Feb. 14, 1950 W. L. PETERSEN 2,497,791

SANDING MACHINE

Filed April 12, 1948 3 Sheets-Sheet 1

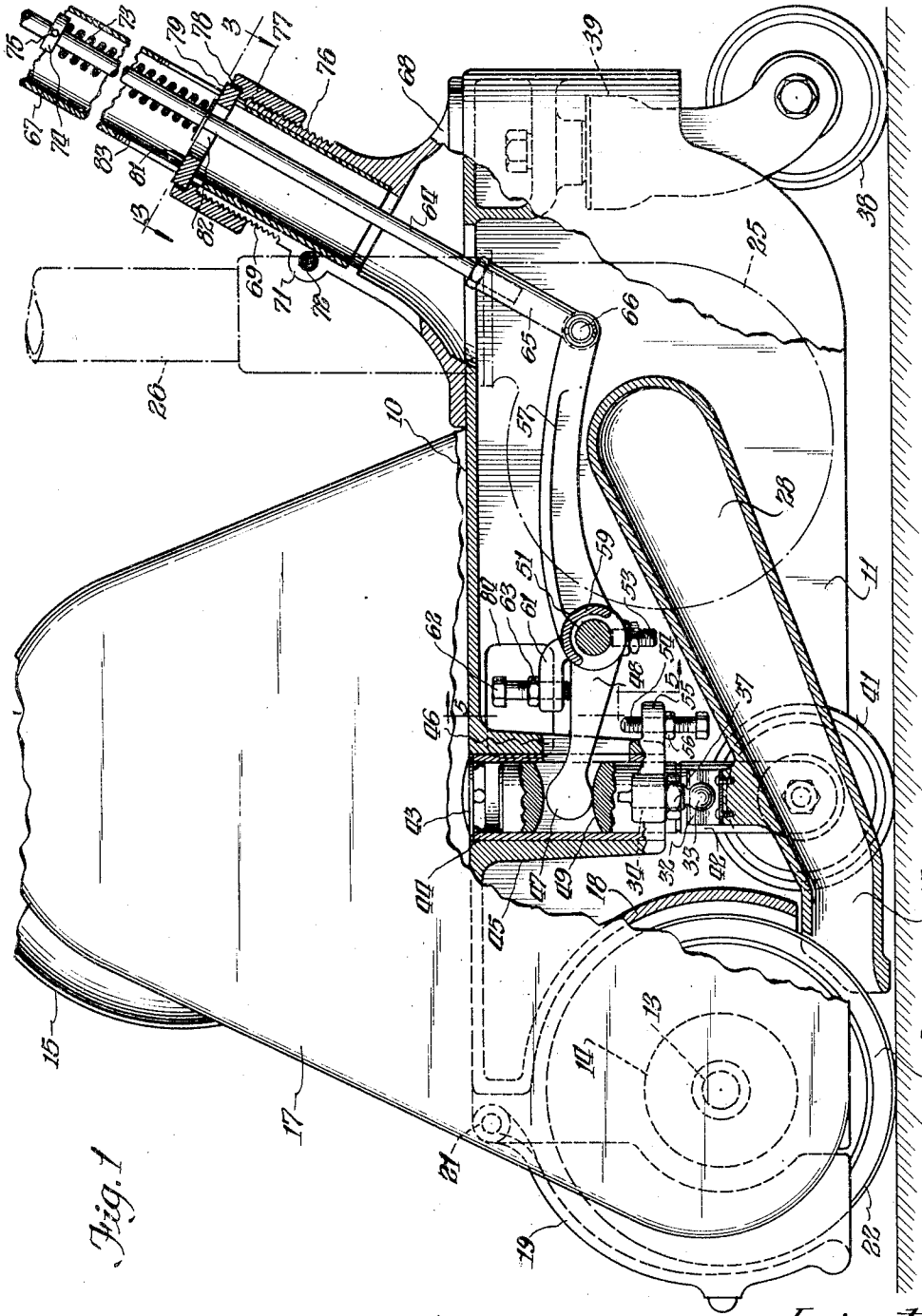


Fig. 1

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