Nov. 18, 1930. H. H. WOLFE ET AL 1,782,376

ROTARY DRUM MACHINE

Filed Jan. 12, 1928 5 Sheets-Sheet 1

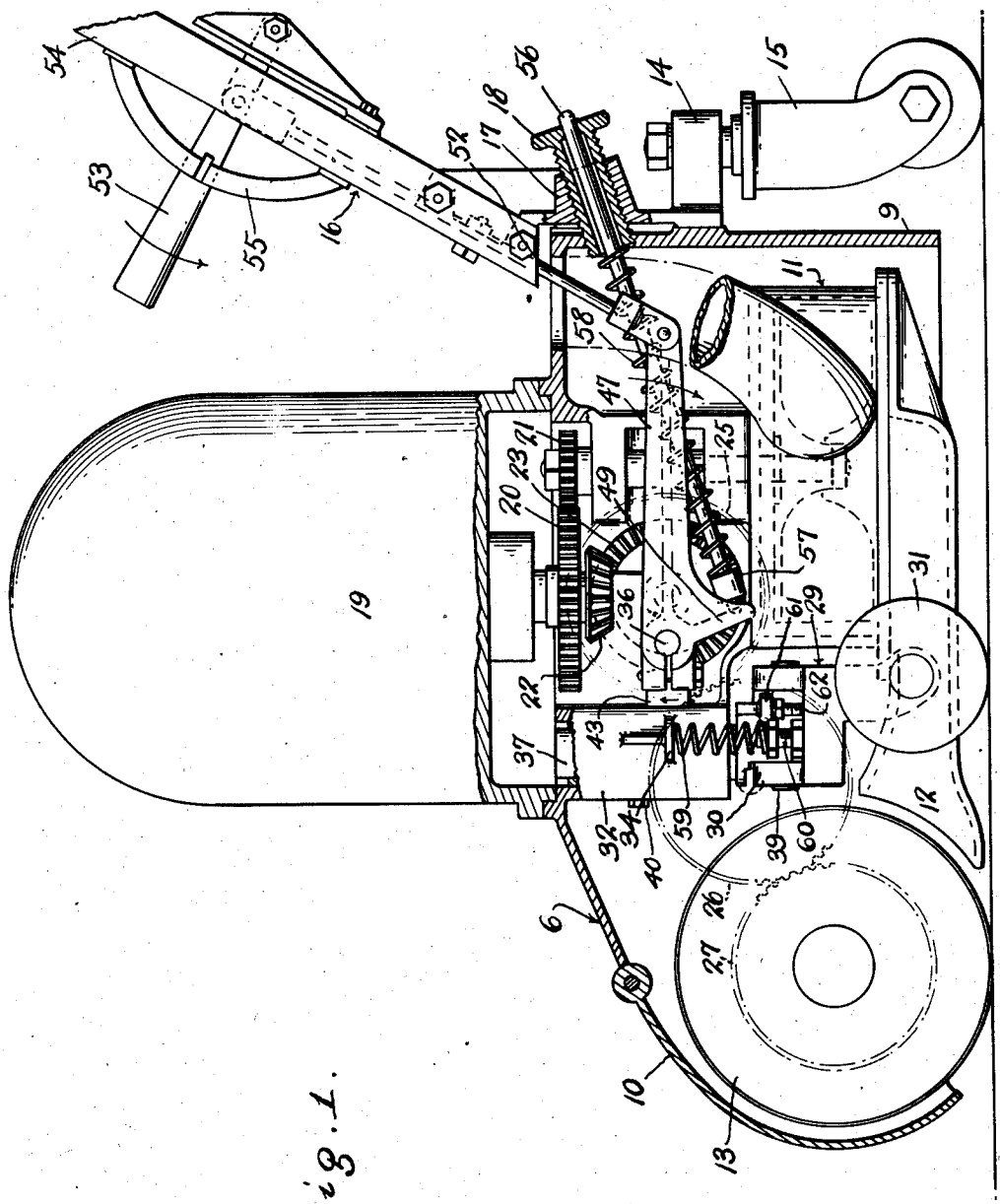


Fig. 1.

