

May 7, 1940.

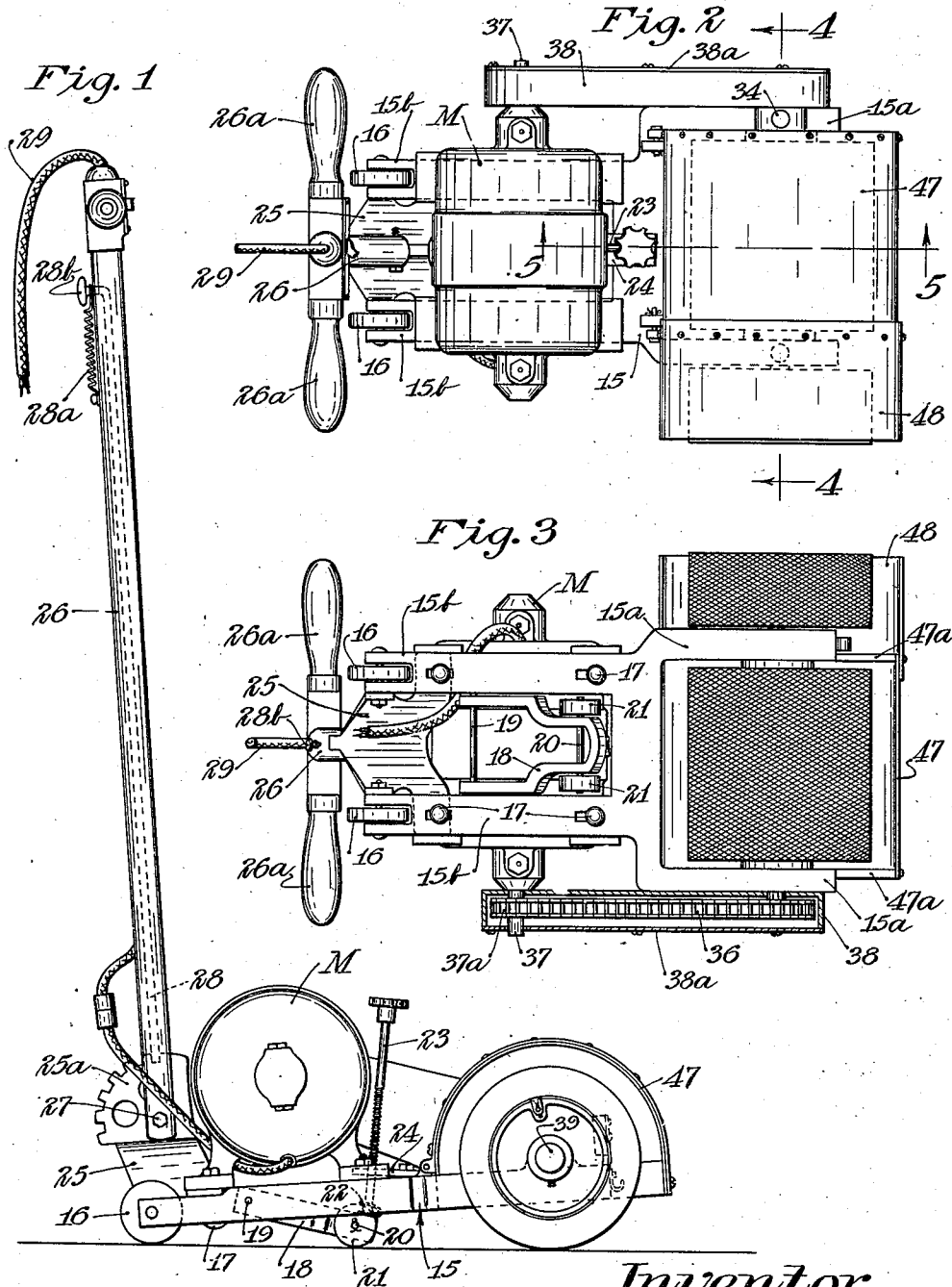
B. A. CASPER

2,199,615

FLOOR ABRADING MACHINE

Filed Aug. 20, 1936

4 Sheets-Sheet 1



Inventor
Benjamin A. Casper
By his Attorneys
Williamson & Williamson

May 7, 1940.