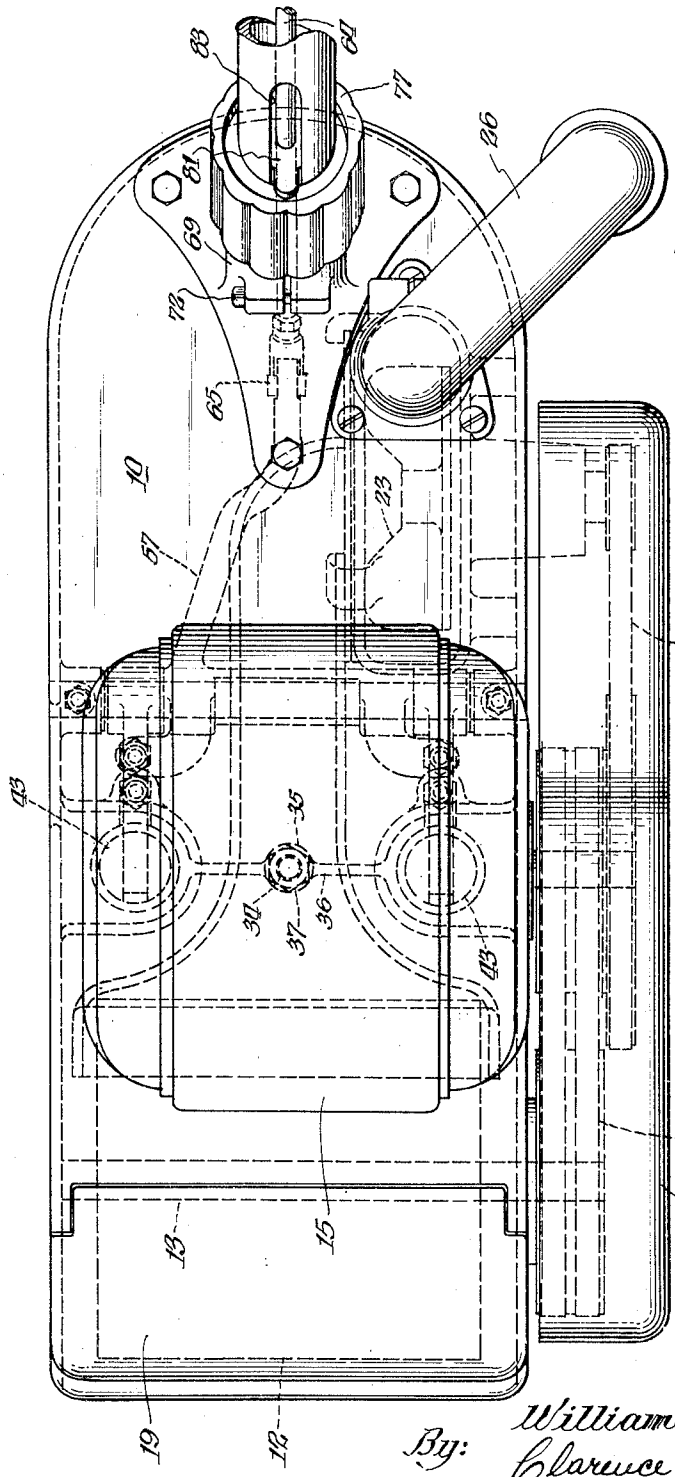


Fig. 2

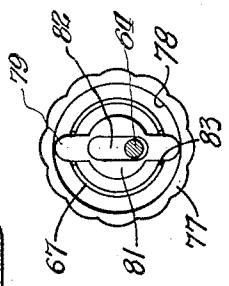


Fig. 3

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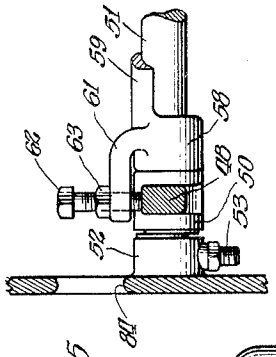


