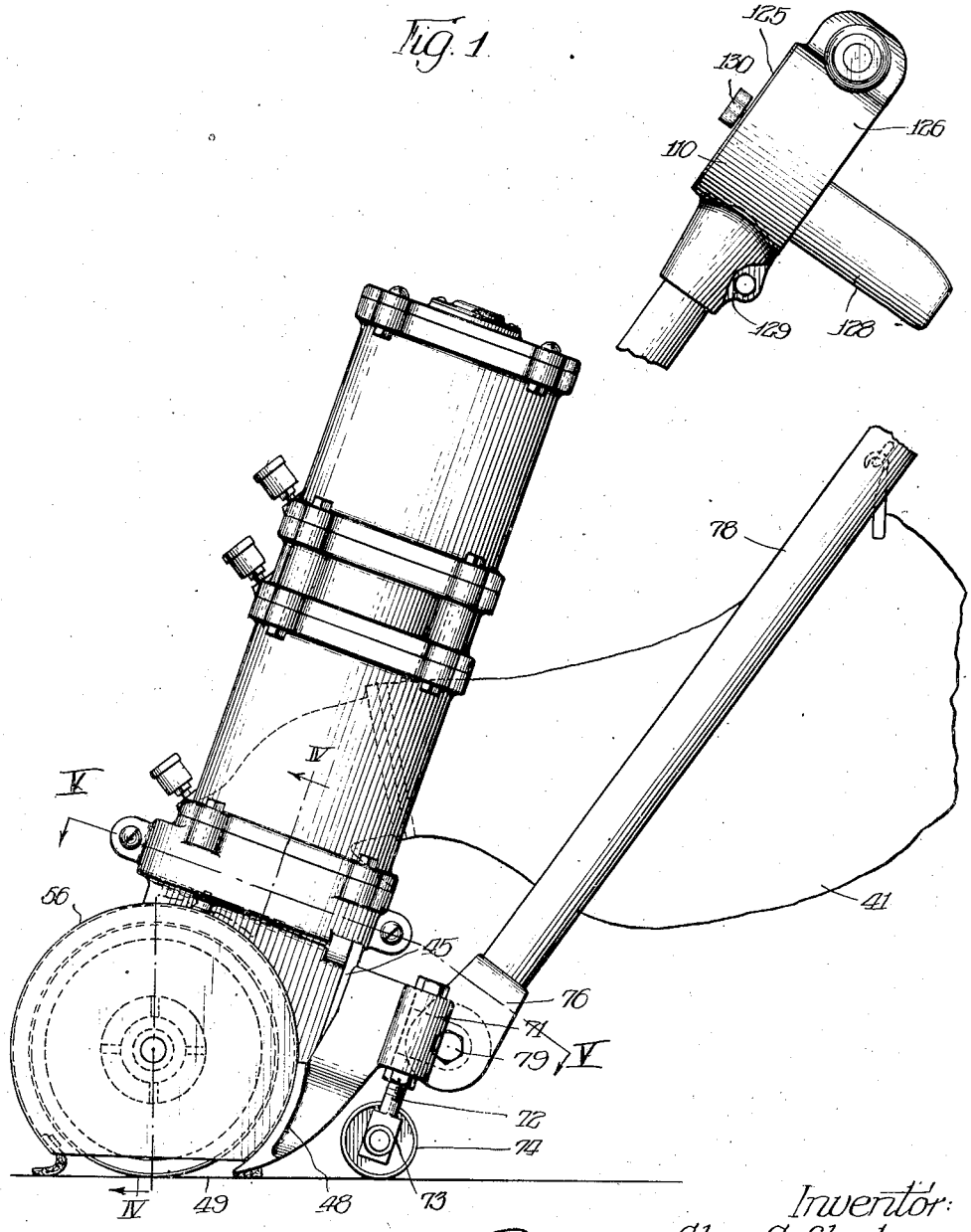
March 7, 1933. A. A. CLARKE 1,900,331

WOOD SURFACING MACHINE

Filed July 13, 1928 4 Sheets-Sheet 1

Fig. 1.



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WOOD SURFACING MACHINE

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Fig. 2.

