Dec. 11, 1962 E. R. GUSTAFSSON 3,067,656

SCREEDS

Filed Nov. 6, 1957 3 Sheets-Sheet 1

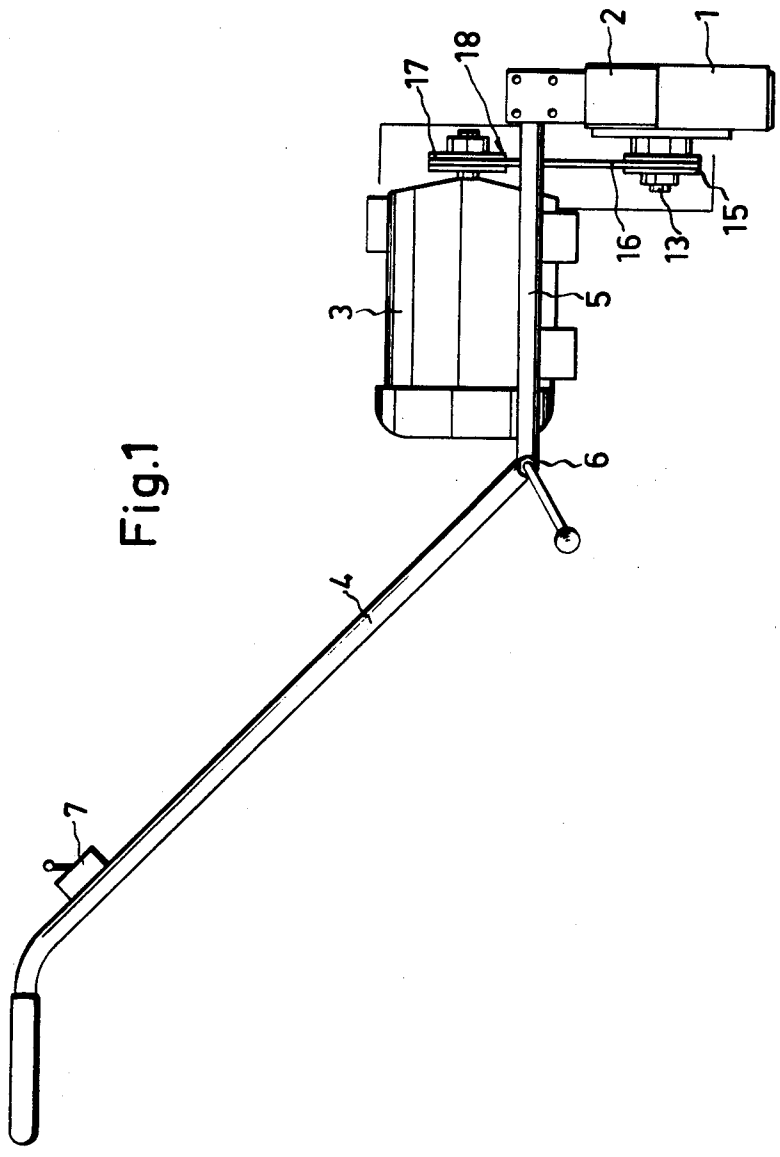

Fig.1

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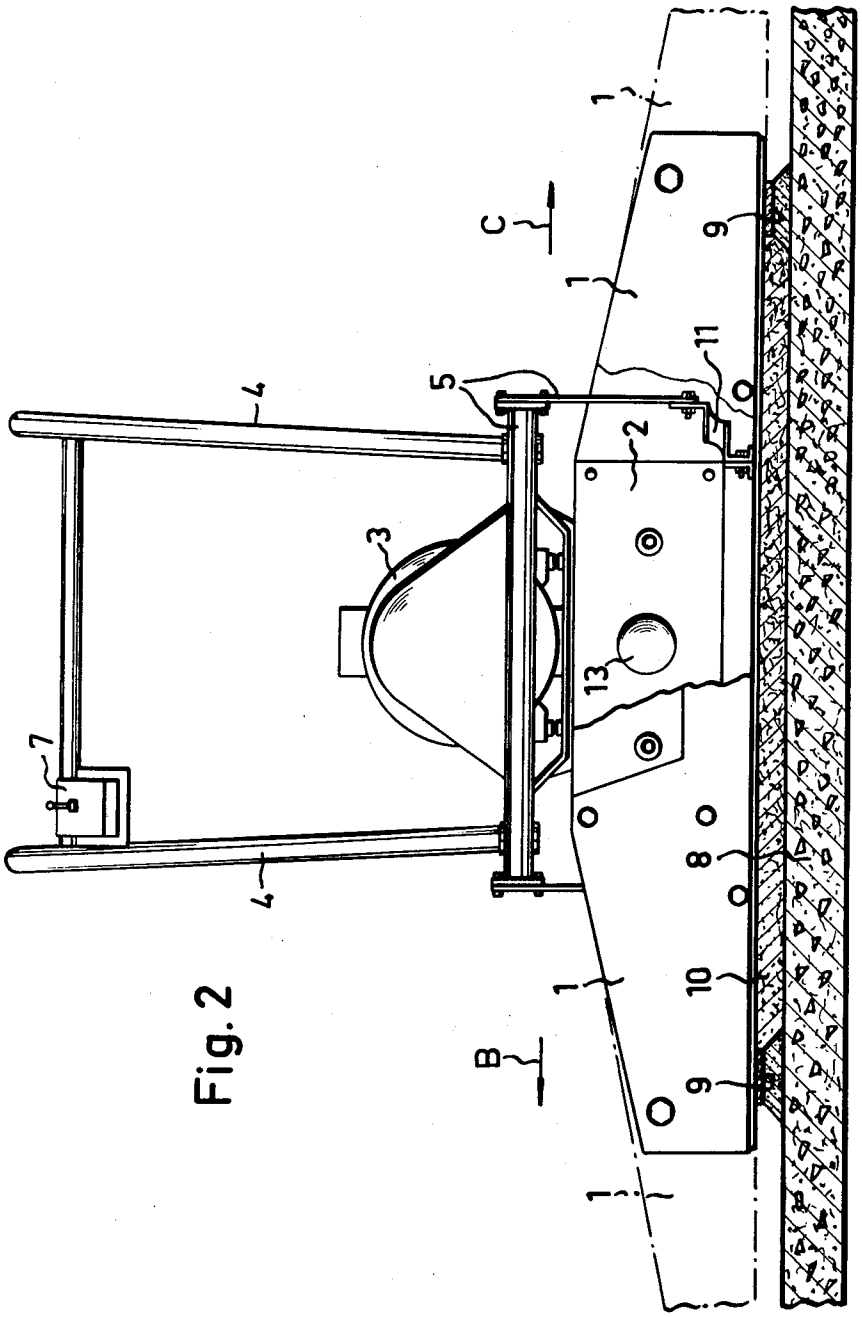

Fig. 2

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Fig.3

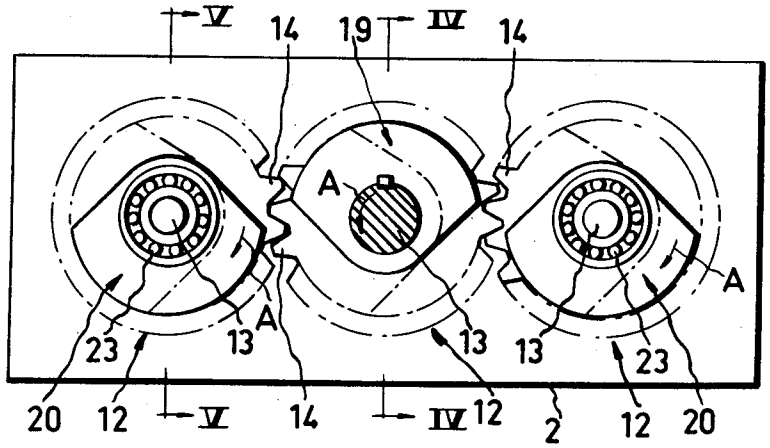


Fig.5