Fig. 5

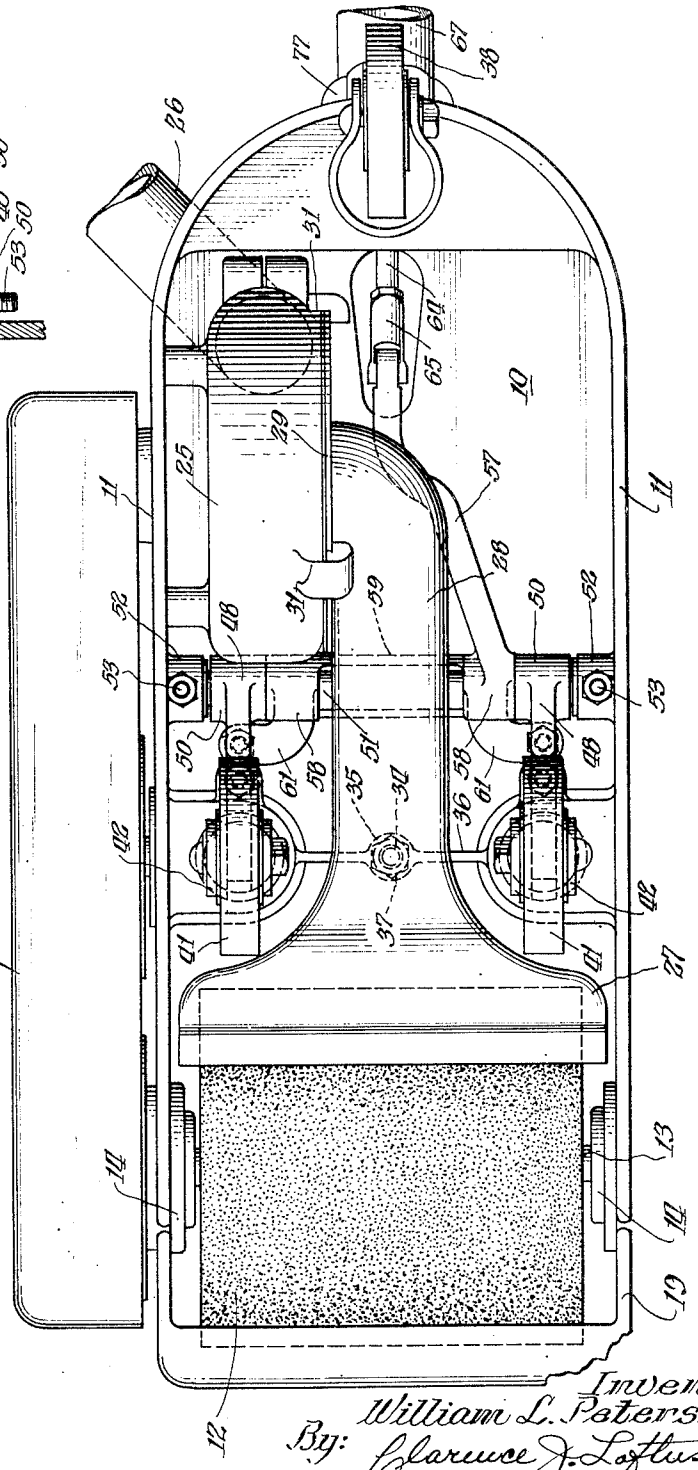


Fig. 6

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2,497,791

SANDING MACHINE

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Application April 12, 1948, Serial No. 20,389

6 Claims. (Cl. 51—176)

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The present invention relates to sanding machines and particularly to heavy-duty floor sanders of the drum type.

In machines of this general type, it is obviously of advantage to utilize a large sanding drum operating at a high speed of rotation, in order to permit a high cutting rate and thus make the speed of operation as fast as possible. It has long been a problem, however, to provide a satisfactory control mechanism for such a machine, since while extremely high cutting speeds are desirable, if properly controlled, yet if the control mechanisms are not smooth acting, positive and precise fast cutting machines can easily cut or groove a floor surface so deeply as to cause serious damage.

The problems incident to control of a high-speed sanding drum in a portable machine are by no means new; in fact, they have vexed workers in this field for many years. Many efforts have been made to provide improved control devices, but despite the time and effort that have been spent, no completely successful solution has heretofore been forthcoming.

It is accordingly the primary object of the present invention to provide, in a portable sanding machine, a large high-speed heavy-duty motor-driven sanding drum, together with a machine carriage having its parts so related and constructed as to permit free and easy many movements of the machine across the floor surface and, at the same time, accomplish smooth, precise and positive manual control of the cutting depth, and permit quick and accurate leveling adjustment.

It is a further object of the invention to provide a carriage for a drum type sanding machine, wherein accurate leveling and precise control of the cutting depth of the sanding drum are achieved, yet wherein the several parts are so constructed and related as to permit the utilization of an efficient dust collecting system, including a suction nozzle extending across the entire width of the drum near its cutting surface.