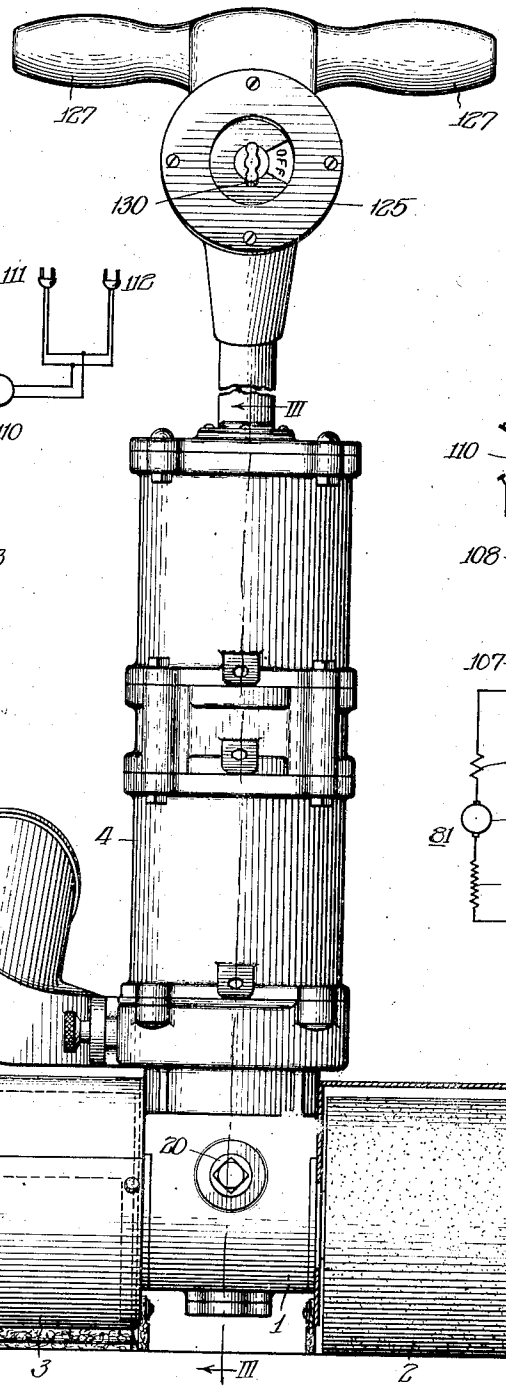

Fig. 7.

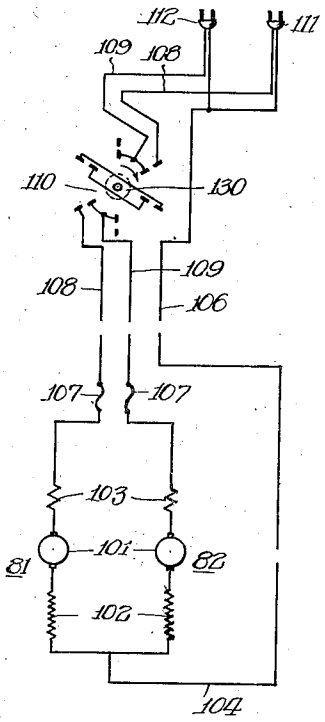

Fig. 8.

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Fig. 3.

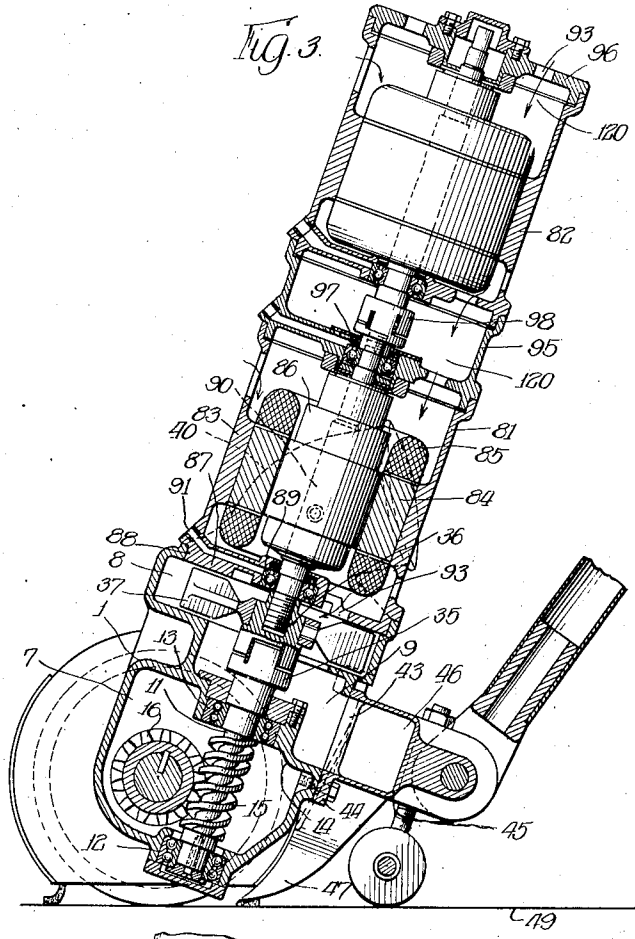
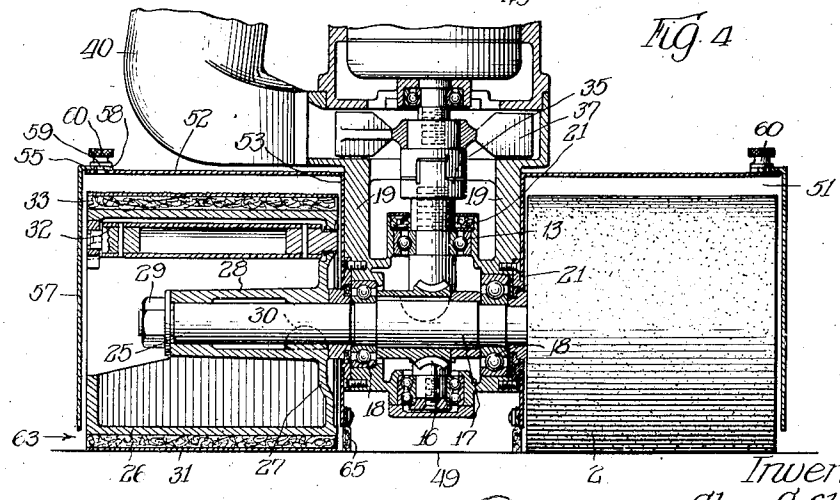