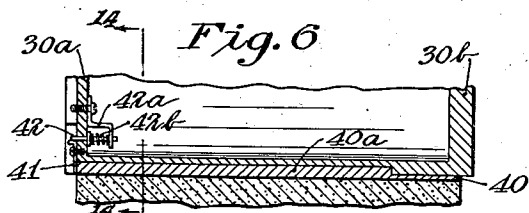
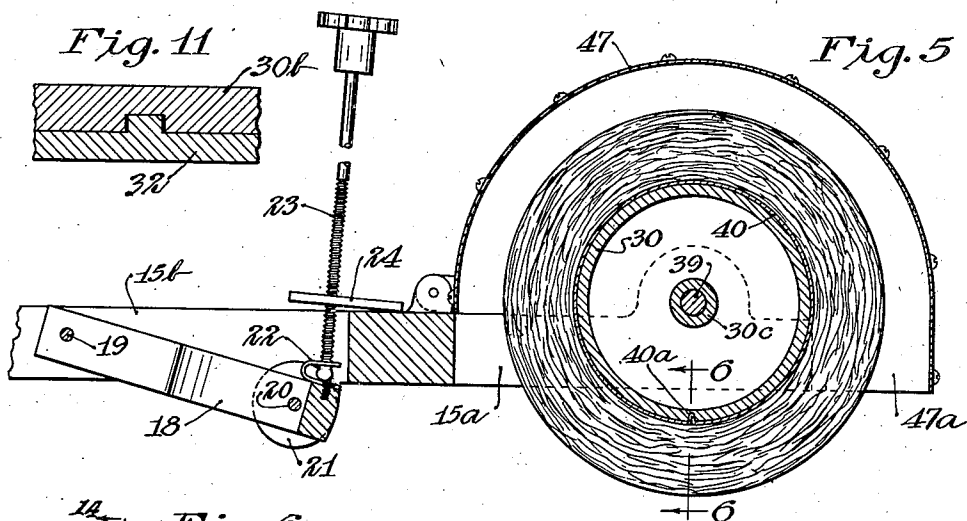
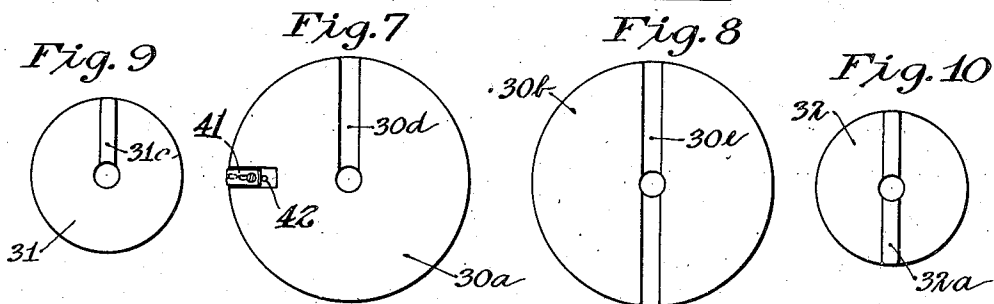
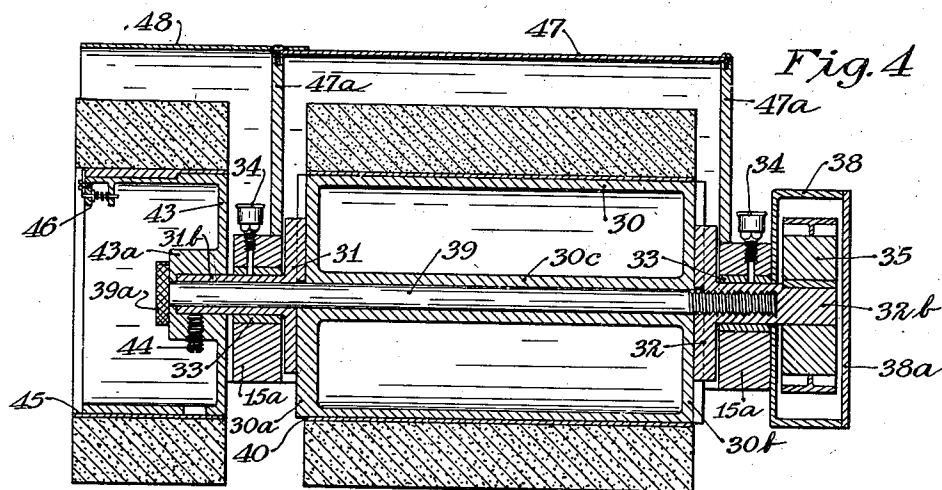
B. A. CASPER