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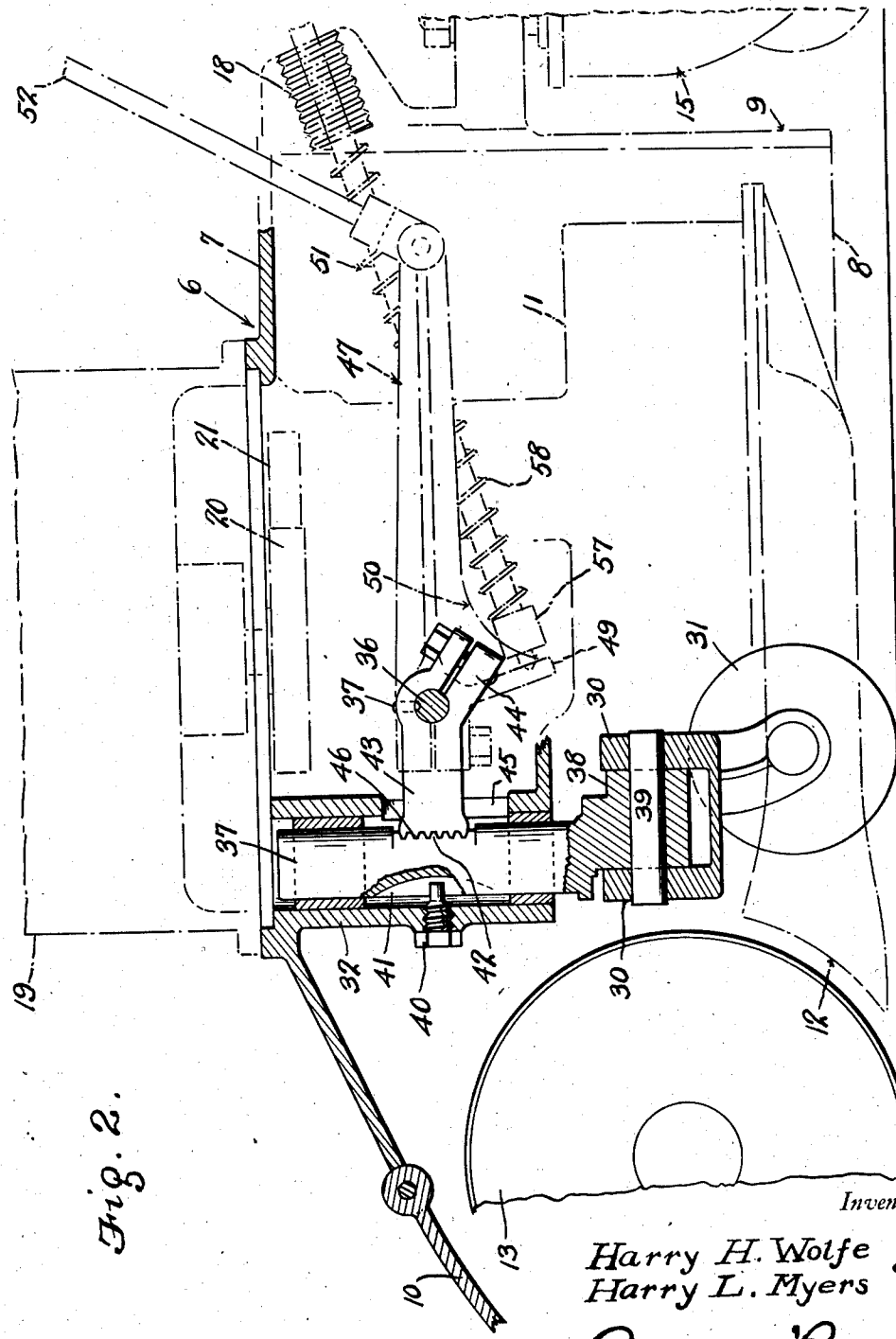


Fig. 2.