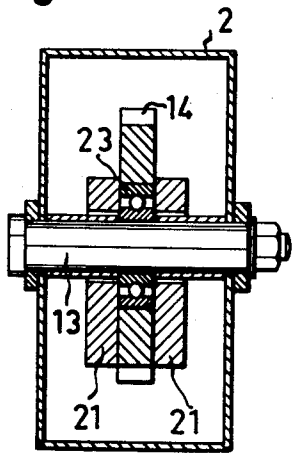
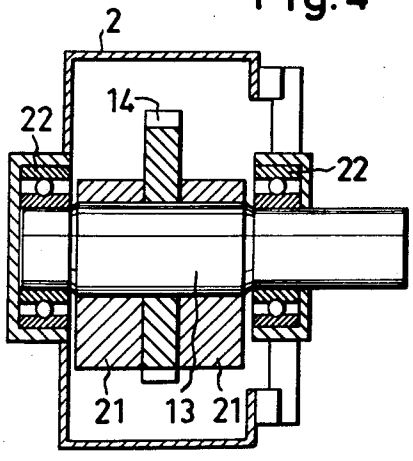


Fig.4



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SCREEDS

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2 Claims. (Cl. 94—45)

This invention relates to screeds for levelling and finishing surfaces to be treated with masses such as concrete.