The foregoing objects are accomplished according to the present teaching by providing a machine including a relatively large and heavy main casting on which the sanding drum, motor and a suction fan are mounted, with the casting comprising a tricycle carriage having a single caster wheel at the end of the machine remote

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from the drum, and a pair of vertically shiftable spring balanced leveling wheels on opposite sides of the machine near the cutting surface. A preferred commercial embodiment of the principles of this invention is illustrated in the drawings of this specification, in which:

Figure 1 is a side elevational view of a sanding machine constructed in accordance with the present teachings;

Figure 2 is a plan view thereof;

Figure 3 is a detail sectional view taken substantially on the plane of the line 3—3 of Figure 1;

Figure 4 is a bottom plan view of the machine; and

Figure 5 is a detail sectional view taken substantially on the plane of the line 5—5 of Figure 1.

The machine comprises, in its general structure, a main frame casting 10 having downwardly extending side flanges 11 along both sides and around the rear end, with a rotatable sanding drum 12 carried at the forward end. The drum 12 is mounted on a shaft 13 extending between bearings 14 in the opposite side flanges 11, and is driven by the motor 15. The motor is connected to the drum through a pair of belts 16 enclosed in a guard or housing 17.

The main casting 10 is formed to include an arcuately shaped rear wall 18 extending around the upper and back portion of the drum, and a pivoted front cover 19 is secured to the frame so that it will normally enclose and act as a guard for the forward portion of the drum, but may be hinged upwardly on the pivot 21 to permit access to the drum for replacing the abrasive paper 22. The motor 15 also drives a centrifugal suction fan 23 by means of the belt 24. The suction fan is enclosed in a fan housing 25, and forms part of a dust collecting system. The suction side of the dust collecting system consists of a wide nozzle 27, positioned immediately behind the cutting surface of the drum 12, and extending the full width of the drum. The nozzle 27 has a neck portion 28 extending rearwardly and terminating in a flat plate 29, which forms the forward wall of the fan housing 25. The plate 29 has notches in its edges coacting with the lugs 31 to hold the nozzle in position, but arranged to permit release of the nozzle and neck by rotary movement of the plate with respect to the housing. Thus, the fan 23 acts to draw the dust in-

wardly at its center and discharges it through the exhaust pipe 26 to any suitable dust bag (not shown).

The nozzle 27 is positioned immediately above the surface of the floor at a point just behind the cutting surface of the drum, and is carried on an adjusting stud 34 threaded into a center boss 35 in a cross flange 36 of the main frame to maintain the nozzle in the precise vertical position desired. A lock nut 37 is placed on the stud to prevent it from working loose, and a spring clip 32 is provided on the nozzle to snap over the rounded head 33 of the stud 34 so that the nozzle may be removed and replaced without altering the adjustment.

The machine carriage, to which the present invention is particularly directed includes, together with the frame casting, a single caster wheel 38 mounted on a vertical swivel 39 at the back end of the machine, together with a pair of leveling wheels 41, each carried by the lower forked end 42 of a vertical stud 43. The studs are 43 slidably mounted in bearing sleeves 44, fitted in the hubs 45 of the machine frame, and manually controlled tensioning devices are provided to balance the weight of the machine and thus hold the drum level and in proper pressure engagement with the work. To this end the rear side wall of the hub 45 and bearing sleeve 44 are slotted, as indicated at 46, so that the rounded head portion 47 of an arm 48 may extend through each of the slots and engage the studs 43 between the upper and lower curved surfaces of a cross slot 49.

The arms 48 include enlarged bearing bosses or hubs 50, individually pivoted on a cross rod 51 extending between the opposite side flanges 11 of the machine. The cross rod is mounted in bosses 52 on the flanges, and is secured in fixed position by the set screws 53. The arms 48 are thus individually free to pivot, but their downward movement, and consequently the downward movement of the leveling wheels 41, is limited by a pair of stop screws 54, each threaded through a lug 55 projecting outwardly from the lower ends of the bosses 45. The stop screws are provided with locking nuts 56 to secure them in any desired position of adjustment.

The arms 48 are actuated by an operating lever 57 common to both of the arms, and in the preferred construction, the arms 57 is formed with a pair of integral bearing portions 58, immediately adjacent the hubs 50 of the levers 48 and interconnected by a semicircular flange 59. The bearings 58 each carry an arm 61, curving forwardly and outwardly to a point immediately above the arm 48 and provided with an adjustable cap screw 62, threaded through the arm and bearing against the upper surface of the lever 48. Locking nuts 63 are also provided to maintain the parts in predetermined adjustment.

