Dec. 6, 1960 R. GRÜB 2,963,059

APPARATUS TO SMOOTH FLOORINGS

Filed Oct. 17, 1957

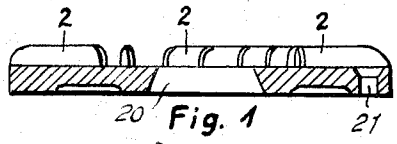


Fig. 1



Fig. 3

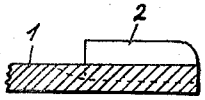


Fig. 4

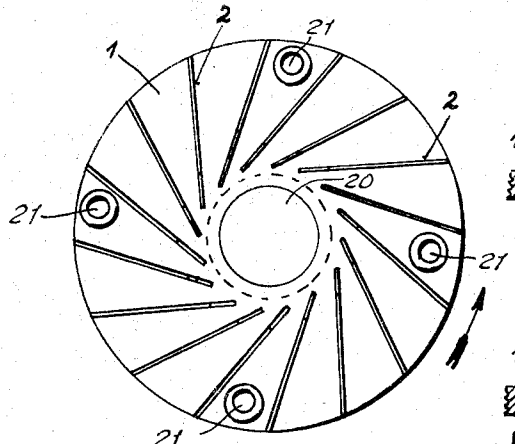


Fig. 2



Fig. 5

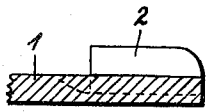


Fig. 6

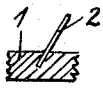


Fig. 7

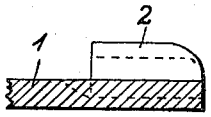


Fig. 8

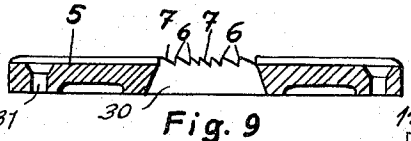


Fig. 9

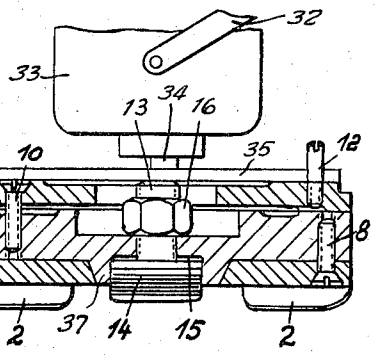


Fig. 11

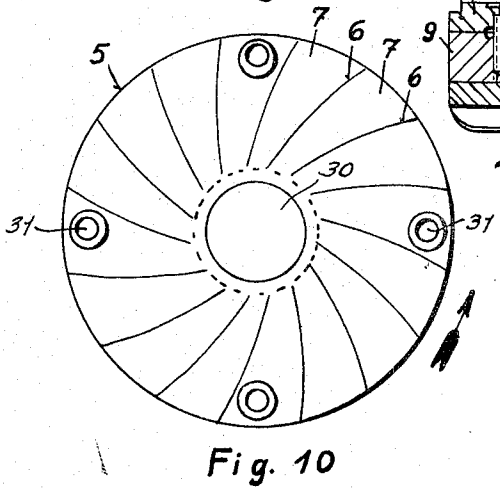


Fig. 10

INVENTOR.
RICHARD GRÜB

BY

ATTORNEY

United States Patent Office 2,963,059 Patented Dec. 6, 1960

2,963,059

APPARATUS TO SMOOTH FLOORINGS

Richard Grüb, 17 Marktstrasse, Schorndorf, Germany

Filed Oct. 17, 1957, Ser. No. 690,775

6 Claims. (Cl. 144—115)

This invention relates to an apparatus for smoothing floors, and is more particularly concerned with an apparatus for smoothing a floor coating or covering material while the material is still in essentially a plastic or semi-solid state.

When a covering material such as asphalt or a synthetic resin is applied to a floor, the material when hot is usually in a relatively plastic condition and must be smoothed so as to provide a uniform surface free from small cavities. Further, the smoothing action removes the entrained or trapped air bubbles which lie immediately below the surface.

For smoothing wooden flooring, devices have been developed in the past which include a motor which drives a disc-like plate in a rotary motion about a vertical axis. Such devices are known as sanding machines. By employing the apparatus of the present invention, the necessity of employing a sanding machine to smooth the upper surface of the plastic material after it has dried is obviated.

Briefly, the present invention includes a smoothing head, capable of being attached to any conventional motor having a vertical shaft, so that the head may be rotated about a vertical axis as the blades thereof glide on the surface to be smoothed. In the present invention there are provided a plurality of blades on the underside of the discs which are uniformly arranged around the center of the disc so that each blade, in plan view, is arranged angularly with respect to the radius of the disc so that the inner end of the blade is skewed forwardly in the direction of rotation of the disc. As viewed in side elevation, the blades of the disc are arranged at an angle and project rearwardly from the direction of rotation of the disc.

