Dec. 17, 1935. F. E. HILL 2,024,764

ROAD SURFACING MACHINE

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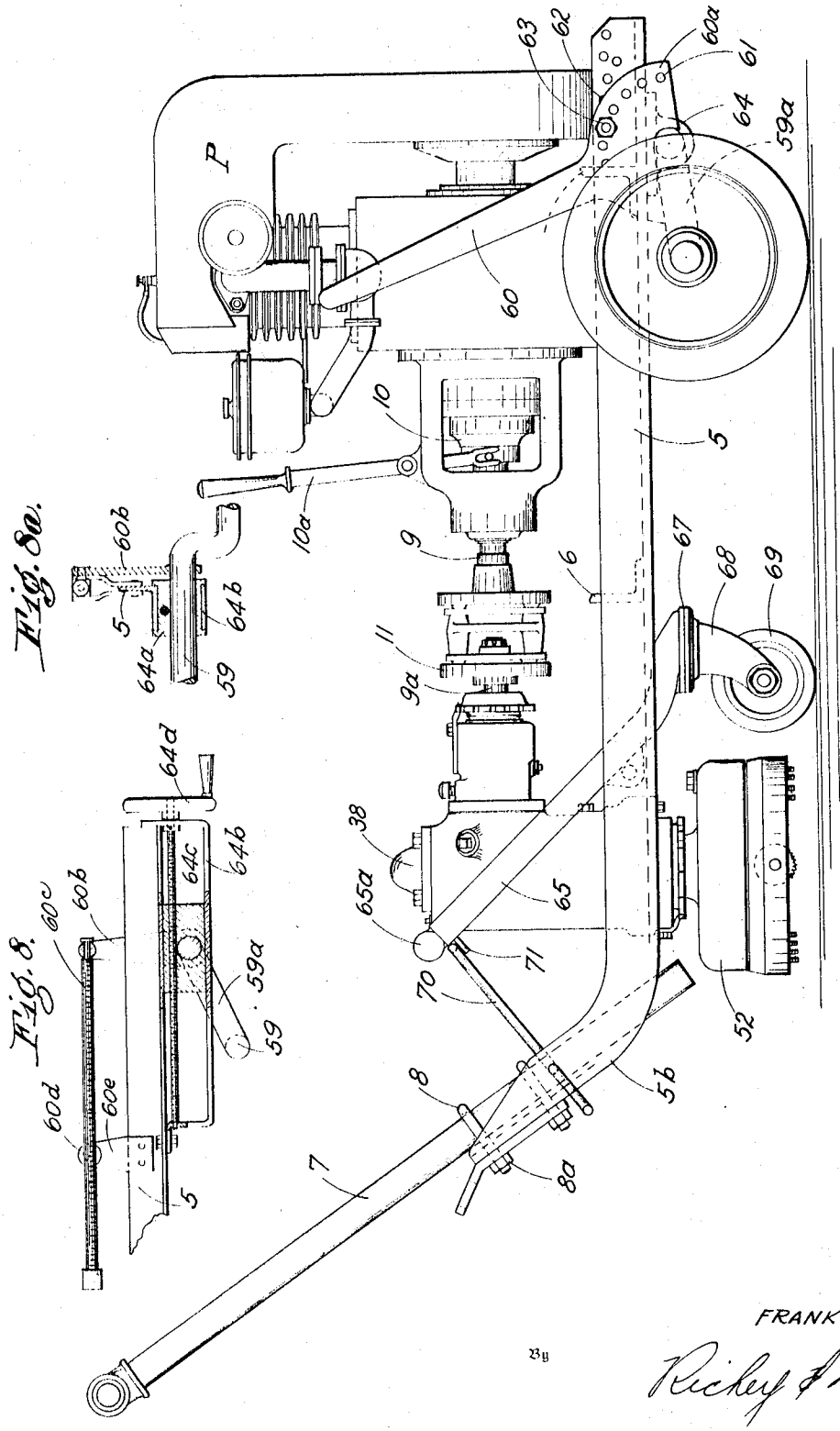


Fig. 8a.

Fig. 8.