The rearward end of the operating arm 57 is raised or lowered by a pull rod 64, joined to the end of the lever by a bifurcated clevis 65 and pivot pin 66. The pull rod 64 extends upwardly through a tubular handle 67, which for convenience may be mounted on a handle bracket 68, and secured in position in a split sleeve 69 having a pair of clamping lugs 71 adapted to be drawn together by a cross bolt 72. The pull rod 64 is normally urged upwardly by a coiled compression spring 73, which surrounds the rod and bears against a collar 74, fixed to the rod by the pin 75 to urge the rod in an upward direction.

It is desirable to provide an easily accessible and convenient manually adjustable tension setting for this spring and to this end the split sleeve 69 is provided with a screw thread portion 76, on which a thread adjusting collar 77 is mounted. The upper extremity of the collar is grooved at 78 to receive the opposite ear portion 79 of a shiftable washer 81. The washer 81 is slotted at 82 to surround the pull rod 64, but the ear portions 79 project through opposite slots 83 in the side walls of the tubular handle 67, so that as the sleeve 77 is manually rotated on the thread 76 the washer will be correspondingly raised or lowered to effect a precise adjustment of the spring 73.

The pull rod 64 extends on up the handle to a more or less conventional hand lever control, which is not shown in the drawings but which serves to raise or lower the rod 64 in response to manual manipulation by the operator.

In operation, it will be seen that the greater part of the weight of the machine is carried on the opposite leveling rollers 41, which may be adjusted to precisely level relationship with respect to the drum 12 by manipulation of the set screws 62 and locking nuts 63. In practice one of these is set at a permanent adjustment at the factory, and the leveling adjustment effected by either raising or lowering the other screw, as required. This is conveniently done at any time necessary, since an aperture 84 is cast in the side wall of one of the flanges 11 to provide easy access to the screw and its locking nut. Downwardly spring pressure is applied to each of the vertical slide studs 43 by the levers 48, which are in turn spring urged by the spring 73, acting through the pull rod 64, clevis 65, operating lever 57 and arms 61. The relative adjustment of the screws 62 between the arms 61 and levers 48 provide a constantly equal spring force on each of the rollers, so that the sanding drum will remain exactly level; at the same time, the total force exerted by the spring may be conveniently adjusted by manually rotating the sleeve 77, so that the force exerted by the spring 73 balances the weight of the machine to the exact degree desired. It follows that as the machine is moved across the floor the cutting depth of the sanding drum may be precisely controlled by the operator by manipulation of a handle lever to raise or lower the pull rod 64. The swiveling movement of the caster 38 permits the machine to be easily guided in any desired direction, yet the fact that the leveling wheels 41 do not swivel nor move in any direction, other than in an exactly vertical path, means that the difficulties of alignment of prior types of machines are largely overcome and that the dangers of excessively cutting or grooving the floor due to improper control of the cutting speed of the drum are successfully overcome. This object is brought about by the use of a wheel mounting and adjusting construction that provides an extremely rugged and sturdy support for the leveling wheels 41, so that they are not apt to be misaligned by accidental impact or shock incident to moving the machine over irregular surfaces, and since each wheel is supported with the center of the wheel directly under the center of the vertically slidable stud, with the result that an unusually high degree of rigidity of the structure is obtained without unnecessary strength or bulk of the machine parts. The relatively long sliding stud 43 provides a smoothly functioning vertical adjustment, and at the same time provides a construc-

tion characterized by freedom from looseness, chatter, play or vibration, so that precise leveling is accomplished without the sacrifice of other features of importance in the machine structure.

While the form of the invention illustrated in the drawings and described herein is the preferred commercial embodiment of these teachings and is believed to be particularly well suited to a description of the advantages inherent therein, it is to be recognized that various deviations in the exact construction and arrangement of parts may be made without departing from the teachings of this disclosure, and it is accordingly pointed out that the precise structure described is referred to by way of illustration rather than by limitation, and that the scope of the inventive concept of this disclosure extends equally to any variation or modification of structure coming within the terms of the appended claims.

