

March 20, 1951

S. A. CROSBY ET AL
PORTABLE RUBBING MACHINE

2,545,942

Filed Feb. 7, 1949

3 Sheets-Sheet 1

Fig. 1.

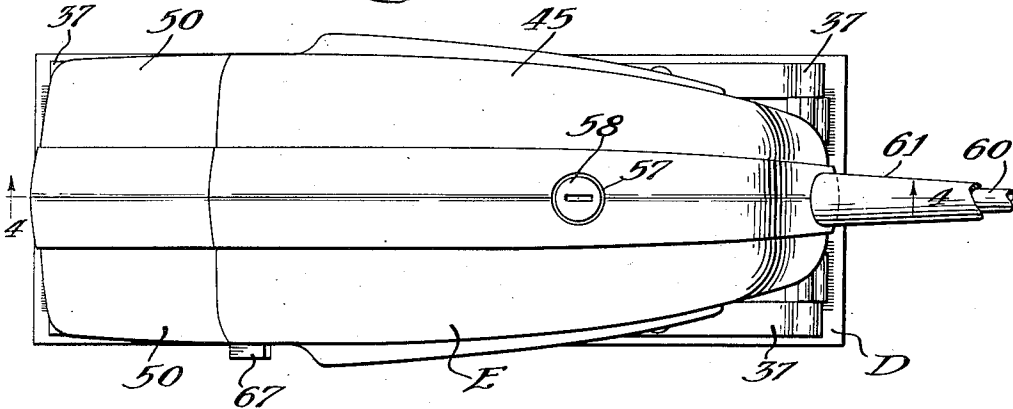


Fig. 2.

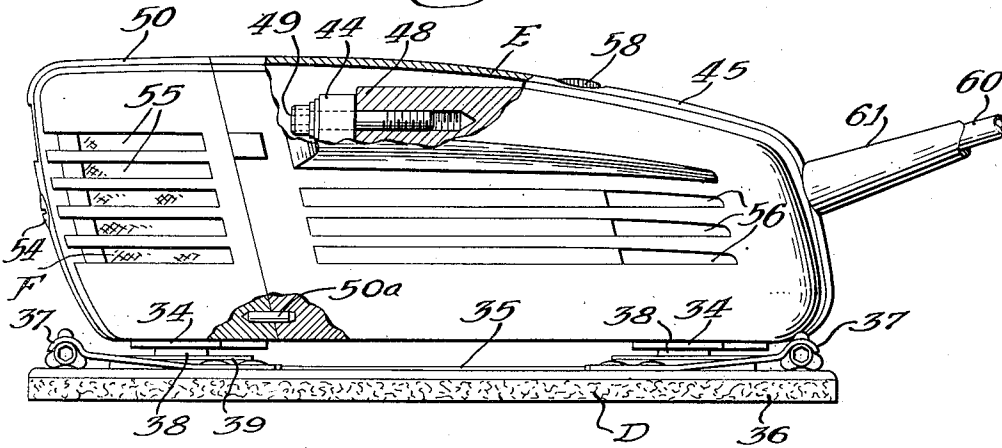
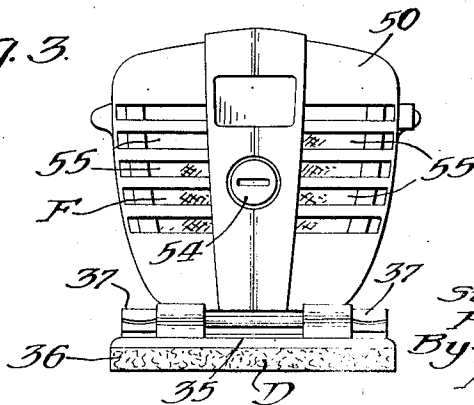


Fig. 3.