When the device of the present invention is employed to smooth a plastic coating on a floor, chemicals such as hexantriol and water may be employed to retain the surface of the coating over the flooring in a plastic condition.

Accordingly, it is an object of the present invention to provide an apparatus for smoothing flooring of plastic material which apparatus is efficient in operation, durable in structure and inexpensive to manufacture.

Another object of the present invention is to provide an apparatus for smoothing flooring which will easily, quickly and effectively provide a smooth uniform surface on plastic material.

Other objects, features and advantages of the present invention will become apparent from the following description when taken in conjunction with the accompanying drawings in which like characters of reference designate corresponding parts throughout the several views, and wherein:

Fig. 1 is an inverted cross sectional view of an apparatus for smoothing flooring, constructed in accordance with the present invention.

Fig. 2 is a plan view of the lower face of the apparatus shown in Fig. 1.

Fig. 3 is a fragmentary end view of a detail showing a portion of the disc of apparatus shown in Fig. 1 with a single blade imbedded in the disc.

Fig. 4 is a side elevation of that portion of the apparatus shown in Fig. 3.

Fig. 5 is a view similar to Fig. 3 showing the blade inclined at a greater angle.

Fig. 6 is a side elevation of that portion of the apparatus shown in Fig. 5.

Fig. 7 is a view similar to Figs. 3 and 5 and showing the blade inclined at a still greater angle.

Fig. 8 is a side elevation of that portion of the apparatus shown in Fig. 7.

Fig. 9 is a cross sectional view similar to Fig. 1 and showing a modified form of the present invention.

Fig. 10 is a plan view of the lower face of the device shown in Fig. 9.

Fig. 11 is a cross sectional view showing the apparatus of Fig. 1 attached to a conventional sanding machine or disc type scraper tool.

Referring now in detail to the embodiments chosen for the purpose of illustrating the present invention, numeral **1** denotes a flat metal circular plate or disc having a central opening **20** and radially spaced apertures **21**. Imbedded in the plate or disc **1** are a plurality of evenly spaced smoothing blades or knives **2** which extend in generally a radial direction. Preferably the blades **2** are formed of flexible or resilient non-corrosive steel even though other materials of construction may be employed if desired. According to the present invention, each of blades **2** has its inner end skewed forwardly in the direction of rotation as indicated by the arrow in Fig. 2. Thus, the longitudinal axis of each blade is inclined from the radius at an acute angle of about 22½° in plan view. Each blade **2**, when viewed in side elevation, is inclined rearwardly from the direction of rotation of plate **1** at an angle of from about 10° to about 40° from the vertical or perpendicular axis of rotation of plate **1**.

If relatively hard surfaces are to be smoothed, the angle of inclination of the blade from the perpendicular should be rather small, e.g. 10°, such as that shown in Figs. 3 and 4. If, on the other hand, the coating material to be smoothed is less hard, blades such as illustrated in Figs. 5 and 6 should be employed, having an inclination of approximately 20° from the vertical axis. If, however, the surface to be smoothed is relatively soft or tacky, then preferably a blade such as illustrated in Figs. 7 and 8 should be employed wherein the angle of inclination from the perpendicular is approximately 30° to 40°.

In using the apparatus of the present invention, it is preferable to keep several plates such as plate **1** in readiness so that the proper apparatus may be employed depending on the condition of the coating to be smoothed.

Referring now to Figs. 9 and 10, in the modified form of the present invention as illustrated therein, the disc or circular plate **5** is provided with a central opening **30** and radially spaced apertures **31**. The plate illustrated in Figs. 9 and 10 is particularly suited for smoothing flooring of hot asphalt or synthetic material. For this purpose, the plate **5** is provided with a plurality of integrally formed radial blades arranged similarly to the blades **2**. In this modified form of the invention as illustrated in Figs. 9 and 10, the blades are integrally formed as the lower surface of the disc. The blades of Figs. 9 and 10, respectively, include outer smoothing edges **6** which lie in the same horizontal plane but are concaved slightly in the direction of rotation of the disc. Each edge **6** is formed by step-like outwardly tapering surfaces **7**.

If it is desired to provide a plate or disc **5** which

is relatively thick, a casting should be made; however, if a relatively light disc is desired, the blades may be protruded or struck or stamped from the disc **5** by employing suitable dies.

Contrary to a prior art practice of sanding an asphalt pouring after it has set up and become hard, the device of Figs. 9 and 10 may be employed to smooth an asphalt flooring to an unexpectedly uniform condition while the asphalt is still hot.