Fig. 4



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WOOD SURFACING MACHINE

Filed July 13, 1928 4 Sheets-Sheet 4

Fig. 5

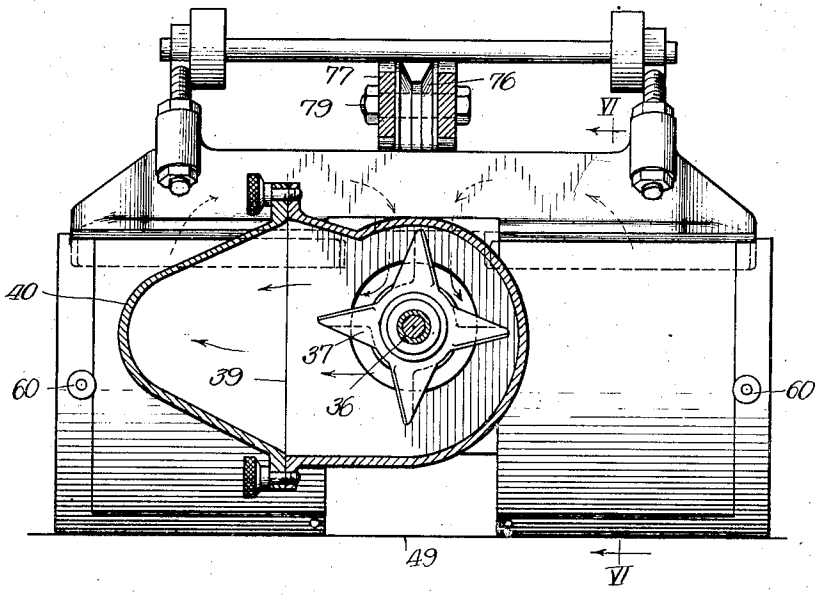
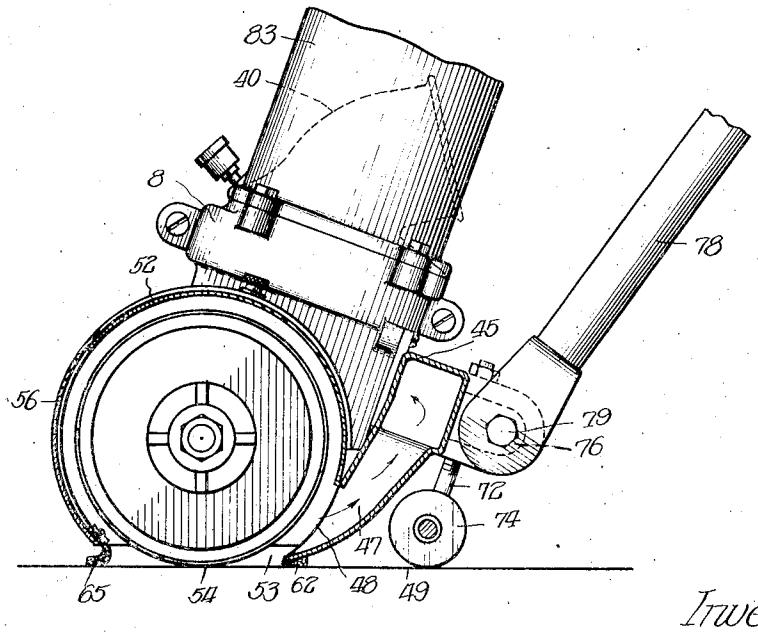


Fig. 6



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Patented Mar. 7, 1933

1,900,331

UNITED STATES PATENT OFFICE

ALEX A. CLARKE, OF CHICAGO, ILLINOIS, ASSIGNOR TO THOMAS B. BENNETT, OF MUSKEGON, MICHIGAN, AND HIMSELF, JOINTLY

WOOD SURFACING MACHINE

Application filed July 13, 1928. Serial No. 292,393.

This invention relates to wood surfacing machines and it has among its objects the provision of an improved portable sanding or abrading machine of high working capacity, great efficiency and simple construction, although some of the features of the machine are by no means restricted to sanding or abrading machines.