Inventors:
Stephen A. Crosby
Peter Zasadny
By: Schroeder, Merriam,
Hoggen & Brady
Attorneys

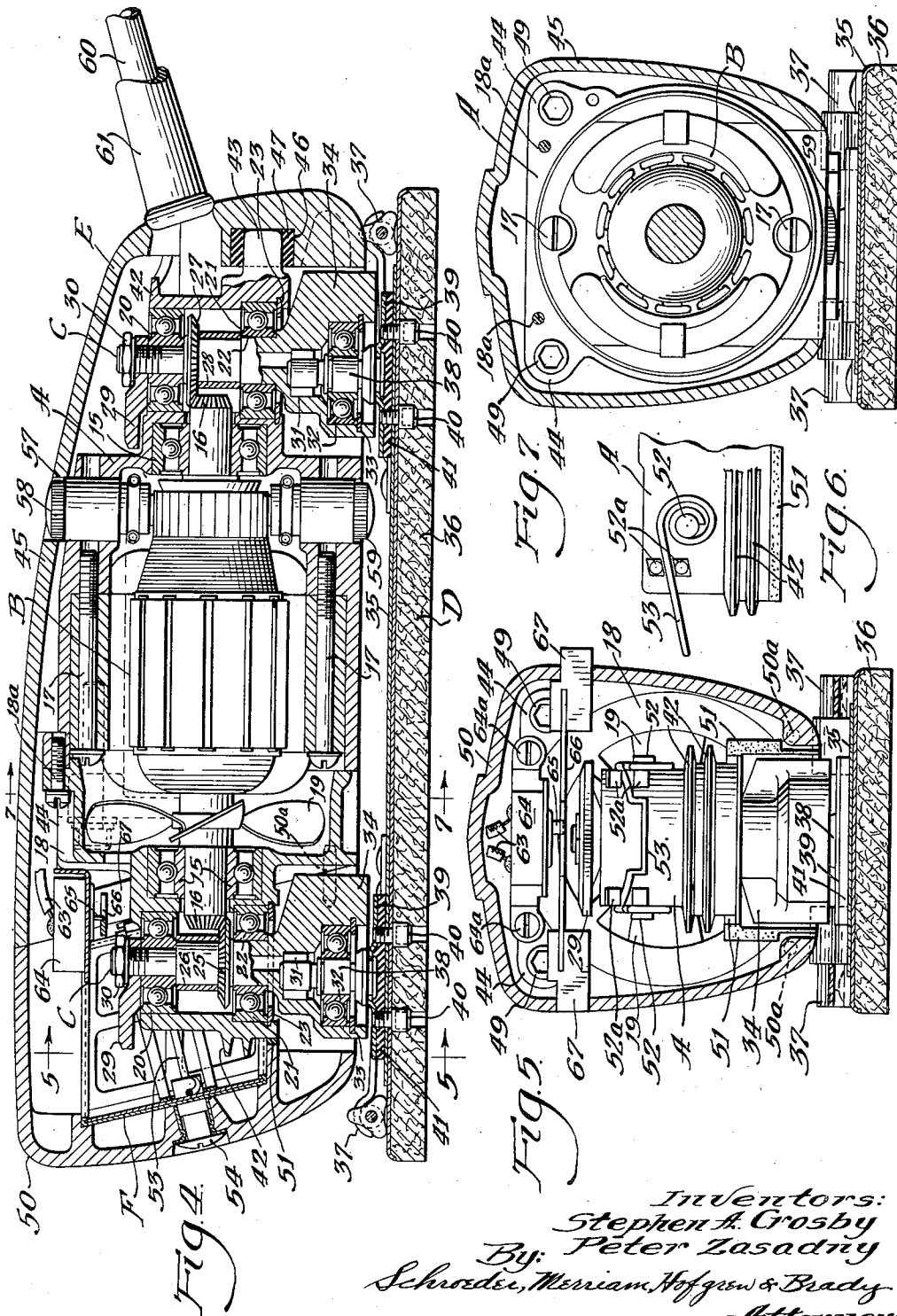
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Inventors:
Stephen A. Crosby
By: Peter Zasadny
Schroeder, Merriam, Hoffgren & Brady
Attorneys

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Fig. 8.