Fig. 1

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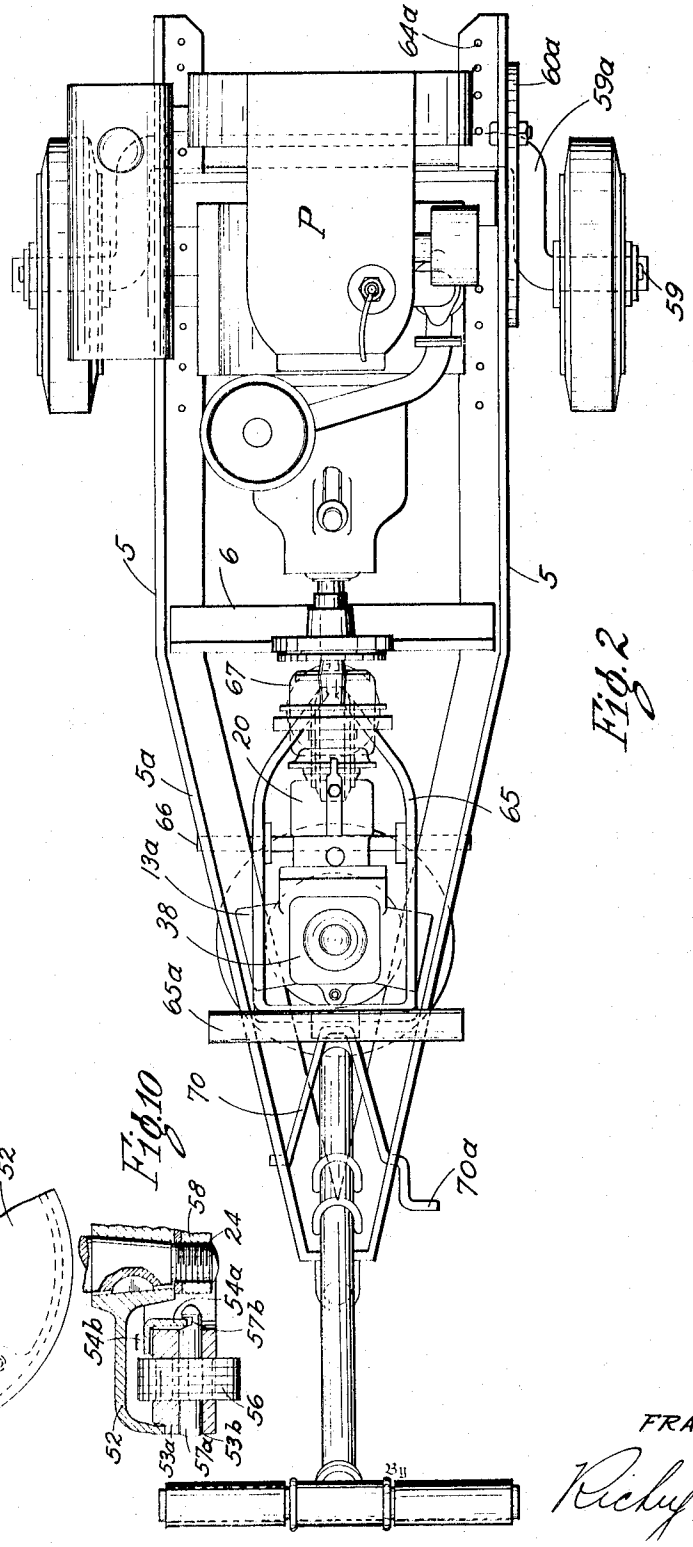