The novel features of the invention and the objects thereof will be best understood from the following description of an exemplification thereof, reference being had to the accompanying drawings, wherein

Fig. 1 is a side elevation of a sanding machine embodying the invention,

Fig. 2 is a front elevation of the machine shown in Fig. 1, with a part of one drum casing in section,

Fig. 3 is a vertical sectional view of the machine along the line III—III in Fig. 2,

Fig. 4 is a sectional view through the machine along the line IV—IV in Fig. 1,

Fig. 5 is a transverse sectional view of the machine along the line V—V in Fig. 1,

Fig. 6 is a sectional view through the machine along the line VI—VI in Fig. 5, and

Figs. 7 and 8 are circuit diagrams of the motor arrangement of the machine shown in Figs. 1 to 6.

The machine of the present invention is intended for large surfacing operations and is particularly adapted for surfacing floors, or the like, the machine being capable of carrying out the surfacing until the very edge of the floor adjacent to the quarter round or base board.

The entire organization of the machine is such that its several parts may be manufactured and assembled in the form of simple, self-contained units, making all the parts readily interchangeable and accessible for repair and supervision.

As shown in the drawings, the machine exemplifying the invention comprises a central driving mechanism 1 carrying on opposite sides thereof two abrading drums 2, 3 and having mounted on the top a motor aggregate 4 which supplies the power for driving the drums.

The driving mechanism 1 constitutes a complete and self-contained unit and comprises a casing divided into three compartments, namely, a gear compartment 7, a fan compartment 8, and a suction compartment 9, disposed in the space between the first two mentioned compartments and communicating with the central portion of the fan compartment. The casing of the driving mechanism may be cast as a single unit and the several compartments are arranged in the direction of the axis of a driving shaft 11 mounted therein. The shaft 11 is mounted on two ball bearings 12, 13 secured on the lower outer wall of the gear compartment and the upper intermediate wall 14 separating the gear compartment from the suction compartment 9. The shaft 11 is provided with a worm 15 engaging a worm wheel 16 secured on a drum shaft 17 which is journaled horizontally on ball bearings 18 secured on the opposite side walls 19 of the gear compartment. After the bearings 12, 13 and 18 with the driving shaft 11 and the drum shaft 16 and associated gearing are assembled in place, the gear compartment 7 is completely closed and protected against entrance of dust or other influences that might affect the operation of the mechanism. The compartment is preferably filled with a lubricating medium such as grease, a special greasing opening that may be closed by means of a bolt 20 being provided at the front of the gear compartment for conveniently renewing the lubricant without interfering with the assembly of the mechanism and the other parts of the machine. The shaft ends projecting from the gear compartment are suitably sealed by means of felt washers 21 so as to preclude the possibility of entrance of even the smallest dust particles into the gear compartment while leaving the shafts free to rotate within the bearings.

The drum shaft 17 has two shaft stubs 25 freely projecting from the opposite side walls 19 of the gear compartment and carrying two abrading drums 2 and 3, the drums being made in the form of cylindrical bodies 26 provided at the inner ends with an end wall 27 having at its center a relatively long hub member 28 fitting over the free shaft

ends 25. Each drum is held in place by means of a nut and lock washer 29 secured to a threaded end of the shaft 25, rotation of the drum with respect to the shaft being prevented by suitable feathers 30. By releasing the nut 29 each drum may be readily withdrawn from the shaft without affecting the remainder of the mechanism. Each drum is arranged to carry at its outer surface a suitable abrading medium, for instance, a layer of sandpaper 31 held clamped in place by a suitable clamping mechanism 32 over a layer of felt 33 secured to the surface of the drum. The drum bodies 26 as well as the parts of the casings are preferably made of aluminum so as to reduce the weight of the machine.

In the preferred construction the drums are assembled on the two shaft ends 25 so that the points of periphery at which the sandpaper is clamped to the clamping device 22 are offset or staggered.

The end of the driving shaft 11 projecting from the gear compartment through the upper bearing 13 has secured thereto, for instance, by a threaded engagement, one member of a claw coupling 35, the other member of which forms a shaft section 36 extending axially through the fan compartment 8 and having mounted thereon an air suction fan 37. The blades of the fan 37 move between the opposite walls of the fan compartment 8 so as to impel the air in the direction from the center to the periphery of the fan, creating a suction at the central portion thereof. The air compressed by the fan is discharged through a discharge opening 39 on one side of the fan compartment. Over this opening 39 may be detachably secured a throat member 40 of a dust or waste collecting bag 41 of suitable porous material adapted to retain the waste particles but permit the escape of the purified air.

The rear wall of the suction compartment 9 has an intake opening 43 to which is secured, for instance, by means of a flange connection 44, an intake duct unit 45 having a chamber 46 communicating with the intake opening 43 and two ducts 47 terminating in elongated nozzles 48 extending alongside the rear of the abrading drums 26 adjacent the floor surface indicated by the line 49.