2,199,615

FLOOR ABRADING MACHINE

Filed Aug. 20, 1936

4 Sheets-Sheet 2



Inventor
Benjamin A. Casper
By his Attorneys
Williamson & Williamson

May 7, 1940.

B. A. CASPER

2,199,615

FLOOR ABRADING MACHINE

Filed Aug. 20, 1936

4 Sheets-Sheet 3

Fig. 12

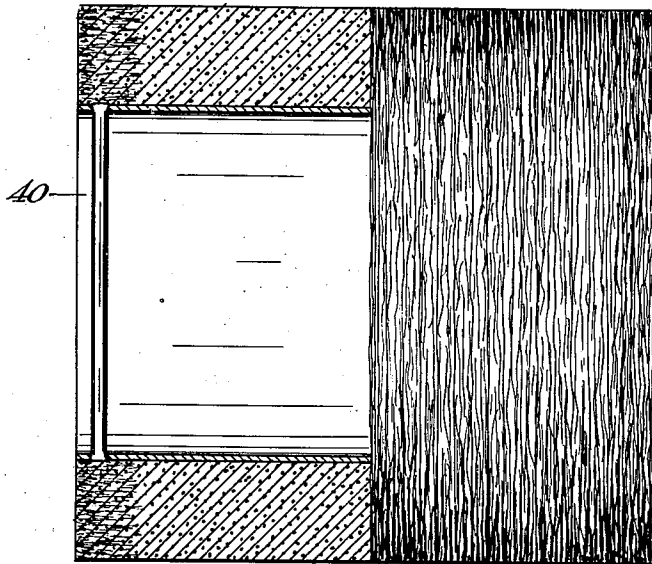
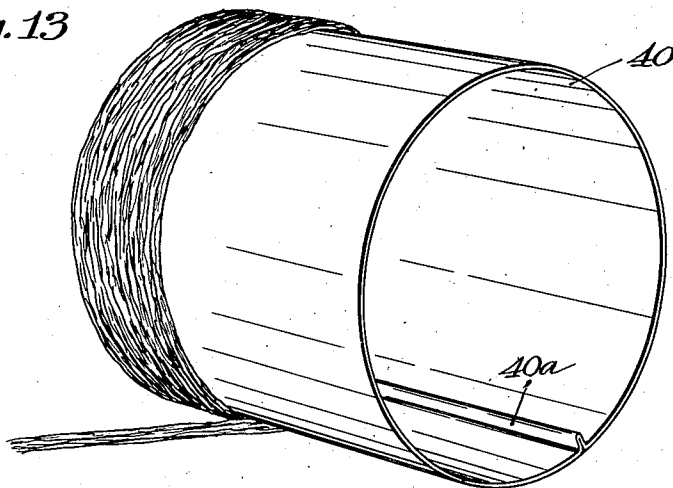


Fig. 13



Inventor
Benjamin A. Casper
By his Attorneys
Williamson & Williamson

May 7, 1940.