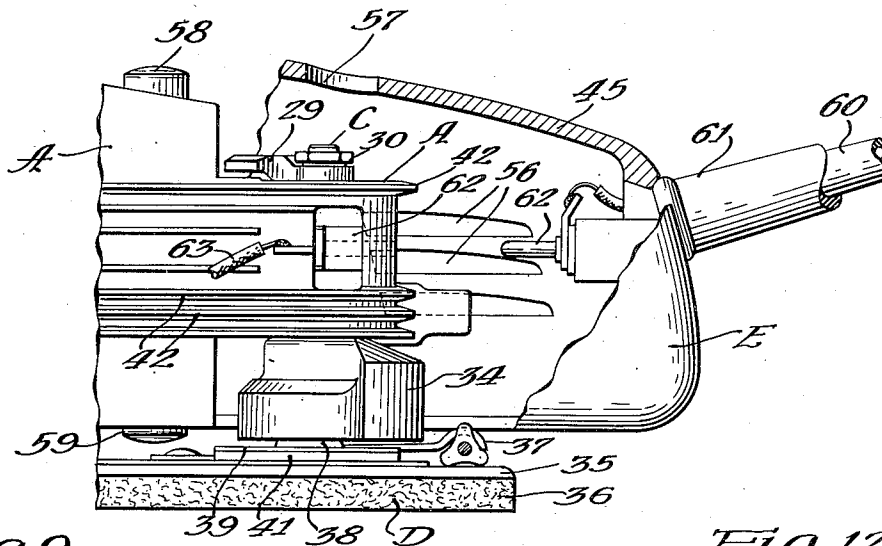


Fig. 9.

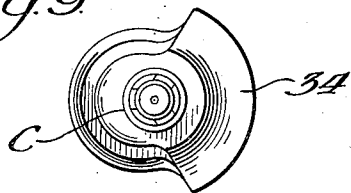


Fig. 12.

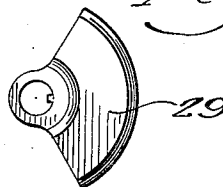


Fig. 10.

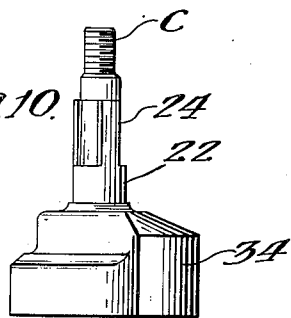


Fig. 13.



Fig. 11.

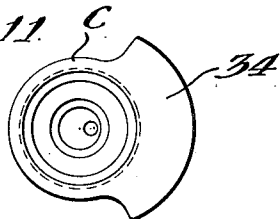
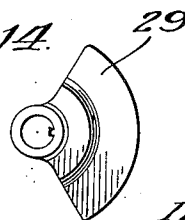


Fig. 14.



Inventors
Stephen A. Crosby
By Peter Zasadny
Schroeder, Merriam, Hoffman & Brady
Attorneys

UNITED STATES PATENT OFFICE

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PORTABLE RUBBING MACHINE

Stephen A. Crosby and Peter Zasadny, Chicago, Ill., assignors, by mesne assignments, to Porter-Cable Machine Company, Syracuse, N. Y., a corporation of New York

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6 Claims. (Cl. 51-170)

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This invention relates to portable rubbing machines, and more particularly to small power driven sanders or polishing machines for use on various structural materials.

The primary object of the invention is to provide a portable rubbing machine which will reduce the physical fatigue and time required for various sander and polishing operations.

Another object of the invention is to provide a portable rubbing machine where vibration is largely cancelled out by counterweights on opposite ends of the cranks which drive the polishing head.

Another object of the invention is to provide an improved blower which will draw air through a filter, cool the bearings of the machine and the housing of the motor, and then be partially discharged so as to blow dust away from the machine.

Still another object of the invention is to provide a housing which embraces the driving mechanism and has a special suspension so that it may serve as a handle for the machine.