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ROTARY DRUM MACHINE

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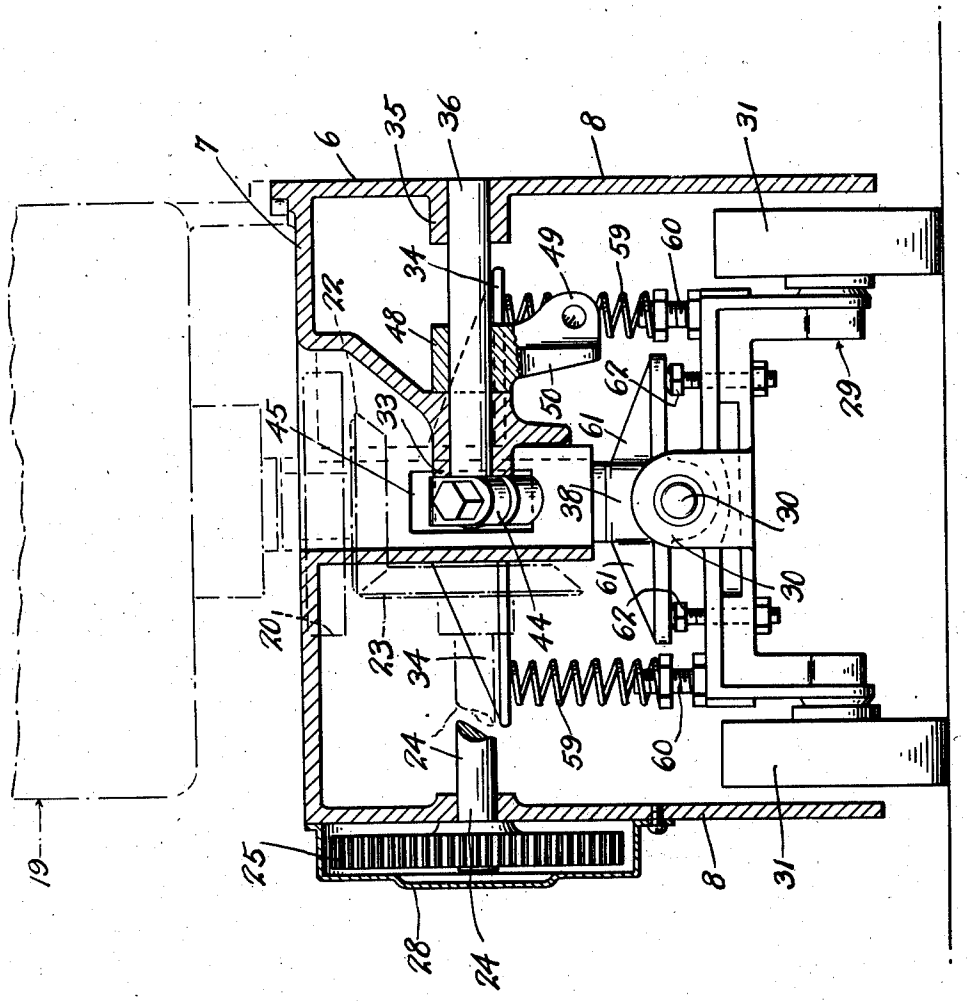


Fig. 3.

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ROTARY DRUM MACHINE

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Fig. 5.

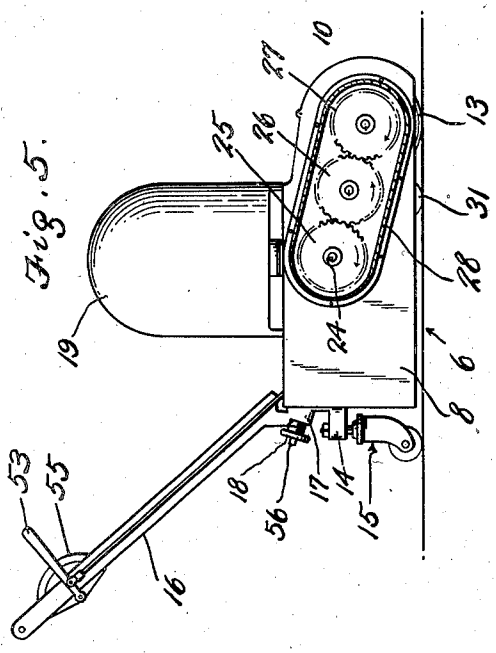
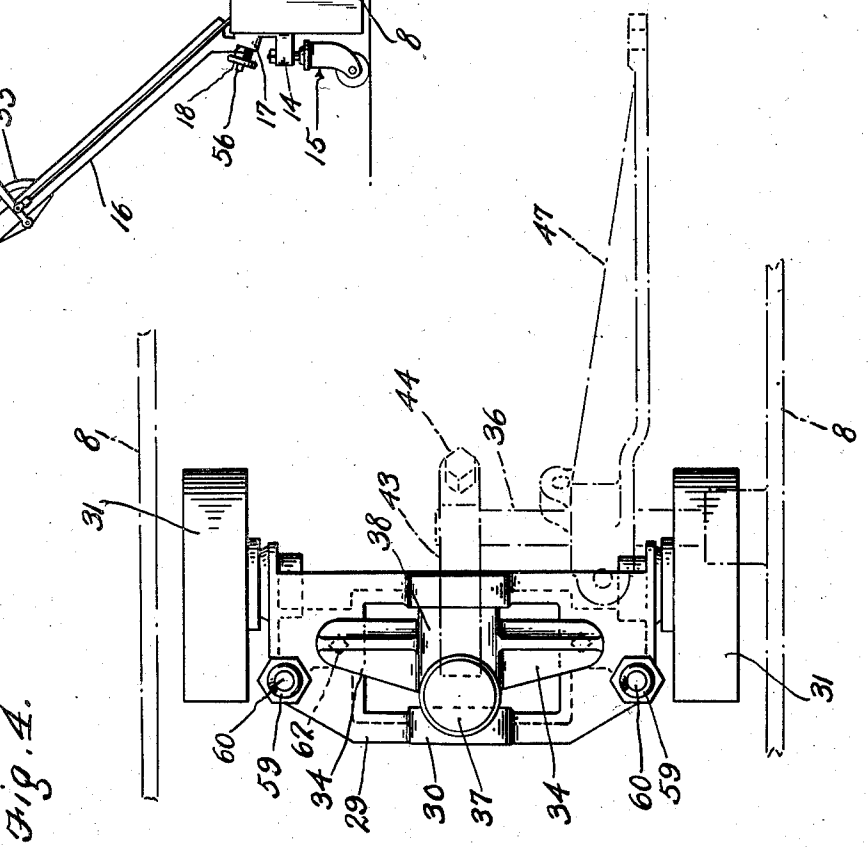