Referring now to Fig. 11, it will be seen that devices of the present invention are employed by attaching the same to a conventional sanding machine or disc type scraper tool, so that the disc or plate **1** or **5** may be rotated with the blades thereof engaging the surface to be smoothed. In Fig. 11, the conventional sanding machine includes a yoke **32** which carries a motor **33** having a shaft **34** arranged essentially vertically and provided with an end flange **35** which extends in essentially horizontal plane. The reception disc **11** is suitably attached to the end flange **35** by means including a pin **12** so that the reception disc **11** may be rotated upon rotation of the shaft **34** of the sanding machine. The elements of the sanding machine thus described are essentially conventional and therefore form no part of the present invention.

A weighting disc **9**, which may be secured to the reception disc **11** by means such as screw **10**, is adapted to receive the disc **1** or the disc **5**. Either the disc **1** or the disc **5** may be secured to the weighting disc **9** by means, such as screw **8**, which pass through the apertures **21** or **31**. The weighting disc **9** is provided with a central hub **37** adapted to project within the central aperture **20** or **30**. Thus, either the disc **1** or **5** may be firmly secured in place on the sanding machine so that it may be rotated against the surface of the coating to be smoothed, the blades of discs **1** or **5** being urged against the upper surface of the coating by the weight of motor **33** and the additional weight of the weighting disc **9**. In the central part of the weighting disc **9** and projecting outwardly of hub **37** is a depth gauge or limiting member including an externally threaded shaft **13** threadedly engaging the internal threads in a central opening through weight disc **9**. The lower end of the shaft **13** is provided with a large flat head **14** received within a recess **15** of hub **37**. A lock nut **16** is provided on the upper end of shaft **13**. Thus, upon rotation of the shaft **13** the head **14** may be raised or lowered, as desired. When the head **14** is in proper position, the lock nut **16** is rotated tight against the disc **9** so as to prevent further rotation of the shaft **13**. Thus, the head **14** is adapted to ride upon the surface to be smoothed and thereby limit the distance which the blades might dig into the surface which is being smoothed. Thus, by varying the position of head **14** with respect to weighting disc **9**, the depth of penetration of the blade discs **1** or **5** may be varied.

It will be understood by those skilled in the art that the devices herein disclosed are suitable for use on substantially any driving machine having one or several vertical axles and may be secured in any convenient manner to the end of the axle or axles. When a driving machine is employed having more than one axle, it is preferable to arrange the machine so that the adjacent discs or plates rotate in opposite directions.

It will be obvious to those skilled in the art that many variations may be made in the embodiment here chosen for purpose of illustrating the present invention without departing from the scope thereof as defined by the appended claims.

I claim:

1. In apparatus for smoothing floorings of plastic material, a rotatable smoothing member comprising, a disc, a plurality of blades on the underside of said disc, each of said blades having its inner end skewed forwardly in the direction of rotation, each of said blades being equally tilted rearwardly from the direction of rotation at an angle of between 10 and 40 degrees.

2. Apparatus as set forth in claim 1, wherein each of said blades is resilient.

3. Apparatus as set forth in claim 1, wherein each of said blades is rigid.

4. Apparatus as set forth in claim 3, wherein each of said blades is curved.

5. In apparatus for smoothing floorings of plastic material, a rotatable smoothing member comprising, a disc, a plurality of blades on the underside of said disc, each of said blades forming an angle of approximately 22½ degrees with a line between the outer end of each blade and the center of said disc so that the outer end of each blade is rearwardly of said inner end in the direction of rotation, each of said blades being equally disposed at an angle of between 10 and 40 degrees with respect to a line perpendicular to the plane of said disc so as to tilt rearwardly from the direction of rotation.

6. In apparatus for smoothing floorings of plastic material, a rotatable smoothing member comprising, a disc, a plurality of equally spaced rigid blades on the underside of said disc being formed by a plurality of generally radial grooves with the inner end of each groove skewed forwardly in the direction of rotation, each of said grooves further being curved so as to be generally concave with respect to the direction of rotation.

References Cited in the file of this patent

UNITED STATES PATENTS

598,364	Dalzell	Feb. 1, 1898
1,387,027	Watrous	Aug. 9, 1921
2,306,470	Rush et al.	Dec. 29, 1942
2,517,374	Amon	Aug. 1, 1950
2,635,653	Hennell	Apr. 21, 1953
2,725,907	Hagen	Dec. 6, 1955

FOREIGN PATENTS

540,716	Germany	Dec. 28, 1931
558,500	Germany	Sept. 8, 1932
773,457	France	Sept. 3, 1934