The invention is illustrated in a preferred embodiment in the accompanying drawings, in which—

Figure 1 is a top plan view of a machine embodying the invention; Fig. 2, an elevational view, partly in section showing the machine; Fig. 3, a front elevational view; Fig. 4, a vertical longitudinal sectional view, taken as indicated at 4-4 of Fig. 1; Fig. 5, a vertical sectional view, taken as indicated at line 5-5 of Fig. 4; Fig. 6, a fragmentary side elevational view of part of the device for securing the front section of the housing to the main section; Fig. 7, a sectional view, taken as indicated at line 7-7 of Fig. 4; Fig. 8, a fragmentary elevational view of the rear portion of the machine, with the rear section of the housing partly withdrawn; Fig. 9, a plan view of one of the cranks with its lower counterweight; Fig. 10, an elevational view of the same; Fig. 11, a bottom plan view of the crank member; Fig. 12, a plan view of one of the auxiliary counterweights; Fig. 13, an elevational view of the same; and Fig. 14, a bottom plan view of the auxiliary counterweights.

In the embodiment illustrated, A designates a main supporting frame in which a horizontally disposed electric motor and fan B are mounted to rotate a pair of crank members C, which in turn drive a rubbing pad D beneath the machine; and E is a housing provided with a removable front section which contains an air filter F.

The supporting frame A has a hollow casting

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provided with openings to receive ball-bearing assemblies for the motor B and the cranks C.

The motor B has its shaft mounted in ball-bearings 15 and its end portions are provided with bevel gears 16, to drive the cranks. Screws 17 anchor the motor field ring into the motor frame. The motor housing is provided at its front end with an open front circular cowling 18, held by screws 18a. The cowling surrounds an air fan 19 and greatly improves its efficiency in drawing air from the front of the machine and blowing it through the motor and rear portion of the machine. The crank members C are journaled in upper ball-bearing 20 and lower ball-bearings 21, the latter fitting around the central portion 22 of the cranks and being held in the supporting frame by a split ring 23 which snaps into an annular groove provided in the supporting frame. The cranks C have splines 24. The front crank is provided with a bevel gear 25 surmounted by a spacing collar 26, while the rear crank has a bevel gear 27 which surmounts the rear spacing collar 28. Thus, both cranks are driven in the same direction by the bevel gears 16 on the motor shaft.

Auxiliary counterweights 29 are provided on the upper threaded ends of the crank shafts and are secured thereto by means of nuts 30. The lower ends of the crank shafts have bearing sockets which are offset $\frac{3}{4}$ of an inch from the main axis of the crank shaft. An upper bearing 31 is pressed into the socket and a lower ball-bearing 32 is secured in position by a split ring 33. The cranks are provided at their lower ends, opposite from the bearing sockets, with a heavy counterweight 34 which is diametrically opposite to the auxiliary top counterweight 29.

The rubbing pad D has top metal plates 35 to which a felt pad 36 is cemented. The plates 35 are provided at each end with spring-held gripping and tensioning devices 37, which are adapted to grip the end portions of a strip of sand paper or polishing cloth which is wrapped around the bottom and ends of the pad 36. The polishing head D is driven orbitally by a pair of studs 38 which extend up into the bearings 31 and 32 and have their lower ends secured to the plates 35 by means of plates 39 held by screws 40. Preferably, a strip of rubber or cushioning material 41 is interposed between the plates 39 and the backing plates 35.

Preferably, the main frame A is provided with cooling fins 42 around the crank bearings 20 and 21. The frame is also provided with a centrally disposed rearwardly extending stud 43, and a

pair of ears 44 for securing the rear section of the housing E to the frame.

The rear section 45 of the housing E has a socket 46 lined with an insulator bushing 47 to receive the stud 43. The upper inside of the rear section 45 has a pair of shoulders 48, which are drilled and tapped to receive socket head bolts 49 which grip the rear section of the housing to the main frame in a three-point suspension. The front section 50 separates from the rear section along an upwardly biased plane, and is provided with a pair of positioning studs 50a which fit into holes provided in the rear section. Preferably, the portions of the front section 50 and the supporting frame A, which are normally in contact, are coated with flock 51, so that a substantially air-tight connection is made. The front portion of the supporting frame, as shown in Figs. 5 and 6, is provided with a pair of laterally extending studs 52, about which coiled ends of a spring wire bail 53 are snapped. A pair of ears 52a hold the wire in proper angular position to be engaged by a slot provided in the rear end of a headed screw 54 which is journaled in the front central portion of the front housing 50. A series of slots 55 are provided in the front section 50.