Having thus described the invention, what I claim as new and desire to protect by United States Letters Patent is:

1. In a sanding machine including a motor-driven sanding drum adapted to rotate on a generally horizontal axis and to act against the surface on which the machine is supported, the combination of drum supporting devices including a single swiveled caster wheel, remote from and at right angles to the axis of rotation of the drum; together with a pair of individually operable vertical slides adjacent the drum near its opposite ends; and a leveling wheel carried at the lower end of each of said slides, together with a pivot shaft extending across the machine adjacent the slides, and a pair of levers freely pivoted on the shaft near its opposite ends with each of the levers engaging one of the slides, a leveling fitting pivoted on the pivot shaft between the levers, with means on the leveling fitting to operatively engage both levers, said means comprising screw threaded adjusting means to adjust the relative positions of the levers and slides and effect precise leveling of the sanding drum on the floor surface; together with a spring tensioning device acting on the leveling fitting and common to each of said slides, including an actuating rod extending upwardly from the leveling fitting through the machine handle, a coil spring within the handle and surrounding said rod, a screw threaded sleeve surrounding the handle, and means interconnecting the spring and the sleeve to adjust the spring by manual rotation of the sleeve.

2. In a sanding machine including a motor-driven sanding drum adapted to rotate on a generally horizontal axis and to act against the surface on which the machine is supported, the combination of drum supporting devices including a single swiveled caster wheel, remote from and at right angles to the axis of rotation of the drum; together with a pair of individually operable vertical slides adjacent the drum near its opposite ends; and a leveling wheel carried at the lower end of each of said slides, together with a pivot shaft extending across the machine adjacent the slides, and a pair of levers pivoted on the shaft near its opposite ends with each of the levers engaging one of the slides; screw threaded adjusting means to adjust the relative positions of the levers and slides and effect precise leveling of the sanding drum on the floor surface; together with a spring tensioning device common to each of said slides, including a manually operable actuating rod extending upwardly through the machine handle, a coil spring within the handle and surrounding said rod, a screw threaded sleeve surrounding the handle, and means interconnecting the spring and the sleeve to adjust the spring by manual rotation of the sleeve.

3. In a sanding machine including a motor-driven sanding drum adapted to rotate on a generally horizontal axis and to act against the surface on which the machine is supported, the combination of drum supporting devices including a single swiveled caster wheel, remote from and at right angles to the axis of rotation of the drum; together with a pair of individually operable vertical slides adjacent the drum near its opposite ends; a leveling wheel carried at the lower end of each of said slides and spring means for urging of said slides downwardly to at least partially balance the weight of the machine on said leveling wheels, together with a pivot shaft extending across the machine adjacent the slides, a pair of levers on the shaft near its opposite ends with each of the levers engaging one of the slides, and screw threaded adjusting means to adjust the relative positions of the levers and slides and effect precise leveling of the sanding drum on the floor surface.

4. In a sanding machine including a frame and handle, with vertically shiftable wheels in the frame and a manually operable wheel control rod extending through the handle; the combination of spring balancing devices including a coiled compression spring surrounding the control rod in the handle; a collar fixed to the rod at the upper end of the spring whereby the spring may urge the rod upwardly; a pair of vertically extending slots in the tubular handle adjacent the lower end of the spring; with a spring seat comprising a washer surrounding the rod at the lower end of the spring and adapted to support the spring, with a pair of lugs on said washer extending through the slots in the handle and a screw threaded collar on the outside of the handle engaging the lugs of said washer; the collar including a manual grip portion whereby it may be threaded up or down in order that the tension of the spring may be adjusted by manual rotation of the sleeve.

5. In a sanding machine including a motor-driven sanding drum adapted to rotate on a generally horizontal axis and to act against the surface on which the machine is supported, with drum supporting devices including a single swiveled caster wheel, remote from and at right angles to the axis of rotation of the drum; together with a pair of leveling wheels, means for urging of said leveling wheels downwardly to at least partially balance the weight of the machine on said leveling wheels, a tubular handle on the machine and a wheel control rod for shifting said leveling wheels, said control rod extending through said handle; the combination of spring means including a coiled compression spring positioned within the handle and surrounding the control rod extending therethrough, a collar fixed to the control rod and engaged by one end of the spring, and a shiftable spring support for one end of the spring, said support having at least one lug extending through a slot in the handle, and a screw threaded sleeve outside of the handle engaging said lug to move the shiftable spring support longitudinally of the rod and adjust the spring by rotation of the sleeve.

6. The combination, with a control rod and handle, of spring means including a coiled compression spring positioned within the handle and

surrounding the control rod extending therethrough, a collar fixed to the control rod and engaged by one end of the spring, and a shiftable spring support for one end of the spring, said support having at least one lug extending through a slot in the handle, and a screw threaded sleeve outside of the handle engaging said lug to move the shiftable spring support longitudinally of the rod and adjust the spring by rotation of the sleeve.

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