Fig. 4.



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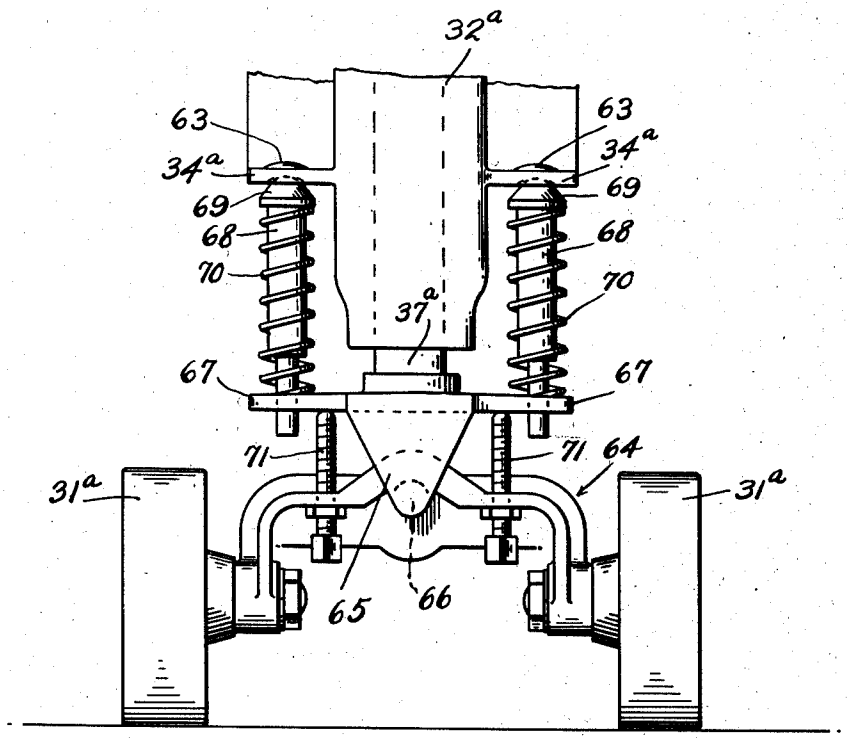
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Fig. 6.



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UNITED STATES PATENT OFFICE

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ROTARY DRUM MACHINE

Application filed January 12, 1928. Serial No. 246,198.

This invention relates to an improved floor surfacing machine of the vertically tiltable rotary abrasive drum type, employed for conditioning and finishing floors of various kinds.

What we have endeavored to do, beyond what has already been done, in this particular art, is to develop a comparatively lightweight motor driven machine capable of being moved by manual power over the surface, wherein the improved machine is characterized by a novel truck arrangement and associated details.

The present-day machines of this specific classification usually include a main body, a source of power, a horizontally disposed abrasive drum at the front of the body, a rear guide caster, and a fulcrum forming truck which is located between the drum and the caster.

With this arrangement, a rigid handle is provided at the rear of the body and the operator grasps this handle, lifts up on the rear portion of the body, swinging the front end portion down, thus using the truck wheel axles as a fulcrum for the body. This method of use therefore requires the expenditure of considerable manual energy on the part of the operator, in order to bring the abrasive drum into firm abrading contact with the floor.