A removable thin foraminous filter member F is positioned inside of the slots 55, so that all of the air drawn into the machine by the fan 19 must pass through the removable filter. This prevents dust and abrasive material from being drawn into the machine. The rear section 45 of the housing also is provided with slots 56, so that part of the air that is drawn through the motor housing may be exhausted therethrough, while the remainder of the air is blown downwardly between the housing and the supporting frame and around the rear crank. This current of air blows the dust and abrasive material away from the edges of the pad D.

The housing E is provided with an opening 57 to permit access to the cap 58 covering the upper brush of the motor. The lower brush is covered by a cap 59 which extends through the bottom of the supporting frame and is accessible when the pad is removed from the machine.

Power is delivered to the machine from a wire 60 which enters the rear section of the housing through a rubber sleeve 61, and makes connection with a plug and socket 62. Wires 63 are connected to the motor through an oscillating switch 64 held by bolts 64a. The switch is provided with a downwardly extending actuator 65 which may be swung to off or on position by a transverse bar 66 provided at its ends with fingers 67 of insulating material which project through openings in the rear section of the housing at the opening between the front and rear sections of the housing.

Operation

After a strip of sand paper has been secured to the polishing pad, and the wire 60 plugged into a source of power supply, the operator grasps the housing and starts the motor by pressing inwardly one of the fingers 67. Preferably, the motor rotates at about 15,000 R. P. M. and drives the pad orbitally on $\frac{3}{8}$ inch radius at about 5,000 R. P. M. The machine may be moved by the operator as desired, and, due to the novel counterbalancing of the cranks, vibration of the housing is extremely small. Due to the light weight of the machine, the operator can work on sur-

faces at practically any angle without difficulty.

The foregoing detailed description is given for clearness of understanding only, and no unnecessary limitations should be understood therefrom, for some modifications will be obvious to those skilled in the art.

We claim:

1. A portable rubbing machine comprising: a supporting frame, a horizontally disposed motor journaled in said frame and provided at its opposite ends with driving bevel gears, a pair of vertically disposed crank-members journaled in the frame and having bevel gears meshing with said driving gears so as to be driven in the same rotational direction by said motor, a driving head having its upper portions journaled in the lower portions of said crank-members for orbital movement with respect to said frame, and a housing embracing and secured to the supporting frame and forming a handle for the machine.

2. A machine as specified in claim 1, in which the lower ends of the crank-members are provided with main counterweights opposite to the driving head journals, and the upper ends of said crank-members are provided with lighter auxiliary counterweights diametrically opposed to said main counterweights.

3. A machine as specified in claim 1, in which the housing is formed in two sections, the rear section being secured to the supporting frame by a three point suspension, one point being at the rear of the frame and the other two spaced points being near the top of the frame, and the front section of the housing being detachably secured to said rear section.

4. A machine as specified in claim 1, in which the housing is formed in two sections, the rear section being secured to the supporting frame by a three point suspension, one point being a stud and socket connection at the rear of the frame, and the other two spaced points being bolts near the top of the frame, and the front section of said housing being detachably secured to said rear section.

5. A machine as specified in claim 1, in which the motor is electric and is provided near its front end with a fan, and a perforate cowling is provided around said fan so that air will be drawn through the front of the housing, around the front crank-member, blown through the motor casing and around the rear crank-member, and discharged partly through the rear of the housing and partly beneath the rear portion of said housing.

6. A machine as specified in claim 1, in which the motor is electric, the housing is formed in two separable sections, and a motor switch actuator extends through said casing between said two sections.

STEPHEN A. CROSBY.
PETER ZASADNY.

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