In combination with the intake nozzles 48 there are formed drum compartments or chambers 51 around each drum. Each drum compartment comprises a fixed substantially semi-cylindrical curved wall section 52 of sheet metal joined at one end to a substantially circular wall section 53. The circular wall section is secured, by means of small flat head screws or rivets, against the outer side of the side wall 19 of the gear compartment and forms an enclosure around the drum on the side facing the gear compartment. The semi-cylindrical wall section 52 has its rear end secured by flat head screws, or the like, to the upper lip of the intake nozzle 48 and extends forwardly so as to enclose the upper side of the abrading drums 2 and 3. The edge 55 of the semi-cylindrical wall section 52 terminates in the plane of the outer end surface of the abrading drums so as to permit bringing said drums directly in contact with the side walls of the floor or similar object that is to be surfaced for carrying out the abrading action to the very edge of the treated surface.

The enclosure around each of drums 2 and 3 is completed by detachable casing units 56 comprising a curved front wall section constituting a continuation of the semi-cylindrical section 52 and enclosing the front side of the drum, and a circular section 57 on the outer end to enclose the projecting end of the drum. This detachable drum wall unit 56 is held in place by means of one or more brackets 58 having slots adapted to slide over a fastening bolt 59 mounted near the edge of the semi-cylindrical fixed casing wall 52. By fastening or loosening the nut 60 on the bolt 59 the detachable drum wall section may be locked in place or loosened for removing and exposing the front portion of the drum and outer end thereof.

The drum compartments 51 arranged as described above constitute complete enclosures around the drum having only at the bottom openings 53 through which the cutting edges 54 of the drums may be exposed against the surface to be treated by the tool. In this way very efficient air flow conditions are obtained in the space wherein the cutting action takes place and the waste particles created by the cutting action are sucked away with a minimum amount of power along an extremely short path with very small losses. In some respects the entire drum compartment may be considered as a part of the nozzle 48 with the upper wall of the nozzle enlarged to form a bulging portion surrounding the upper side of the drum surface, as shown best in Fig. 6 of the drawings.

In order to better confine the air stream, the front edge of the detachable casing wall 56 may be provided with a flexible curtain member 65 of felt, rubber, or the like, suitably cemented or joined to the edge of said wall 56. The lower edge of the curtain member 65 is free to flex and slide along the surface treated and confies the air stream to the portion of the drum adjacent the cutting edge 54. In a similar way, the lower lip 62 of the intake nozzle 48 may have its under surface provided with a strip of flexible material such as felt, or the like, so as to confine the air stream to the space adjacent the drum. In this way the suction created by the fan 37 produces a stream of air entering the drum compartment adjacent the cutting edge 54 from the side thereof, as

indicated by the arrow 63 in Fig. 4, the air stream carrying the waste particles into the intake nozzle 48 and therethrough by way of the intake compartment 9, into the fan compartment 8 of the machine. This air stream may be caused to enter into the drum compartment from both end sides thereof through the openings underneath the lower edges of the side walls 53 and 57, although in some cases it may be preferable to close up the space under one of said side walls confining the suction flow to one end of the compartment, such arrangement being shown in the drawing wherein the openings at the lower edges of the inner side walls 53 are closed up by strips 62 of felt or similar material.

The intake duct unit 45 constitutes also the carriage by means of which the entire machine may be moved over the surface to be treated. To this end there are formed on the walls of the intake duct 46 two bosses 71 each adapted to receive the shank 72 of a bracket 73 on which are journaled supporting rollers 74. By means of nuts 75 screw-threaded on the shank 72 the height of the rollers 74 may be adjusted to vary, within a limited range, the point of support of the machine against the floor surface 49. The intake nozzle member has also formed thereon a rearwardly projecting lug 76 to which may be clamped a pair of ears 77 extending from the lower end of a guiding lever 78 made of a section of pipe. The ears 77 may be held firmly clamped to the lug 76 by means of a bolt 79. By loosening the bolt 79 the angular position of the guiding lever 78 with respect to the machine may be readily varied and adjusted.

The abrading drums and the fan 37 are jointly driven by the motor aggregate 4 comprising two like electric motors 81, 82 mounted in tandem axially above the fan compartment 8 and directly coupled to the shaft section 36 of the fan 37. The lower motor 81, which is constructed like the upper motor 82, comprises a substantially cylindrical motor casing 83 having mounted therein a field core 84 and core windings 85 cooperating with an armature 86 arranged to rotate within the core 84. The motor is of the universal type and has a commutator type armature of familiar type, the detail features of this motor constituting the subject matter of the co-pending application of Alex A. Clarke and John Wilkiewricz, Serial No. 289,035. The lower end of the motor casing is closed by a wall 87 forming a cover for an opening 88 on the upper side of the fan compartment, this opening being sufficiently wide to permit ready removal of the fan 37 from said compartment. The central portion of the motor casing wall 87 has mounted therein a ball bearing 89 for journaling the lower end of the shaft 90 of the armature 86, this shaft end being screw-threaded into a corresponding perforation in the shaft section 36 of the fan 37. A perforation 91 in the end wall 87 of the motor casing serves for lubricating the bearing 89 therein. The central portion of the end wall 87 is provided with openings 93 for drawing cooled air through the motor casing into the central suction space of the fan 37 in the fan casing 8. The upper end of the motor casing may be enclosed either by a coupling section 95 or by a cover plate 96 shown at the upper ends of the lower motor 81 and of the upper motor 82, respectively. The coupling section 95 has the shape of a tubular casing having its lower side forming a cover fitting into the open upper end of the motor casing 83 and provided at its center with a bearing 97 for journaling the upper end of the shaft 90 of the lower motor armature. On the opposite end of the coupling-section casing 95 forms an opening having the same shape and contour as the opening 88 in the fan compartment so as to receive the lower end of the upper motor 82 of the same construction as the motor mounted above said fan compartment. The shafts 90 of the members 81 and 82 are coupled to each other by means of a claw coupling 98 similar to the claw coupling 35, said claw coupling having two sections secured to the adjacent shaft ends, respectively. The cover 96 over the upper motor 82 serves as a support for the bearing journaling the upper end of the armature shaft of said motor and is, like the other side walls of the motors and like the side walls of the coupling casing 95, provided with perforations 93 for permitting the flow of air through the several motor chambers for cooling the operating parts thereof.