Masses of concrete or like materials laid on surfaces such as floors to be treated with concrete are brought to a true level and finish by means of screeds. In its simplest embodiment such a screed is a straight-edge or board which is worked backwards and forwards, and laterally as well, until the required surface finish is obtained. The screeds are guided on well-balanced strips or laths which have been laid beforehand on the surface to be treated. It has also been tried to provide mechanically driven screeds having for instance an eccentrically mounted body of rotation, whereby to facilitate the screeding work, make it more rapid and save labour. However, such mechanically driven screeds have not proved satisfactory, for which reason the screeding is still effected mainly by hand.

This invention has for its object to provide a screed which is substantially characterized in that means to reciprocate it longitudinally is provided by a preferably odd number of eccentrics mounted for rotation around parallel axes in the screed and divided into two groups rotating in opposite directions, the total mass of one group being approximately equal to the total mass of the other group. Said eccentrics are adapted to rotate at the same speed in opposite directions, whereby said eccentrics alternately travel past positions in which their component masses are added and the forces arising at the rotation of said component masses have the same direction and are set to act longitudinally of the tools of the screed, and alternately travel past positions in which the component masses of said eccentrics are balanced and the forces arising at the rotation of said component masses annul each other. Tests have shown that the screed according to the invention is an extraordinary implement giving a most satisfactory result.

Further features of the invention and the advantages gained thereby will become apparent from the following description, reference being had to a suitable embodiment shown in the accompanying drawings in which:

FIG. 1 is a side elevation of the screed;

FIG. 2 is a front view of the screed showing a portion of the front plate broken away;

FIG. 3 is a view of a detail; and

FIGS. 4 and 5 are sections taken along lines IV—IV and V—V, respectively, in FIG. 3.

The screed shown in the drawings has a tool 1, a housing 2, an electric motor 3, and handles 4 for operating the screed. As will appear from the drawings, the motor 3 is arranged and mounted in a supporting frame 5 to which the handles 4 are adjustably connected by means of a tension screw 6 acted upon by a lever. The motor 3 can be connected to a suitable source of power in a manner not shown. The connection between the motor 3 and the source of power can be established and broken by means of a switch 7 disposed on one of the handles 4. A floor is designated 8, and well-balanced strips or laths 9 are laid on said floor to serve as supports and guides for the tool 1 when levelling a layer 10 of for instance concrete laid on the floor. For levelling and finishing the surface of said concrete layer 10 the tool 1 is adapted to be reciprocated in the direction of its length by means in said housing 2, which are operatively connected to the motor 3 and described more in detail in the following. At the same time the screed is moved

longitudinally of the strips 9 by a manual operation of the handles 4. The supporting frame 5 connected to the handles 4 should be connected to the housing 2 by elastic members 11.

The screed comprises an eccentrically mounted body of rotation which is preferably formed by an odd number of eccentrics 12 which are mounted for rotation in the housing 2 of the screed and divided into groups, in the present instance two groups, of which the total mass of one group in said body of rotation is approximately equally large as the total mass of the other group in said body of rotation. In the illustrated embodiment the eccentrics 12 are formed by three equally large meshing gears 14 which rotate about separate axes. Said gears 14 are disposed in a row longitudinally of the tool 1. The drive shaft 13 of the intermediate gear 14 is fixedly connected to the gear and coupled with the shaft of the motor 3 by means of a transmission 18 formed by a pulley 15 secured to the shaft 13, a V-belt 16 and a pulley 17 secured to the shaft of the motor 3, said transmission thus serving to drive the intermediate gear 14 and the other gears 14 meshing therewith. The gears 14 are provided with eccentrically mounted aggregations of material 19 and 20, the aggregation 19 on the intermediate gear 14 forming one group being equally large as the aggregations 20 collectively on the remaining gears forming the other group. The aggregations 19 and 20 are preferably constituted by separately designed pieces of material in the form of sector-shaped disks 21 arranged on either side of the respective gear 14 parallel to the main plane thereof, said disks being connected to the gear. The disks 21 are adjustable peripherally relative to the respective gear. The gears 14 are adapted to rotate at the same number of revolution for a purpose to be mentioned in the following. Because of their engagement, the gears rotate in two opposite directions. The shaft 13 of the intermediate gear 14, as already mentioned, is fixedly connected to the gear and mounted in the housing 2 by means of ball-bearings 22. The shafts 13 of the outer gears 14 are secured in the housing 2 and the gears are mounted on these stationary shafts by means of ball-bearings 23.

