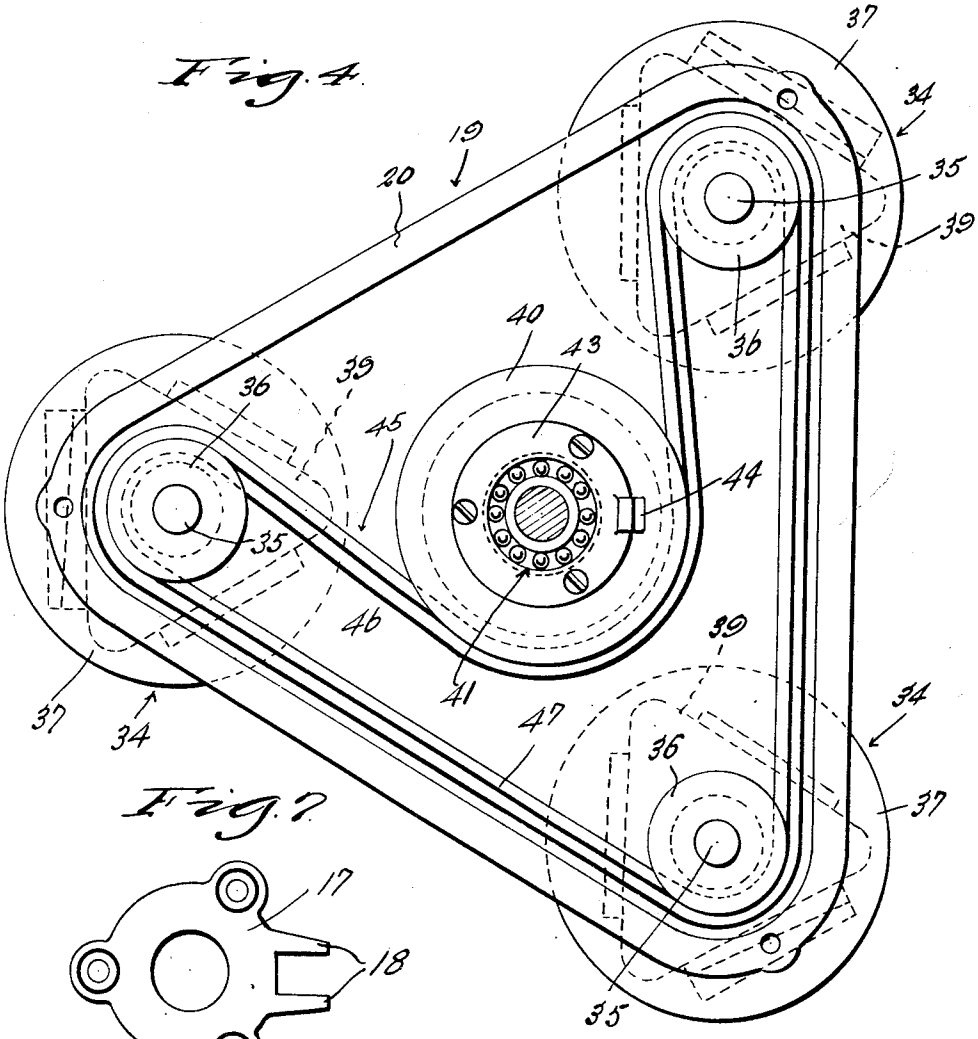
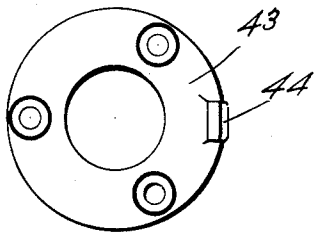


Fig. 7.

Fig. 9.



Fig. 8.



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Patented Sept. 26, 1933

1,928,390

UNITED STATES PATENT OFFICE

1,928,390

PLANETARY TYPE SURFACING MACHINE

Harry L. Myers, Toledo, Ohio, assignor to The American Floor Surfacing Machine Company, Toledo, Ohio, a corporation of Ohio

Application May 28, 1932. Serial No. 614,181

5 Claims. (Cl. 51—177)

This invention relates to an improved floor surfacing machine of the rotary disc planetary type especially constructed for grinding, rubbing and polishing various kinds of composition floors, such as for example, terrazzo, mosaic, marble and the like.

It is a matter of common knowledge to those familiar with the floor surfacing trade and industry that in order to uniformly grind and surface composition floors and to at the same time minimize work and labor and save time, machines of the aforesaid type though comparatively small and relatively light in weight must be built for strength, durability and heavy duty. The machine constituting the novelty of this application, like some prior patented machines developed for the same class of work, is of the multiple disc ensemble planetary type. Otherwise stated, the machine comprises a horizontally disposed revoluble head revolving on a common fixed center and carrying an assembly of duplicate companion surface abrading units rotatable on their own individual axes. Broadly this planetary type of capacity machine is not new.

The purpose of the present invention is to provide the trade with a structurally improved and materially refined machine characterized by a revoluble self-levelling head having the distinguishable rotary surfacing units and a special power transmission means for said units located in the confines of the head, thereby providing an arrangement which is calculated to better fulfill the requirements of a machine of this kind while at the same time minimizing lubrication.