B. A. CASPER
FLOOR ABRADING MACHINE

2,199,615

Filed Aug. 20, 1936

4 Sheets-Sheet 4

Fig. 14

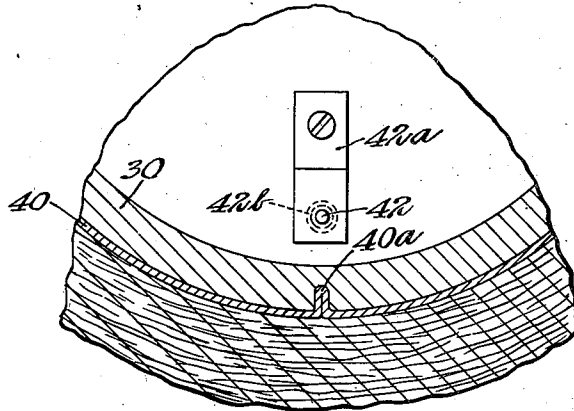
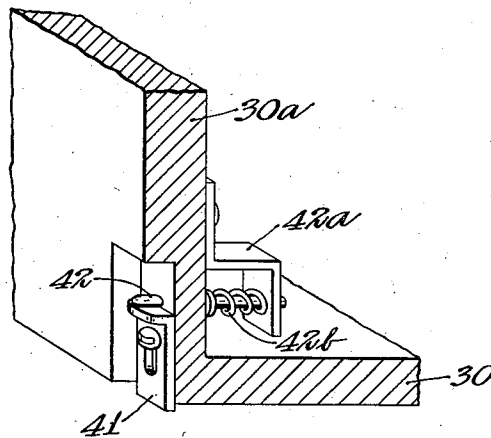


Fig. 15



Inventor
Benjamin A. Casper
By his Attorneys
Williamson & Williamson

UNITED STATES PATENT OFFICE

2,199,615

FLOOR ABRADING MACHINE

Benjamin A. Casper, Minneapolis, Minn.

Application August 20, 1936, Serial No. 96,999

2 Claims. (Cl. 15-93)

This invention relates to floor abrading and cleaning machines and is an improvement upon the invention disclosed in my U. S. Letters Patent Number 1,879,083, granted September 27, 1932.

My improved machine, while well adapted for use with abrasive rolls or drums of most types, is particularly adapted to utilize replaceable steel wool rolls or buffing elements of the general type disclosed in my above identified patent.

It is an object of my present invention to provide an improved and highly efficient portable floor abrading and cleaning machine capable of being manufactured at relatively low cost, and preferably utilizing as a source of driving power an electric motor carried by a wheeled frame.

It is a further object to provide a portable machine of the class described wherein the abrasive element or roll is held in tangential relation against the floor or other surface to be treated and is provided with convenient means for varying its pressure against the floor.

Another object is to provide a machine of the class described wherein the rotary abrasive elements or rolls may be very quickly and easily changed or replaced and wherein material and dirt rubbed from the surface treated or from the abrasive roll is prevented from scattering and being distributed rearwardly of the machine in its travel over the floor.

Another object is the provision of an abrading machine especially well adapted for efficiently and rotatively applying an abrasive element constructed of steel wool filaments spirally wound about a spool or drum in successive layers and wherein means are provided for driving the abrasive element in a direction against the movement or travel of the machine over the floor.

A still further object is to provide a floor abrading machine having an auxiliary abrasive element laterally projecting from one of the sides thereof and secured to and driven from the main abrasive element. This auxiliary element enables the machine to efficiently treat corners and surfaces adjacent to irregular or recessed walls, and the like.

Another object is to provide an improved steel wool roll of the class described, having reinforced ends or edges which materially increase its durability, and efficiency.

These and other objects will be more apparent in the following description made in connection with the accompanying drawings, wherein like reference characters refer to similar parts throughout the several views and wherein:

Figure 1 is a side elevation of an embodiment of my improved machine.

Figure 2 is a top plan view of the same.

Figure 3 is a bottom plan view of the machine, with the chain case shown in section.

Figure 4 is a cross section on a larger scale taken on the line 4-4 of Figure 2.

Figure 5 is a vertical section taken substantially on the line 5-5 of Figure 2, showing the construction and mounting of the roll elevating and adjusting means as well as the hood covering the upper portion of the roll.

Figure 6 is a fragmentary vertical section taken on the line 6-6 of Figure 5 and showing the manner in which the abrasive drum is keyed to the spool and retained against longitudinal displacement.

Figures 7 and 8 are elevations showing the respective ends of the spool.

Figures 9 and 10 are elevations showing the inner ends of the two spool engaging elements.

Figure 11 is a fragmentary section view showing the driving engagement between one end of the drum and one of the drum engaging members.

Figure 12 is a view partly in side elevation and partly in axial section of a suitable type of steel wool abrasive element.