The gears 14 are so adjusted inter se that when set in motion by the motor 3 at a speed of about 1500 to 2800 r.p.m. in the directions indicated by the arrows A in FIG. 3, the eccentrics 12 formed by said gears 14 and the aggregations 19 and 20 will alternately travel past positions in which the component masses formed of the eccentrics 12 are added and the forces arising at the rotation of said component masses have the same direction or act longitudinally of the tool 1 of the screed. In this position the aggregations of material 19 and 20 are situated on the same sides of the axes 13 of the respective gears 14. Said position is shown in FIG. 3 by dash and dot lines. Under the action of the forces acting in the same direction the tool is moved in the longitudinal direction or the direction indicated by the arrow B in FIG. 2. A screeding movement in one direction has thus been obtained. At the continued rotation of the gears 14 they will travel past positions in which the component masses of the eccentrics 12 are balanced and the forces arising at the rotation of said component masses annul each other. These positions of the eccentrics 12 formed by the gears 14 and the disks 21 are shown by full lines in FIG. 3. In this position the aggregation 19 on the intermediate gear 14 is situated on one side of or above a line drawn through the axes 13 of the gears, and the aggregations 20 on the outer gears 14 are situated on the opposite side of or below said line. The component masses formed by the gears 14 and the aggregations 19 and 20 are balanced in this position, and the forces arising at the rotation will thus act in opposite directions and annul each other. In other words, the tool 1 will be stationary. At the con-

tinued movement of the gears 14 they will produce a screeding movement in the direction opposite to the one earlier described or in the direction shown by the arrow C in FIG. 2. Finally, there again arises a pause, whereupon the operating cycle now described of the tool is repeated. The required shifting of the screed is obtained, as already mentioned, by manual operation of the handles of the screed.

It may be advantageous in certain cases to effect screeding of the concrete layer simultaneously with the necessary compression thereof, which is otherwise generally made after the screeding. In this case the intermediate gear can be moved peripherally by some teeth, whereby in addition to the necessary force for the screeding movement a force is obtained, which is adjustable in size and directed towards the concrete layer. In the same way, the gears and the eccentrics formed by said gears and said aggregations can be so adjusted that a certain travel is imparted to the tool, and the manual force need thus be used only for steering the screed.

For obtaining the screeding movement it is unimportant whether the common main plane of the gears is disposed vertically or horizontally, or whether, in other words, the aggregations describe a vertical or horizontal path at their rotation. To provide the sometimes desirable compression the gears with their aggregations of material somewhat mutually offset peripherally can be disposed vertically, while they can be arranged horizontally to provide a travelling movement. In order simultaneously to produce these sometimes desired movements the gears can be mounted for swinging movement so that the common main plane thereof can be caused to occupy a vertical or horizontal position or to occupy intermediate positions so that both a compression and a travelling movement is obtained simultaneously with the screeding movement.

In order that the screed may be adjusted to varying distances between the strips 9 the housing 2 is removably connected to the tool 1, and in addition said housing is available in a suitable number of varying lengths.

Further modifications are conceivable within the scope of the invention such as it is defined in the appendent claims.

What I claim and desire to secure by Letters Patent is:

1. A screed having an elongate horizontally disposed screed tool and means for imparting an entirely horizontal screeding movement without vertical compacting component to said tool alternately in opposite directions along a line longitudinally of said tool, comprising a housing rigidly attached to said tool, a drive shaft rotatably mounted in said housing, the axis of said shaft being normal to a plane through said line, a first gear fixed to said shaft, second and third gears disposed on opposite sides of said shaft meshed with said first gear and of equal diameters therewith, said second and third gears being mounted in said housing for rotation about respective axes parallel to said first named axis and spaced therefrom on opposite sides thereof, all of the centers of rotation being on a line parallel to said longitudinal line, a first eccentric mass rigidly connected to said first gear for rotation therewith, second and third eccentric masses rigidly connected respectively to said second and third gears for rotation therewith, the centers of gravity of each of said eccentric masses being substantially equally offset from the respective axes, said second and third eccentric masses being equal and together being equal to said first eccentric mass, the centers of gravity of said eccentric masses lying substantially in a plane normal to said drive shaft, said eccentric masses being positioned peripherally on their respective gears so that, when the central mass is up the others are down, and so that all three reach their maximum horizontal displacements at substantially the same time when said drive shaft is rotated, and means to rotate said drive shaft at a speed to impart a screeding amplitude to said tool.

2. A screed as defined by claim 1, each of said eccentric masses being in two equal parts, the two parts being disposed on opposite sides of the respective gear and connected thereto.

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