The drum drive of the present machine is arranged in accordance with my co-pending application Serial No. 101,033, filed April 10, 1926, and the motors are so designed as to develop under load sufficient power to drive the abrading drums at a peripheral speed of approximately 3,000 feet per minute.

As pointed out in the foregoing application, a very marked increase in the abrading capacity is obtained by driving the sanding surface under load at the high speed mentioned. A relatively slowly moving sandpaper particle acts like a chisel that is pushed into the wood. A great deal of pressure is necessary to affect cutting under such conditions. However, if the same sand particle is swung with speed against the wood like a hatchet, it is possible to split it up much better and cleaner and with a lesser total power input. The sand particles moving on a high speed drum act on the wood in much the same way as a rapidly swung hatchet. Accordingly, it is possible to accomplish with a small drum rotated at a high speed approximately

as much work as with a heavy drum several times as large and operating at a relatively low speed. The sandpaper drums used in the machine described above have a diameter of approximately six inches or less and have a length also approximately six inches, although these dimensions may be departed from within practical limits without materially affecting the performance of the machine. The principal factor that has to be observed in the design of machines in order to secure the high abrading capacity is the provision of sufficient driving power to operate the drum under load within a speed range near the speed specified above. In practical operation the speed may vary about 20% above or below said value depending on the condition of the sandpaper used and the character of the surface treated.

In order to secure proper operation with the high speed abrading drums, it is important that the pressure with which the drum is held against the surface of the wood that is treated shall not be excessive. In the preferred arrangement I use pressure of approximately 25 to 30 pounds on each drum, the total weight acting on the drums being so distributed as to secure the desired working pressure. An excess of pressure acting on the high speed drum would cause development of too much heat at treated surface and result in scorching of the same. Accordingly, there is a definite preferred range of relationships between the operating pressure and the peripheral speed of the sandpaper drum that should be observed in practical machines, corresponding to the values given above.

The features of the present invention, as far as the organization and the construction of the several parts and the combination thereof into operating units is concerned are not, however, limited to any particular relationships of the weights and speeds of the drum but are generally applicable to machines of the type under consideration.

The two motors 81 and 82 are connected in accordance with the diagram shown in Fig. 7. Each of the two motors 81, 82 has a commutator type armature winding 101, a compensating winding 102 and an exciting winding 103. The several windings of each motor are connected in series. One set of terminals of the two motors is connected to a common conductor 104 of a supply cable 106. The other two terminals are connected through fuses 107 to two additional conductors 108 and 109 of the supply cable. A switch 110 preferably of the snap type is included in the circuit of the two conductors 108, 109, the switch being so arranged that as it is successively turned from position to position, say, in the direction of the arrow, the motors are one by one cut in or energized so that there is no sudden rush of current to both motors at a time. The ends of the conductors 108, 109 are connected to two socket plugs 111, 112, one terminal of each socket plug being connected to one of the two conductors 108, 109, respectively, and the other terminals of the socket plug being connected to the common conductor 104 of the supply cable.

The tandem arrangement of the motors is particularly suited for obtaining the desired power and pressure necessary in order to secure the high capacity action referred to above. It is very important that tools for surfacing floors and the like shall be arranged for drive by universal motors. This makes it possible to operate such machines from any house current supply without requiring the installation of special motors for use on direct current or alternating current exclusively, depending on the character of current available at the point of use. It is not practical to build, and there are not available at the present time, universal motors in sizes larger than about one horse power. The construction of the present machine enables the application of two or more universal motors of one horse power each for driving the two sanding drums so that for all practical purposes the machine acts as if it were composed of two separate sanders each driven by a separate one horse power motor. A high abrading capacity is thus obtained with the advantage of an extremely simple driving mechanism and a unitary construction while, at the same time, utilizing universal motors adapted to be operated on either D. C. or A. C. from the ordinary domestic current supply circuits.