Figure 13 is a perspective view of said element showing the manner in which the metal fibers or steel wool is wound upon the spool of cylindrical shell.

Figure 14 is a fragmentary cross section taken on the line 14-14 of Fig. 6; and

Figure 15 is a fragmentary perspective view showing the manner in which the abrasive drum is keyed to the spool and retained against longitudinal displacement.

In the form of my invention illustrated a substantially horizontal frame 15 is provided which may conveniently be in the form of a casting or heavy plate having a pair of parallel widely spaced and forwardly extending arms 15a for supporting the abrasive roll. Frame 15 as shown includes parallel rearwardly extending arms 15b, the rear ends of which are bifurcated for the attachment of rear supporting wheels 16. A suitable electric motor M is secured to the top of arms 15b with its armature shaft positioned horizontally and transversely of the frame. The base of the motor M may be conveniently secured to slotted portions of arms 15b by means of nutted bolts 17.

Between the rear arms 15b of the frame an adjustable yoke 18 is swingably mounted on a pin 55

19, said yoke at its U-shaped or free end carrying a transverse axle 20 on the ends of which are mounted small supporting wheels 21.

At the top of the free end of yoke 18 a strong U-shaped spring clip 22 may be secured to which the lower end of a thrust or upwardly extended adjustment screw 23 is swivelly connected. Adjustment screw 23 threadedly engages a rigid plate 24 which is conveniently secured to the transverse and medial portion of the frame 15.

A ribbed or knurled adjustment handle or knob may be secured to the upper end of screw shaft 23 to facilitate the turning thereof and consequently the adjustment of wheeled yoke 18.

An upstanding attachment bracket 25 is secured to the rear end of frame 15 straddling the arms 15b of the frame and an elongated push handle 26 is adjustably secured to said bracket, as shown, by means of a pivot bolt 27. Bracket 25 is provided with a toothed sector 25a adapted to be engaged by a retractable tooth carried at the lower end of a release rod 28 which extends longitudinally of handle 26 and is urged downwardly by resilient means, such as the spring 28a connected with the upper and bent portion 28b of the rod which constitutes an operating handle. Elongated push handle 26 terminates at its upper or outer end in a cross bar provided with suitable hand grips 26a. Handle 26 may be of tubular construction to accommodate an electrical service cord 29 which is adapted to supply motor M.

A cylindrical roll-carrying drum 30 is mounted horizontally and transversely between the forward arms 15a of the frame as shown having the flat ends 30a and 30b respectively and provided with an axially disposed tubular portion 30c for accommodating a locking shaft. The end 30a of the drum is provided with a radial groove or keyway 30d and the opposite end 30b is provided with a diametric keyway or groove 30e extending from the peripheral edge of the end to the central aperture through the end. A pair of combined journal and drum-engaging members 31 and 32 respectively are provided, journaled in suitable bearings 33 which are mounted in the outer portions of the arms 15a of the frame. Bearings 33 may be suitably lubricated by grease cups 34 threadedly attached to the upper sides of arms 15a. The journal and drum-engaging member 31 comprises a disk having a rib or key 31a at the outer end thereof adapted to engage the groove 30d at one end of the drum 30 and said disk carries a tubular stub axle or journal 31b extending normally thereto, and projecting some distance beyond the outer end of the left hand bearing 33 shown in Fig. 4. The journal and drum-engaging member 32 comprises a substantially similar disk having, however, a diametric rib 32a for engagement with the groove 30e formed in the end 30b of the drum. The stub axle 32b of the member 32 extends some distance beyond the outer side of the arm 15a wherein it is mounted and has affixed to the outer end thereof a sprocket 35 which is driven by means of a chain 36 from a sprocket 37a affixed to the outwardly projecting end of the armature shaft 37 of motor M. A suitable chain case 38 encloses sprockets 35 and 37a and the chain 36, and said case may be conveniently secured to the outer side of the adjacent arm 15a and is preferably provided with a detachable face plate 38a.