This type of machine, it is submitted, is ideal to use for rubbing in the mastic and polishing the floor on the final finishing operation. It is such in construction as to uniformly surface high and low spots, eliminate an appreciable amount of labor usually expended in accurately levelling or smoothing up the floor when laying the terrazzo.

In carrying the inventive conception into actual practice, I have found it expedient and practical to select an unusual arrangement of mechanical features carefully matched and coordinated to take care of the self-levelling feature of the head, said head being in effect a housing for the ingenious method and means of simultaneously rotating the surfacing units while revolving about a common axis or center.

In the drawings:

Figure 1 is a view showing a fragmentary portion of the portable support and electric motor drive (not shown) with the improved planetary device.

Figure 2 is a horizontal sectional view taken approximately on the plane of the line 2—2 of Figure 1.

Figure 3 is an enlarged detail sectional and elevational view on the line 3—3 of Figure 2.

Figure 4 is a plan view of the revoluble head with the cover plate removed to show the internal details.

Figure 5 is a horizontal sectional view taken on the plane of the line 5—5 of Figure 3.

Figure 6 is a bottom plan view of the driving flange carried by the drive shaft.

Figures 7, 8 and 9 are detail views.

Figure 10 is a detail view of the thermoid or especially fabricated flexible driving ring.

Before introducing the detailed description, attention is invited to the fact that this invention is similar to a structure possessing certain common characteristics disclosed in my co-pending application filed the 28th day of May, 1932, and designated by Serial Number 614,182, which matured into Patent Number 1,919,389 granted July 25, 1933.

Referring now to the illustrative drawings, it will be observed that the numeral 11 in Figure 1 designates what is herein broadly referred to as a portable support. In fact, this is the major part of a wheeled truck supported casing carrying an electric motor (not shown) which motor drives a sprocket chain (not shown) trained over the sprocket 12, said chain operating in the shield or guard 13.

Through the medium of appropriate gearing, the perpendicular drive shaft 14 is actuated, said shaft extending down through a tubular guide 15 provided with an appropriate end thrust bearing. The numeral 16 designates the conventional apron or guard. These parts are all old.

In accordance with the present invention, a washer 17 is fixedly bolted to the lower end of the tubular guide 15 and provided on one side with a pair of outstanding prongs or lugs 18 which define a keeper which serves a purpose to be hereinafter described.

The revoluble head is denoted as a unit by the numeral 19, said head being in the form of a casing. The lower or body portion is denoted by the numeral 20 in Figure 3, and the cover distinguished by the ordinals 21, said cover having raised sockets 22 provided with renewable bushings 23. Directly beneath the sockets 22 the body portion 20 is provided with circumferentially

spaced bearings 24 provided with additional bushings or liners 25.

The lower end of the drive shaft 14 extends down into the head where it is provided with a ball-like terminal 26 seated in the complemental depression of an end thrust plate 27. Keyed to the shaft is a driving flange 28 having circumferentially spaced enlargements 29 threaded to accommodate the screw-threaded portions of connecting bolts 30. These bolts are fastened at circumferentially spaced points to the thermoid or flexible ring 31. The ring is in turn secured by bolts 32 to inwardly projecting studs 33 carried by the body portion 20 of the head. This provides a flexible driving coupling between the shaft 14 and the head to provide the requisite revolving action of said head.

The individual rotatable surfacing units are generally distinguished by the numerals 34. Each unit is the same in construction and a description of one will suffice for all. The unit comprises a stub shaft 35 mounted for rotation in the bearings 23 and 25, said stub shaft being provided with a fixed sheave or pulley 36, located directly beneath the cover plate 21.

The stub shaft carries a backing plate 37 to which the pivotally mounted tiltable spring pressed subplate 38 is connected. The subplate is constructed to carry the renewable abrasive stones or blocks 39. Incidently no claim is herein made to the specific construction of these units with the exception that each one is provided with a rotary shaft mounted in appropriate bearings and said shaft is equipped with a pulley, sprocket wheel, or equivalent rotating element.

As a matter of distinction, these pulleys 36 are hereinafter referred to as the supplemental pulleys in that they co-operate with a main stationary or fixedly mounted pulley 40. The pulley 40 is centrally located and surrounds the shaft 14 as seen clearly in Figure 3. This pulley 40 has no positive connection with the shaft 14. In fact, a conventional self-levelling bearing 41 is provided to permit this pulley 40 to maintain in the same plane with the head 19 at all times. To guard against disalinement of the pulley 40 I provide one or more retaining brackets or clips 42.

Attached to the upper side of the pulley is an annulus 43 provided with a marginal keeper finger 44 which extends up between the lugs 18. This prevents the pulley 40 from rotating with the shaft 14. Thus, in this sense the pulley 40 is fixed and the supplemental pulleys 36 are rotatable.

The aforesaid action is accomplished through the use of a flexible tracking belt 45 which as seen in Figure 4 is formed to define a double V arrangement. The small V may be distinguished as the inner flight 46 and this has its apex portion partially embracing the pulley 40. The outer V or flight 47 is trained over the supplemental pulleys 36. The belt is approximately diamond-shaped in cross section so that one surface thereof co-operates with the main fixed pulley 40 while the other surface thereof has frictional driving connection with the supplemental pulleys 36.