Sanding machines of the type under consideration are very often imployed in refinishing old floors and for finishing the floors in new residences that have wall plug connections of limited current-carrying capacity. It is a source of extreme annoyance, cost and delay to have to lay special supply lines from the main junction box for supplying sanding machines used in refinishing floors. In the machine of my construction I eliminate this difficulty by providing on the supply cable 106 two parallel connected plugs, each one of which may be connected to a separate wall socket so that the current drawn into the machine is distributed between two branches of the domestic supply circuit and two wall plugs. Since the current drawn by a one horse power motor of my construction is within the limit of the capacity of a single wall plug, the laying of special supply lines is made unnecessary and the machine may be operated from the domestic supply circuit whether of the direct current or alternating current type. Furthermore, since the principal rush of current occurs at the moment when the circuit to the motors is established with the motors at standstill, the switch 110 is arranged to prevent simultaneous closure of the energizing circuits to both motors.

With the arrangement shown, in order to start the machine the switch must be successively moved first to one position where the circuit to one motor is established, bringing the machine up to speed, then to another position where the energizing circuit to the other motor is established, there reducing the current peaks when starting the machine. In many cases this refinement is not necessary and an ordinary switch which either connects or disconnects all motors simultaneously may be used.

The tandem arrangement of the motors is also desirable because it permits ready replacement of the individual motors and permits addition of a third motor where this is necessary because of some special circumstances, such as a low supply voltage under which two motors would be incapable of developing sufficient power to drive the drum at the required load speed.

As pointed out above, an important factor in the satisfactory operation of the machine is the application of the proper pressure at the point of contact between the drum and the surface under treatment. The tandem mounting of the motors above the drums in a rearwardly inclined direction is very helpful in securing the proper distribution of the weight of the entire machine so that when the machine is normally resting upon the floor in operative position each drum will be pressed against the floor with a pressure of approximately 25 pounds or about four and one-half pounds per inch drum length.

Through the construction of the machine in several units its manufacture and assembly is extremely simplified. The driving unit 1 with the gear mechanism can be assembled separately and a minimum of working operations are required in order to make up this unit of the machine. The casing forming the several compartments is preferably made by casting and the openings for receiving the bearings of the driving shaft 11 and the end of the lower motor may be machined with a single alignment of the casing. The intake duct unit may also be made as a complete unit and is readily joined to the driving mechanism 1 without difficulties of alignment. Each motor unit may be also separately assembled and the entire organization built up with a minimum of operations. The claw couplings 35 and 98 are flexible and arranged to compensate for any small variations of the alignment of the several units so that the two motors and the driving shaft 11 of the driving mechanism may be readily coupled without alignment difficulties.

In operation, the two tandem connected motors will drive the fan 37 and the two drums 2 and 3. The drum is moved along the surface to be treated by means of a guide lever 78 and the pressure with which the drum is applied against the surface may be readily varied and controlled by variation of the pressure applied to the lever while sliding the machine. The driving mechanism is so arranged that the front sides of the drums are rotated towards the floor, so that the waste particles cut off from the treated surface are directly impelled by the rapidly moving drum against the intake nozzles 48 of the machine.

The suction created by the air produces three parallel air streams. One air stream goes by way of the two tandem connected motors along the arrows 120 and serves for cooling the two motors. The two other streams of air lead by way of the abrading chambers into the intake nozzles 48 and intake ducts 47, into the suction compartment 9, and then into the suction space of the fan 37, the sucked-in air being impelled into the dust bag 41.

The upper end of the guiding lever 78 is provided with a grip member 125 shown in Figs. 1 and 2. This member has a central hollow casing 126 from which extend two side grips or handles 127 running substantially parallel with the drums and a rear grip or handle 128. The entire grip member may be cast as a unit and is arranged to be readily secured over the upper end of the lever pipe 78 by clamping it thereon by means of the bolt 129. In the hollow casing at the junction of the grip members 127 and 128 the switch 110 may be mounted, this switch being arranged for operation through a knob 130, or the like, projecting in front of the casing member 126. The two side grips 127 enable the operator to guide the tool with both hands, this being the ordinary method of operation. In some cases it is necessary, however, to make the tool adapted for guidance with a single hand and the rear grip 128 serves the latter purpose.

In normal operation the guide lever 78 is firmly clamped to the lug 76 extending from the combined suction duct and carriage unit so that by tilting the lever 78 the pressure with which the drums 2 and 3 are applied to the surface may be very closely controlled. This close control of the pressure of the drum is extremely important for satisfactory surfacing and the entire organization is designed with this in view. By making the driving shaft 11 inclined in rearward direction and disposing the motors 81 and 82 in axial direction above the driving shaft, the center of gravity of the entire machine is placed slightly forward of the fulcrum presented by the line of contact of the rollers 74 with the floor on which they rest. This permits ready swinging forward and back of the weight of the tool to vary the pressure applied by the drum without any effort on the part of the operator. Ordinarily, the machine is expected to operate under proper pressure without any other action on

the part of the operator than moving it forward along the floor. The arrangement of the machine referred to above secures the desired distribution of the weight between the guiding rollers 74 and the drums so that the pressure with which the drums are normally applied is correct for efficient surfacing. The weight distribution may be readily controlled by raising or lowering the rollers 74 through adjusting the position of the shank supporting the rollers in the perforation of the bus 71 in which they are mounted, as explained above.