The journal member 31 has an axial bore for receiving a locking rod or shaft 39 which rod also extends through tubular portion 30c of the drum,

threadedly engaging a socket provided in the inner end of journal member 32 and having at its left hand end, as shown in Fig. 4, a knurled knob 39a to facilitate its turning. Drum 30 detachably carries an abrasive roll which is preferably constructed by helically winding a multiplicity of steel wool filaments upon a cylindrical spool or shell 40, the winding of said filaments forming successive and spiral layers of abrasive material and the roll being substantially cylindrically shaped. The peripheral wall of the drum 30 is provided with a longitudinal groove for receiving an internal spline or rib 40a formed in the cylindrical shell 40, the connection of said elements fixing the roll to the drum 30 for driving. Retaining or locking means are provided to prevent longitudinal displacement of the spool and roll from the drum and, as clearly shown in Fig. 6, said means may comprise a small slidable retaining bolt 41 radially mounted upon the end 30a of drum 30 adjacent the peripheral edge thereof and slidably affixed thereto by a pin working in a suitable longitudinal slot provided in the bolt. A small spring pressed plunger 42 extends through drum end 30a and is adapted to abut the turned inner end of bolt 41 to hold the bolt in outwardly projected retaining position. Plunger 42 may be guided by drum end 30a and at its inner end by a suitable bracket 42a mounted on the interior of drum end 30a. A coiled spring 42b is interposed between the off set end of bracket 42a and an abutment or pin fixed to the medial portion of plunger 42, normally holding the plunger outwardly.

An auxiliary and rotary abrasive element may be affixed to the outer end of journal member 31, as clearly shown in Fig. 4, this auxiliary element comprising a relatively short drum 43 having a closed inner end and an open outer end through which access may be had to the knob of locking rod 39. The closed end of drum 43 may be provided with an outwardly projecting boss 43a surrounding the projecting end of the stub axle 31b and being fixed thereto by suitable means such as the set screw 44. Drum 43 carries a replaceable auxiliary abrasive roll which is constructed in a manner similar to the main abrasive roll, comprising a multiplicity of metallic or steel wool filaments helically wound upon the thin open ended cylindrical spool 45. Spool 45 is keyed to the drum 43 in a manner similar to the attachment of the main abrasive roll, and is prevented from outward longitudinal displacement by retaining mechanism indicated as an entirety by the numeral 46, of similar construction to the retaining mechanism previously described which is carried by the drum 30.

Obviously the machine may be operated with the auxiliary abrasive element removed and in this instance the locking rod 39 is screwed inwardly until its head or knob 39a is clamped tightly against the outer end of journal or stub axle 31b of the drum engaging member 31.

A segmental shaped hood 47 is provided for covering the upper portion of the main abrasive element, as shown, said hood having substantially semi-circular vertical ends 47a, the lower edges of which may conveniently be supported upon the tops of the arms 15a of the frame. Hood 47 is hinged at its rear edge to the intermediate and transverse portion of frame 15 in order that it may be swung back against the top of the motor for rendering accessible the abrasive element. Hood 47 carries at one end thereof a concentric auxiliary hood 48 adapted to cover the upper

portion of the auxiliary roll. Hood 48 may be rigidly secured to the adjacent end 47a of hood 47.

As shown in Figs. 12 and 13 my abrasive elements are preferably constructed by helically winding a multiplicity of metal filaments such as steel wool upon a suitable spool 40. The multiplicity of filaments are preferably directed for winding in the form of a thin ribbon and the spool is wound from one end to the other and reversely to form successive spiral layers of the filaments, effecting a cylindrical external shape of the roll. The ends of the roll so formed are impregnated with some adhesive self-hardening material, such as sodium silicate (water glass) which stiffens and reinforces the roll and prevents slippage or displacement of the filaments over the ends of the roll. This stiffening of the ends of the roll has been found to add materially to the durability and efficiency of the construction.

Operation

The main abrasive element is operatively mounted in the machine by releasing and removing locking rod 39, sliding the main drum 30 outwardly from its key engagement with the drum engaging members 31 and 32 and then slipping the roll carrying spool 40 over the drum with the rib 40a engaging the small groove provided on the external periphery of drum 30. Drum 30 may then be slipped back onto the machine by properly engaging the grooves 30d and 30e with the keys or ribs 31a and 32a of the spaced drum engaging members. Drum 30 slips into place easily and the tubular lock shaft receiving portion of the drum is axially aligned with the bore of member 31 and the threaded socket of member 32. The locking rod or shaft 39 is then slipped through drum engaging member 31 through the central and tubular portion 30c of the drum and is screwed into the socket of member 32 drawing members 31 and 32 tightly against the ends 30a and 30b of the drum.