In operation it is understood that the shaft 14 is motor driven and that it imparts the desired revolving action to the head 19 through the medium of the flexible driving coupling composed of the flange 28 and thermoid or fabricated flexible ring 31. Thus the head 19 is positively driven and rendered self-levelling to compensate for irregularities in the surface being treated.

The surfacing units 34 are individually rotatable through the medium of the shaft 35 rotating in their bearings. The units 34 are bodily carried around the common center of rotation through the medium of the head 19 in order to obtain the requisite planetary action.

The tracking belt 45 trained over the fixed pulley 40 and the supplemental rotary pulleys 36 constitutes the means for individually rotating the units 34 as they travel around the aforesaid common center.

Although I have shown a reversible tracking or driving belt co-operating with movable and fixed sheaves, it is understood that the same result may be accomplished by using sprockets and a complemental sprocket chain.

An explicit review of the particular selection of mechanical parts will disclose the fact that the arrangement is unique from a manufacturing and assembling standpoint. Particularly do I wish to emphasize however, the principal novelty of the invention which resides in the flexible belt and pulley drive confined completely within the hollow casing-like head operating in conjunction with the self-levelling head.

I claim:

1. A floor surfacing machine of the glass described complising a portable support including a relatively stationary depending shaft guide, a perpendicular power-actuated drive shaft mounted for rotation in said guide, a revoluble self-levelling head, a flexible operating connection between said head and shaft, said head being provided with circumferentially spaced marginal bearings, a plurality of duplicate surfacing units having stub shafts mounted for rotation in said bearings, a relatively fixed main pulley connected with said guide and arranged centrally with respect to the axis of revolution of said head, individual supplemental pulleys fixedly attached to said stub shafts, and a flexible tracking belt trained over said pulleys, said belt being substantially diamond-shaped in cross section with one tracking surface engaged with the main pulley and the opposed tracking surface engaged with the supplemental pulleys.

2. A floor surfacing machine of the class described comprising a portable support including a relatively stationary depending shaft guide, a perpendicular power-actuated drive shaft mounted for rotation in said guide, a revoluble self-levelling head, an operating connection between said head and shaft, said head being provided with circumferentially spaced marginal bearings, a plurality of duplicate surfacing units having stub shafts mounted for rotation in said bearings, a relatively fixed main pulley attached to said guide and arranged centrally with respect to the axis of revolution of said head, individual supplemental pulleys fixedly attached to said stub shafts, and a flexible tracking belt trained over said pulleys, said belt being substantially diamond-shaped in cross section with one tracking surface engaged with the main pulley and the opposed tracking surface engaged with the supplemental pulleys, and being flexed into double V-shaped formation in the manner described.

3. In a surfacing machine of the class described, a portable support including a vertical relatively stationary guide, a drive shaft mounted for rotation in said guide, a hollow revoluble head provided with a centrally arranged internal thrust plate, said drive shaft extending down into said head and having a ball-like terminal co-operable

with said plate, a driving flange keyed on that portion of the drive shaft located in said head, a flexible coupling ring attached to the head and flange respectively to permit the head to be substantially self-levelling, a relatively fixed main pulley surrounding the shaft and connected to said tubular guide, said head being provided with rotatably mounted surfacing units, supplemental pulleys carried by each unit, and a belt trained over all of said pulleys.

4. In a surfacing machine of the class described, a portable support including a vertical relatively stationary guide, a hollow casing-like head, a drive shaft mounted for rotation in said guide and extending down into said head, a flexible operating connection between the head and shaft, a centralized main pulley surrounding said shaft and located in said head, an anti-friction self-levelling bearing interposed between the pulley and shaft, co-acting means between the pulley and guide to render the pulley substantially stationary and to prevent rotation thereof, said head being provided with circumferentially spaced bearings, a plurality of surfacing units provided with stub shafts mounted for rotation in the respective bearings, supplemental pulleys fixedly connected to the stub shafts, and a belt trained over all of said pulleys.

5. In a machine of the class described, a vertical relatively stationary tubular guide, a drive shaft mounted for rotation in said guide, a plate fixedly connected to the lower end of the guide and provided with marginal outstanding retaining lugs, a sectional hollow revoluble head, said shaft extending down into the interior of said head, a flexible operating connection between the head and shaft, a main pulley surrounding said shaft and confined in said head, an annulus attached to said pulley and provided with an upstanding finger located between said retaining element to prevent rotation of the pulley, a self-adjusting bearing interposed between the top of the pulley and said shaft, said head being provided with circumferentially spaced bearings, a plurality of surfacing units including stub shafts mounted for rotation in said bearings, supplemental pulleys fixedly attached to the stub shafts and located in the head in alinement with said main pulley, a flexible belt of double V-shaped formation, the intermediate portion of one flight of said belt partially embracing said fixed pulley, and the remaining flight of the belt surrounding said supplemental pulleys.

HARRY L. MYERS.