Fig. 2

Fig. 9

Fig. 10

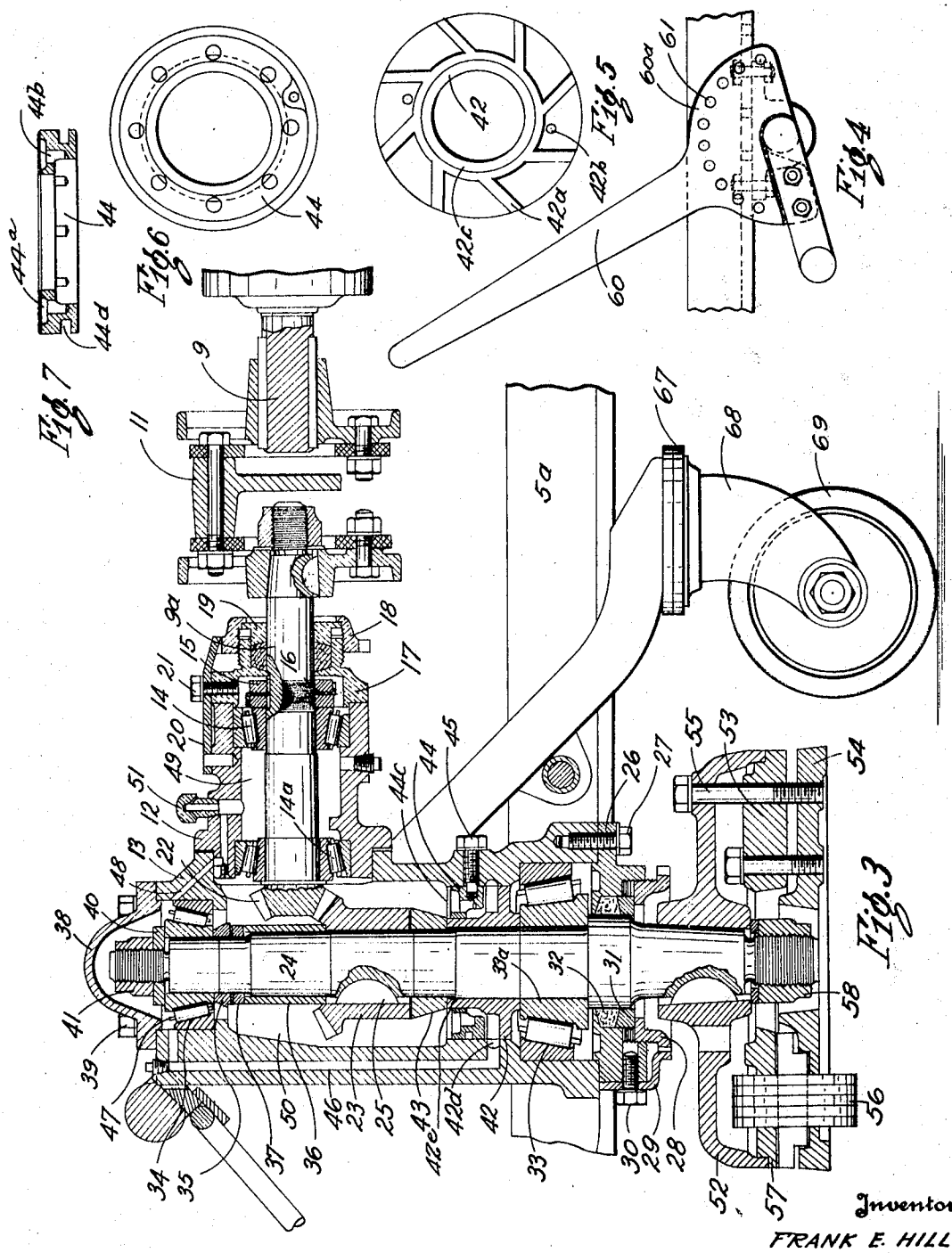
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ROAD SURFACING MACHINE

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5 Claims. (Cl. 262—8)

This invention relates to a road or pavement surfacing machine, and includes among its objects:

To generally improve machines of this type by rendering the same more convenient in handling and efficient in operation with reduced wear of running parts by adequate lubrication;

More specifically, to provide means whereby the machine may be adjusted to vary its weight or center of gravity with respect to the cutter or surfacing head or member to adjust the working pressure on said head or member;

To provide a simple, easily operated means for adjusting the machine vertically with respect to the surfacing head or member to conform to varying working levels and conditions;

To provide a simple and efficient type of lubricating system for the running parts which is particularly adapted for machines of this type;

To provide an improved type of mount for the caster or carrying wheel whereby the latter may be easily and quickly thrown into and out of carrying position.