Bearing in mind the disadvantages and objections which accompany an arrangement of this kind, we have devised an improved organization of parts which eliminates the usual stationary fulcrum truck, and embodies instead a novel adjustable truck whose construction and position on the body permits the accomplishment of several important results.

First, the truck, which is of the two-wheeled type, is connected to the body through the medium of a jack structure, thus permitting the truck wheels to be extended below the body and the drum, or permitting them to be retracted or withdrawn into the body in order to transmit the major part of the weight of the body to the drum to hold the latter in forcible contact with the floor.

Secondly, the truck thus constructed and mounted serves as an adjustable stop to limit the depth of cut of the abrasive drum and to thus insure smooth and uniform work.

In addition, the truck is in itself adjustably mounted so that it is allowed to rock transversely, of the body, thereby making it substantially self-leveling, to compensate for irregularities on the surface.

The improved machine is further individualized by the presence of a manually manipulated means located on the handle for conveniently adjusting the aforesaid jack structure and locating the truck in the most appropriate position to fulfill the requirements of the improved conception.

In the accompanying drawings:—

Figure 1 is a side view with one side of the body removed to expose and to permit clear observation of the drive and other details.

Fig. 2 is a similar view on an enlarged scale, showing principally the features of the wheeled truck and jack mounting or connection.

Fig. 3 is a transverse section through the structure with the predominating part of the jack and truck emphasized.

Fig. 4 is a plan view of the truck.

Fig. 5 is a side elevational view on a reduced scale of the complete drum machine constructed in accordance with the present invention.

Fig. 6 is an exaggerated elevational view of a fragmentary portion of jack structure, and pivotally mounted truck, showing a slightly different embodiment of the invention.

A prominent part of the machine comprises the part broadly designated as the body. Specifically, this body is in the form of a novel casting, the principal portion of which comprises a box-like housing, generally designated by the reference numeral 6.

As is better apparent from Fig. 5, this housing is of general rectangular configuration and embodies a substantially flat top 7, depending spaced parallel sides 8, a straight rear end wall 9, and a downwardly and forwardly curved front portion including a substantially arcuate drum shield 10, (see Fig. 1).

Formed integral with the top and located inside of the housing is a horizontal fan casing 11 constituting a part of a dust collecting device and associated with a dust intake 12, whose mouth is located in close proximity to the horizontally disposed abrading drum 13.

Incidentally, this drum is rigidly mounted in the housing beneath the shield 10 and between the side walls, and in practice, it is especially constructed to facilitate attachment and removal of the abrasive paper which is used thereon. This is a feature of special note which is covered in a co-pending application filed under date of January 26, 1928, and designated by Serial No. 249,649.

Suitably fastened to the rear wall 9 of the housing is a bracket of appropriate construction including a portion 14 upon which a caster 15 is swivelly mounted. This is a single wheel caster, and is located centrally of the wall 9, and it cooperates with the abrading drum 13 in supporting the entire body and parts associated with the latter under predetermined conditions. Also associated with the bracket is a handle 16 which is here shown as being channel-shaped in cross section, and rigidly mounted so that the machine can be conveniently propelled across the surface.

It might be added that the bracket includes an internally screw threaded boss 17, which is in alinement with the screw threaded opening in the wall 9, and this opening together with the boss serves to accommodate a screw threaded bushing 18, having a finger gripping flange at the outer end. This serves a purpose to be hereinafter described.

Supported on the central portion of the top plate of the housing is a conventional electric motor 19, equipped with a driving gear 20 in mesh with a smaller gear 21, which serves to drive the fan of the dust collecting device in an obvious manner. Mounted on the motor shaft below the gear 20 is a beveled power take-off gear 22, in mesh with a vertical complemental beveled gear 23 on the shaft 24 (see Fig. 3).

The shaft extends through one side wall of the housing, and carries a driving gear 25 which is in mesh with complemental gears 26 and 27 located in the side housing 28. We thus provide a gearing train which serves to take power from the shaft 24, and to transmit it to the aforesaid abrading drum 13.

Attention is now invited especially to Fig. 3, wherein it will be observed that the truck comprises an arced axle or yoke 29 whose central portion is provided with upstanding lugs 30, and whose depending arm portions are provided with axles on which the small surface engaging wheels 31 are mounted.

As shown better in Fig. 2, this truck is connected with the body, through the medium of what may be designated as a jack mounting or connection. As the name implies, this jack is intended for raising and lowering the truck with respect to the body so that the truck wheels may be projected down and beyond the bottom of the body or may be withdrawn entirely into the body.