The drum 30 and abrasive element are driven in a direction against the movement or travel of the machine over the floor and when the abrasive roll is applied to the drum 30 the loose ends of the filaments of the roll extend rearwardly of the machine at the bottom of the roll so that the revolution of the roll will tend to compact the filaments rather than to unwind the same from the roll.

The frame adjustment screw 23 and wheeled yoke 18 may be adjusted to support the abrasive roll in spaced relation from the floor or supporting surface and when it is desired to operate the machine, yoke 18 may be raised causing the frame and motor M to be partially supported by the abrasive roll. The pressure of the abrasive roll against the floor may thus be varied in accordance with the raised position of the wheels 21. In operating the machine, it is, of course, pushed across the floor and the filaments of the roll are held tangentially to the surface to be treated and the roll is driven by motor M against the traveling movement of the frame. With steel wool rolls of the type herein described the helically wound filaments abrasively treat the floor or surface longitudinally, penetrating the grain or interstices of a wooden floor and producing excellent results.

The fine sawdust, dirt and other material abrasively removed from the floor, as well as the metallic dust and small fragments of the filaments worn from the roll are caught by the hood

47 and are prevented from being thrown upwardly and outwardly. The angulation of the handle 26 and the height of the hand grips 26a may be conveniently adjusted by means of the rod 28 in cooperation with sector 25a in accordance with the height or requirements of the operator.

When it is desired to treat a floor surface adjacent a wall or the mop board applied to a wall, my auxiliary abrasive roll is quickly mounted on the machine by removing locking rod 39, slipping the bossed portion 43a of the drum over the outer projecting end of the journal or stub axle 31b of the drum engaging member 31 and then locking the auxiliary drum in place and tightening the set screw 44. It will then be seen that the auxiliary abrasive roll is disposed at the extreme side of the machine and may treat the floor surface up to the wall or mop board.

From the foregoing description it will be apparent that I have provided a comparatively simple, very durable and highly efficient floor abrading machine wherein the abrasive rolls may be very quickly and easily replaced, wherein pressure of the rotary abrasive element against the floor may be nicely varied and wherein the dirt and material rubbed from the surface treated or from the abrasive roll is prevented from scattering in the operation of the machine.

It will further be seen that I have provided an improved, highly efficient rotary abrasive element comprising a multiplicity of helically wound metal filaments and constructed for great durability.

It will, of course, be understood that various changes may be made in the form, details, proportions and arrangement of the parts, without departing from the scope of my invention, which, generally stated, consists in a device capable of carrying out the objects above set forth and in the novel parts and combinations of parts disclosed and defined in the appended claims.

What is claimed is:

1. In a floor abrading machine, a frame comprising a pair of forwardly extending spaced arms, an abrasive drum, a pair of drum driving elements comprising plates in engagement with the ends of said drum and having stub axles extending outwardly therefrom, one of said stub axles having an axial bore entirely therethrough and the other of said axles having a threaded axial socket therein, said drum having an axial aperture therethrough in alignment with the aperture in one of said stub axles and the threaded socket of the other of said axles, and a threaded rod extending through the apertures in said axle and said drum and in engagement with the threaded socket in said other axle, whereby said drum and said engaging elements and axles may be detachably connected as a unit, and said unit being journaled between said spaced arms.

2. In a floor abrading machine and the like, a rotary drum supported for movement on said machine, said drum having a longitudinal slot extending from one end thereof to a point adjacent the other end thereof, and an abrading element comprising a sleeve having an abrasive material thereon, said sleeve being slidable over said drum and having a key structure slidable into said drum groove, a movable locking element on said drum engaging an end of said sleeve to secure the same on said drum, and a spring held retainer normally retaining said locking element in locked position.

BENJAMIN A. CASPER. 76