The foregoing and other objects and advantages will become apparent in view of the following description taken in conjunction with the drawings, wherein:—

Figure 1 is a view in side elevation of a road surfacing machine embodying the features of the invention in their preferred form;

Fig. 2 is a top plan view of Fig. 1;

Fig. 3 is an enlarged view in section and side elevation of the forward portion of the machine, particularly showing the lubricating system;

Fig. 4 is a view in detail of an adjusting lever and cooperating parts;

Fig. 5 is a detail plan view of an impeller for the oil-circulating system;

Figs. 6 and 7 are detail views in plan and sectional elevation of a combined impeller chamber cover and oil filter for said system;

Fig. 8 is a fragmentary view of the rear portion of the frame of the machine showing in sectional side elevation an alternative means for adjusting the weight of the machine relatively to the surfacing member; and Fig. 8*a* is a vertical section thereof;

Figs. 9 and 10 are fragmentary views in plan and vertical section, respectively, of a modified type of surfacing head or disk for use with the machine.

Referring to the drawings in detail, 5 indicates side frame members and 6 cross connectors or stiffeners. The frame members 5 as here shown converge at an intermediate point as indicated at 5*a* and at the handle extremity of the machine are bent upwardly as at 5*b*.

The handle 7 of the machine is preferably adjustably connected to the upwardly-bent extremity 5*b* of the side frame members 5 by means such as U-shaped clamping bolts 8 and nuts 8*a*. By loosening the clamps 8, the handle may be adjusted to conform to the desires of the operator, a feature which is of marked advantage in a machine of this type. It will be obvious that other means for adjusting the handle could be adopted, the object being to provide a handle which may be adjusted to conform to the desires of the operator.

The machine may be provided with any preferred type of prime mover, that here shown being a gas engine generally indicated at P which is thrown into driving engagement with drive shaft 9—9*a* by means of the clutch 10 and lever 10*a*, shaft 9—9*a* being provided with a universal coupling 11.

Shaft 9*a* is supported by a flanged housing 12 which is secured to a main vertical housing 13 by cap screws or the like. A bearing assembly 14 is provided for shaft 9*a* at one end of housing 12 and is held in place by a collar 15 which is threaded on shaft 9*a* and secured thereto by lock 16. A bearing cover 17 is positioned against the outer end of housing 12 and is provided with an exteriorly-threaded portion to receive a packing nut 18 which retains in position a packing gland 19. Nut 18 is peripherally notched and adjustably locked in position by a lock-bar 20, which engages in any one of said notches and is pinned at one end to the housing 12 and held in locked position by a lock-nut 21.

The inner end of shaft 9*a* is provided with a bevel drive pinion 22 which meshes with a drive gear 23. Gear 23 is secured by key 25 to a vertical shaft or spindle 24 which drives the cutter head or disk assembly to be described. The base of the housing 13 is provided with side lugs or flanges 13*a* which are secured to the frame members 5*a*. A bearing cover 26 is secured to the bottom of the housing by screws 27. At its lower extremity, shaft 24 is provided with a packing nut 28 which is threaded into cover 26 and is notched on its periphery and adjustably locked in position by a lock bar 29 which engages in any one of said notches and is secured to plate 26 by screw 30. A packing gland 31 is positioned in plate 26 to provide an effective seal against leakage of lubricant from the lower extremity of the spindle-mounting assembly. 32 denotes an annular shoulder formed on shaft 24 and 33 denotes a bearing assembly for the lower extremity of said shaft or spindle.

At its upper extremity, shaft or spindle 24 is provided with a bearing assembly 34, and spacers 35, 36 and 37. The top of vertical housing 13 is provided with a flanged cap 38 which is secured to said housing by cap screws 39. The top of spindle or shaft 24 is threaded and thereon is applied a washer 40 and nut 41.