As shown in Fig. 2 the jack includes a cylindrical stem guide 32 formed integral with and depending from the top plate of the housing in advance of the electric motor driving gears. As shown in Fig. 3, this guide includes on one side, a horizontal bearing 33, and is further equipped with outsanding horizontally disposed lugs 34, which function as spring abutments.

In connection with bearing 33 as shown in Fig. 3, we desire to call attention to the complemental bearings 35 formed on the housing, wherein these bearings serve to accommodate an oscillatory rock shaft 36. Referring again to the cylinder 32 as shown in Fig. 2, it will be observed that it is provided with internal bushings which serve to accommodate a vertically disposed cylindrical standard 37, of the jack structure.

This standard is provided at its bottom with an offset head 38 which fits down between and is pivotally connected by a pin 39, to the aforesaid ears 30, thus providing a rocking connection between the stub axle and the jack standard. The standard is held against rotation by the stem of a screw 40, fitting into a groove 41 in one side of the standard. The diametrically opposite side of the standard is provided with teeth 42 forming a vertical raising and lowering rack.

Closely associated with the rack, is a crank arm 43 fastened by a clamp 44 to the rock shaft 36, and maintained against accidental displacement by a set screw 37. This crank arm has its forward end extending through an opening 45 in the guide cylinder, and equipped with a gear segment 46, the teeth of which are in mesh with the aforesaid rack teeth.

When the arm 43 is raised up or down, a corresponding sliding movement is given the standard 37 thereby raising or lowering the truck according to the direction of movement of the standard. Convenient means is provided for operating the jack from a distant point, and preferably this means is controlled from mechanism on the handle. The means comprises a lever 47 (see Fig. 1), which has its forward end portion clamped to the shaft 36, and disposed in abutting relation with the aforesaid bearings 33, as at 48 in Fig. 3.

The lever is formed adjacent this clamp with a laterally disposed depending wing 49, reinforced by the presence of the web 50. These details serve a purpose to be later described. Connected to the rear end portion of the lever through the medium of a fork 51 is an operating link or rod 52, which extends up through an opening in the housing,

and then up between the flanges of the handle 16 as indicated in Fig. 1.

At its upper end, it is connected with an actuating arm 53, pivotally mounted on the handle by suitable means and carrying an appropriate retaining latch 54 held in adjusted position by the segmental keeper 55, (see Fig. 1).

It will be seen that by moving the handle 53 up or down, the lever 47 will be actuated and will impart movement to the rod 52. It is obvious also that when the lever is rocked, the shaft 36 will be rocked also, and this will in turn actuate the arm 43 to operate the jack. The lever and operating rod constitute what is broadly designated as the manual means for actuating the jack.

Associated with the manual means, is a self-acting or substantially automatic means to aid in the operation of the jack. This means includes the aforesaid screw threaded bushing 18, shown in Fig. 1, and a freely slidable rod 56 which has its lower pointed end fitting into a depression in the wing 49 shown in Fig. 3, and also in Fig. 1.

The upper end of the rod is slidable thru an opening in the head of the bushing, and the lower end is provided with a shoulder 57 against which the lower end of a coiled spring 58 bears. This coiled spring surrounds the rod 56 and bears at its upper end against the bushing 18. It is obvious however, that the adjustment of the bushing merely serves to regulate the tension of the spring and the spring in turn bears upon the rod, and the rod exerts a yielding thrust upon the depending wing of the lever, thus exerting a normal downward pressure on the lever and a consequent upward swinging motion on the crank arm 43, tending to raise the standard in the guide cylinder.

Counteracting the action of the spring 58, we find a pair of vertical springs 59, (see Fig. 3), which are interposed between the outstanding lugs 34, on the guide cylinder, and the axle 29 on the truck. In this connection, it will be noted that the axle carries adjusting screws 60 with which the lower ends of the springs coact, while the springs bear at their upper ends against the lugs 34.

In this same figure, it will be noticed that the head 38 is equipped with a pair of outstanding lugs 61 which overlie the truck axle and provide stop shoulders for the adjusting screws 62. These details obviously serve to regulate the rocking motion of the truck. In other words, the truck has sidewise rocking motion which is regulated by the screws 62 and abutment lugs 61.

In addition, the coiled springs 59 cooperate in resisting the rocking motion of the truck so that it is substantially self-leveling. As before intimated, these springs 59 not only act in the capacity of rendering the self-adjustment features of the truck yieldable, but they counteract to the certain extent, the action of the aforesaid spring 58. In other words, the spring 58 has a downward thrust upon the lever 47, thus raising upwardly on the jack standard, while the springs 59 tend to adjust the truck by forcing it downwardly. By proper adjustment of the springs, equalization of these two stresses may be brought about so as to maintain the truck in a somewhat "floating" state when the retaining means on the handle is released.