A sander of the type described above may be built to have a total weight of slightly over 60 pounds, such machine having a surfacing capacity almost double that of relatively slower running machines that weigh six to ten times as much and that require large heavy motors either of the direct or alternating-current type. Through the arrangement of the two abrading drums on freely projecting shaft ends extending from a central driving mechanism, the machine may be used for surfacing the entire floor area without necessitating separate small machine units for finishing the edges of the floors, it being possible to bring either one of the abrading drums right up to the quarter round or base board. The combination of the foregoing drum arrangement with a motor aggregate projecting rearwardly above the driving mechanism makes it possible to obtain a simple power transmission mechanism and enables the operation of the two drums from two axially aligned motors disposed centrally above the driving mechanism with a single power transmission mechanism, the entire gearing of said mechanism being enclosed in a dust-proof lubricant-filled casing.

The use of interchangeable motor units with self-aligning couplings and coupling casing, facilitates the mounting, assembly and interchange of the parts. It also results in the proper distribution of the weight of the machine to obtain the correct pressure at the cutting surface of the drum and facilitates ready control of said pressure by the operator guiding the machine. The circuit connections of the motors eliminate the difficulties in obtaining operating current from ordinary domestic lines, the machine being able to run from a pair of lamp socket plugs. No separate supporting frame is required for the machine, the intake duct unit being constructed so as to direct the suction exerted against the cutting edge of the drums and also as a support for the guiding rollers by means of which the machine is moved over the surface that is being treated. Each unit of the machine may be separately removed without affecting the remainder of the machine. Each drum may be taken off its shaft without affecting the other drum and without affecting the assembly of the driving mechanism and the intake duct unit. The mounting of the drum is such that each drum protrudes freely from the balance of the mechanism without any support at the free end of the drum.

In some cases slight differences in the two tandem mounted motors may undesirably affect the load distribution between the same, particularly since the two motors are directly coupled on a single shaft and must run at the same speed. In order to secure proper balance of the load between the two motors, I may employ a circuit arrangement such as shown in Fig. 8. In the latter arrangement the compensating winding 102 of each motor is connected in series with the armature winding as in the circuit diagram shown in Fig. 7. However, the field winding of one motor is connected crosswise in series with the armature and compensating winding of the other motor, the two motors being otherwise connected in parallel to a supply cable terminating in two separate plugs 110, 111. Any tendency of one motor to draw more current than the other and become overloaded causes immediately the other motor to operate with a stronger field, thus loading it to the same extent as the first motor, thereby maintaining balance of the load.

The invention is not restricted to the details of construction, arrangements of parts, and features described in detail hereinbefore, and many modifications thereof will suggest themselves to those skilled in the art. It is accordingly desired that the appended claims be given a broad construction commensurate with the scope of the invention within the art.

I claim:

1. In a floor surfacing machine, a motor unit, a downwardly extending driving shaft in said unit, a driving mechanism on the lower end of said shaft, a driven shaft extending from said driving mechanism transversely to said driving shaft and freely projecting therefrom, a pair of abrading drums mounted on the opposite ends of said shaft, a fan mounted on said driving shaft between said driving mechanism and said motor unit, a casing forming a chamber enclosing said driving mechanism and a chamber enclosing said fan, a pair of intake ducts extending from said fan chamber in the rear of said drums, said intake ducts terminating in elongated nozzles constituting at their ends chambers enclosing said drums, and rolling means mounted on said intake ducts rearwardly of said drum chambers.

2. In a floor surfacing machine, comprising a casing constituting a gear compartment, a suction intake compartment disposed above said gear compartment, and a fan compartment disposed above said intake compartment, a driving shaft extending

through said compartments in upward direction, a driven shaft extending through said gear compartment transversely to said driving shaft, gearing interconnecting said driving and said driven shafts, a pair of abrading drums mounted on said driven shaft on opposite sides of said gear compartment, an exhaust fan mounted on said driving shaft in said fan compartment, an intake unit comprising two intake ducts communicating at one end with said intake compartment and terminating at their other ends in intake nozzles extending alongside said drums, roller means secured to said intake unit in the rear of said drums, guiding means secured to said casing, and a motor unit mounted above said casing, said motor unit comprising a plurality of electric motors axially arranged in tandem above said driving shaft.

3. In a floor surfacing machine, a driving mechanism having a closed gear chamber, driving shafts freely projecting from opposite sides of said gear chamber and supported thereon, abrading drums carried by said shafts, an exhaust chamber adjacent said gear chamber, and a pair of intake ducts extending from said exhaust chamber in the rear of said drums, said intake ducts terminating in elongated nozzles extending adjacent the rear sides of said drums, said ducts and chambers constituting in themselves a carriage structure, and roller means on said ducts disposed axially parallel to said drums.

In testimony whereof I have hereunto subscribed my name.

ALEX A. CLARKE.