A feature of the present invention is the lubri-

cating system, which is particularly adapted for machines of this type. A description of this system follows:—

Around the spindle 24 above the bearing 13 is mounted an oil-impeller 42, shown in detail plan in Fig. 5, said impeller being provided with a plurality of blades 42*a* which are preferably inclined backwardly with respect to the direction of rotation of the shaft or spindle 24. This impeller may be mounted for positive rotation with spindle 24, but in the present instance it depends for its drive upon frictional contact with bearing collar 33*a* below the thrust collar 43 above. In the base of impeller 42 one or more holes or oil passages 42*b* are formed, to permit a certain amount of oil to be fed down into the bearing 33. The impeller 42 is provided with a necked portion or boss 42*e* around which, but preferably out of contact therewith, is positioned a combined impeller chamber cover and oil filter member 44, note Figs. 6 and 7. Member 44 is formed with a top chamber or annular recess 44*a* which communicates with a plurality of oil passages or holes 44*b* which open into the chamber 42*d* in which the impeller blades 42*a* rotate. The chamber 44*a* is covered by a suitable strainer 44*c* which may be substituted by any suitable means adapted for the purpose, the object being to filter the oil as it passes into the impeller chamber 42*d*. Member 44 is preferably provided with means for holding it clear of the impeller, in the form of screws 45 which are spaced radially and threaded into the housing 13 and engage an annular groove or recess 44*d* formed in the periphery of member 44.

The main vertical housing 13 is provided with an oil passage 46 which communicates at its lower end with the impeller chamber 42*d* and feeds at its upper end into a chamber 47 provided at the upper extremity of spindle 44. Oil from this chamber circulates down through an oil passage 48, formed partly in housing 13 and partly in housing 12, into chamber 49 which surrounds the shaft 9*a* and supplies bearings 14 and 14*a*. Oil from top chamber 47 also circulates down around bearing 34 into main central chamber 50, and oil from chamber 49 also flows into chamber 50. From chamber 50 the oil passes through filter 44*c* into the impeller chamber 42*d*. Passage 48 is preferably provided with a filter and breather cap or screw 51.

It will be seen that the system provides a positive circulation for a suitable lubricant such as oil and that the oil is filtered during circulation, any sediment remaining in the bottom of the main central chamber 50, thereby ensuring a constant supply of clean, cooled oil to the bearings and gears. The system is simple and is far superior yet requires very few additional parts as compared to road surfacing machines which depend on heavy gear lubricant. Oil of varying degrees of viscosity may be used in the system, since there are no restricted passages for the oil to pass through during circulation.

The surfacing head assembly may be of any preferred type, that shown more particularly in Fig. 3 consisting, briefly, of a carrier plate 52 which is keyed to the lower end of spindle 24, upper and lower disks 53 and 54 which are secured to said plate as by bolts 55, and cutter wheels 56, the latter rotating in openings formed in said disks and being mounted on trunnions 57 which are positioned in cooperating recesses therefor, not shown, formed between the disks. A retaining nut 58 is threaded on the lower end of the shaft or spindle 24. The surfacing head shown in the drawings may be replaced by any desired type of surfacing disk or tool adapted for the work being performed.

Figs. 9 and 10 show another form of surfacing head assembly. In this instance the cutter wheels and trunnions are mounted in a plate or casting 53*a* which is detachably secured to the carrier plate 52 by bolts 52*a* and has radially extending bearing holes 53*b* formed therein which holes open out at the periphery of the plate to permit insertion of trunnions 57*a* for the wheels 56. The inner end of each trunnion is formed with a locking notch 57*b* which receives the edge of an annular angle-shaped lock plate or member 54*a*. This lock plate is shown as secured to the top of the plate 53*a* by bolts 54*b*, any suitable number of which may be used. This type of unit has the advantages of ease in manufacture and assembly and convenience in removing and replacing the cutting wheels, since all that is required for the latter operation is to detach the lock plate 54*a* and any or all of the trunnions 57*a* may be removed radially from the periphery of the plate 53*a*, permitting the cutter wheels 56 to be removed from the openings provided therefor.