This aids in the sensitivity of adjustment of the truck either down or up, and takes some of the strain off the manual means so that the manual means for adjustment is very easy to operate.

The principal purpose of this improved structure, it will be understood, is not only that of adjusting the elevation of the body or frame in order to change the pressure and the surfacing of the drum, but to improve upon the efficiency of operation of the tilting type of floor surfacing means such as includes an eight-inch revolving drum. The pressure feature is accomplished by distributing the entire weight of the machine in such a manner that when the machine is not being operated, it will rest upon the truck and the rear caster.

However, it is possible to gradually or otherwise, at the will of the operator, place approximately 75% of the entire weight of the body and motor upon the surfacing drum. This is made possible by locating the truck in advance of the center of gravity of the entire load, and greatly forward from the rear caster. In other words, the truck is located between the center of gravity and the abrasive drums. It is obvious then, that under ordinary conditions, with the drum off of the floor as caused by a slight clearance, we have a three-point support, namely, the two truck wheels, and the caster. Thus the machine can be easily pushed about from place to place.

When it is desired to surface the floor, the manually manipulated retaining means is actuated in such a way as to elevate the jack and the truck carried thereby. This allows the truck to be retracted into the hollow housing and to transfer the weight of a greater portion thereof to the abrasive drum. The abrasive drum surfaces until the truck wheels again come into contact with the floor. In this respect, the truck wheels have the additional function of adjustable gage elements.

This permits the depth of the cut to be regulated. The result is that this improved machine requires only a minimum expenditure of manual energy in its operation. In conclusion, we desire to emphasize the fact that the body or frame includes as one of its principal portions, a box-like housing which constitutes a shield for the majority of the parts as well as the rotary abrading drum. The motor constitutes the source of power,

and provides a weight which is transmitted to the drum, when the truck is retracted into the housing, to insure a more tenacious abrading contact with the floor. The drum is rigidly mounted in the housing and is vertically liftable with the latter.

The caster aids in supporting and propelling the machine, and is preferably of the single type and located on the rear center of the housing. This caster, however, supports but a portion of the weight. The wheeled truck is self-leveling, bodily adjustable in a vertical direction, provides a depth gage for the abrading action of the drum, a yieldable stop, and is the principal transporting means for the machine. These, together with the other structural features between the manual adjusting and retaining means for the jack, have been made clear by the description and drawings. Hence, a clear understanding of the invention and features of novelty will be had.

Attention is now invited to Fig. 6 which, as before indicated, shows a different embodiment of the invention as regards the jack structure and the truck which is adjustably and pivotally mounted thereon. From the details already described, it is obvious that the standard of the jack and the truck which is pivotally mounted thereon are adjustable as a unit. Moreover, screws are provided for swinging the truck about its fulcrum or pivot and retaining it in adjusted position. Then too, the spring means is interposed between the jack and truck to bring about the aforesaid yieldable result.

In Fig. 6 the result is accomplished thru the medium of a slightly different structure, wherein the jack cylinder is designated by the numeral 32^a, this being provided with outstanding lugs 34^a constituting spring abutments. In this instance, the lugs are formed with depressions providing shallow sockets 63. The truck wheels 31^a, are mounted on the arched axles 64 whose central portion is ribbed and fashioned to provide a portion of a pivotal connection between the trucks and the standard 37^a of the jack.

In this particular instance, the standard is provided with spaced parallel ears 65 at its lower end which straddle the ribs on the arched axle and which carry inturned cylindrical studs 66 providing pivotal mountings.

The standard is additionally provided with extensions or arms 67, apertured at their outer ends to slidably receive the lower reduced ends of the vertical spring pins 68. Incidentally, these pins are provided at their upper ends with heads 69 receivable in the aforesaid socket 63. Then too, the coiled spring 70 surrounds the pins in each instance, bearing at their upper ends against the head 69 and at their lower ends against the extensions 67.

These extensions serve additionally as abutments against which the adjusting screws 71, carried by the axle, bear. Thus, in a broad sense we have spring means between the abutments, on the jack cylinder operating indirectly upon the trucks.

Having thus described our invention, what we claim as new is:—

1. In a surfacing machine of the class described, a body, a surfacing drum rotatably mounted on the forward end of the body, a guiding caster swivelly mounted on the rear end portion of the body, a handle connected to the rear end portion of the body, a motor supported on the top of the body and centrally located, a driving connection between the motor and said drum, a jack including a cylinder integral with the body, a standard slidably mounted in the cylinder, a wheeled truck disposed transversely of the body and in close proximity to said drum, said truck embodying an arched axle pivotally connected with said standard.

2. In a surfacing machine of the class described, a body, a surfacing drum rotatably mounted on the forward end of the body, a guiding caster swivelly mounted on the rear end portion of the body, a handle connected to the rear end portion of the body, a motor supported on the top of the body and centrally located, a driving connection between the motor and said drum, a jack including a cylinder integral with the body, a standard slidably mounted in the cylinder, a wheeled truck disposed transversely of the body and in close proximity to said drum, said truck embodying an arched axle, a pivotal connection between said axle and standard including spaced parallel ears, a pair of outstanding spring abutments carried by said cylinder, and coiled springs associated with said axle and abutments and bearing at their upper ends against said abutments.

3. In a surfacing machine of the class described, a body, a surfacing drum rotatably mounted on the forward end of the body, a caster swivelly mounted on the rear end of the body, a handle rigidly connected to the rear end portion of the body, a jack structure including a cylinder formed integral with and depending from said body, a standard slidable in said cylinder, a wheeled truck mounted on the lower end of the standard, a rock shaft supported for oscillation on said body adjacent said cylinder, a crank arm carried by said rock shaft, an operating connection between the crank arm and said standard, a lever fastened to said rock shaft, and operating means for the lever mounted on said handle.

4. In a surfacing machine of the class described, a body, a rotary surfacing drum carried by said body, a wheel support carried by the body, a handle carried by the body, a jack structure embodying a cylinder mounted on the body, a standard slidable in said cylinder,

a wheeled truck including an arched axle, pivotally connected to the lower end of said standard, outstanding spring abutments carried by said cylinder, springs interposed between said axle and jack and bearing at their upper ends against said abutments, outstanding lugs carried by said standard, and adjustable stop screws carried by said axle and cooperable with said lugs, whereby to provide a substantially self-leveling yieldable truck on the lower end of the jack standard.

5. In a surfacing machine of the class described, a body, a surfacing drum carried by the body, a guide caster carried by the body and swivelly mounted thereon, a handle mounted on the body, a jack structure comprising a cylinder formed integral with and depending from the body and provided in one side with an opening, a cylindrical standard slidable in said cylinder and having rack teeth on one side opposite said opening, a truck mounted on the lower end of the standard, a rock shaft journaled for oscillation and bearing on said body adjacent said cylinder, an arm carried by said rock shaft, and having a gear segment extending through said opening with its teeth in mesh on the rack teeth, a lever carried by said rock shaft, and operating means for the lever located on said handle.

6. In a surfacing machine of the class described, a body, a surfacing drum carried by the body, a guide caster carried by the body and swivelly mounted thereon, a handle mounted on the body, a jack structure comprising a cylinder formed integral with and depending from the body and provided in one side with an opening, a cylindrical standard slidable in said cylinder, and having rack teeth on one side registering with said opening, a truck mounted on the lower end of the standard, a rock shaft journaled for oscillation in a bearing on said body adjacent said cylinder, an arm carried by said rock shaft and having a gear segment extending through said opening with its teeth in mesh with the rack teeth, a lever carried by said rock shaft, operating means for the lever located on said handle, together with auxiliary spring means associated with the lever and body and including adjusting means.

7. In a surfacing machine of the class described, a body 00, a rotary abrading drum supported on the body, a handle connected to the body, a guide caster swivelly mounted on the body, a raising and lowering jack comprising a cylinder, a standard sliding in the cylinder, operating means for the standard, and a wheeled truck pivotally mounted on the lower end of the standard, and a spring means interposed between the truck and jack, and exerting pressure upon the truck to yieldably resist pivotal motion of the truck.

8. In a surfacing machine of the class described, a body, a horizontal rotary surface treating drum mounted on the forward end portion of the body, a guiding and supporting caster swivelly mounted on the rear end portion of the body, a motor supported on top of the body between the caster and drum, a handle fastened to the rear end portion of the body adjacent said caster, a wheeled truck, and mounting and adjusting means for the truck connected to the body and serving to permit the truck to be gradually adjusted in a step by step manner, together with spring means associated with the truck and said mounting means to aid in the adjustment of the truck and render the truck substantially self-leveling.

In testimony whereof we affix our signatures.

HARRY H. WOLFE.
HARRY L. MYERS.