Another feature of the present invention resides in the provision of simplified, easily operated means whereby the machine may be readily adjusted in a vertical direction, and in conjunction with such adjustment means are also provided for increasing or decreasing the weight on the surfacing head to conform to varying types of surfacing work. With this object in view, the rear extremity of the machine is mounted on a crank type axle 59, said axle being formed with a crank portion 59*a*. Secured to the inner side of the crank 59*a* is an adjusting lever 60, note particularly Fig. 4. The lower extremity of this lever is in the form of a quadrant 60*a* formed with a plurality of adjusting holes 61. The holes 61 are adapted to register with corresponding adjusting holes 62 formed in the rear extremity of the frame member 5. To hold the frame in fixed adjusted position relative to the axle, means such as a bolt 63 may be passed through the registering holes when the frame has been moved to adjusted position. The frame members 5 are rotatably mounted on the axle 59 by means of bearing brackets 64.

When it is desired to adjust the machine vertically, bolt 63 is removed and the handle 60 is moved in an arc, whereupon the crank is also moved in an arc bringing the machine to the desired level, the bolt 63 then being inserted to hold the parts in adjusted position. This adjustment is provided primarily to accommodate varying heights of work such as curb stones and the like where the machine is resting on a surface lower or higher than the surface to be operated upon, or to lower the machine to conform to wear of the surfacing member, as in cases where an abrasive disk or stone is used.

In many types of work it is of advantage to vary the weight on the surfacing head or member. For example, less weight is required for green, relatively soft concrete than is required in cases where the concrete has hardened through ageing. With the foregoing in mind, I have provided means for shifting the weight of the machine, or its center of gravity, with respect to the surfacing member, said means being designed so as to coordinate with the means for adjusting the machine vertically. In the main figures of the drawings, this adjustment consists in

forming a plurality of holes **64***a*, note particularly Figs. 2 and 4, in the rear extremity of the frame members **5**, the bearing brackets **64** on the axle **59** being adjustably secured to said frame members by means such as bolts **64***b* adapted for interchangeable positioning in said holes. These holes **64***a* are so spaced relatively to the holes **62** that the arc in which the quadrant **60***a* moves will always bring the holes **61** therein into proper registration with the holes **62** in the side of the frame members **5** regardless of longitudinal adjustment of the said members with respect to the bearing brackets **64**.

In Figs. 8 and 8*a*, the adjustment structure for shifting the weight of the machine relatively to the surfacing head or member and for vertical adjustment is such that no disconnection of parts is required to make the adjustment. In this instance the bearing brackets **64** are in the form of sliding blocks **64***a* in which the axle **59** is journaled, the said blocks being grooved to receive the frame members therein. The blocks are slidingly mounted in brackets **64***b*. Adjusting screws **64***c* are rotatably mounted in brackets **64***b* and provided with handles **64***d*. By turning handles **64***d*, blocks **64***a* together with axle **59**, or the rear truck as a whole, will be shifted longitudinally with respect to the machine, thereby throwing greater or less weight on the surfacing member as the case may be. The axle is held against rotation by arm **60***b* which is secured thereto as by welding or otherwise. At its upper end arm **60***b* has swiveled therein a screw **60***c* which extends forwardly and is threaded through a rotatable block **60***d* mounted in an anchor bracket **60***e* which is secured to the frame members **5**.

By adjusting screw **60***c*, axle **59** will be caused to turn, and due to the crank portion **59***a* thereof, the machine will be raised or lowered, depending upon the forward or rearward travel of said screw.

The machine is provided with an advantageous type of caster assembly for transporting the machine from one place to the other. This assembly comprises a yoke or frame **65**, note particularly Figs. 1 and 2, which is mounted on a cross shaft **66**. At its one extremity, the yoke converges and is secured to a caster plate **67** which is provided with a bracket **68** and a caster wheel **69**, and at its opposite extremity the yoke is provided with a counter-balance or weight **65***a*. At the handle extremity of the machine, a latch **70** for holding the caster in carrying position is provided, said latch being journaled in the side frame members **5***a* and having formed on one side thereof a treadle or crank handle **70***a*. The one end of the latch is adapted to contact with a lug **71** formed on the yoke member **65**.

When it is desired to bring the caster **69** into carrying position, the yoke **65** is swung upwardly and the latch **70** turned so that its one end contacts with the lug **71**. When it is desired to throw the caster out of carrying position, the yoke or frame **65** is raised sufficiently to permit the latch **70** to clear the weight **65***a* whereupon the yoke drops by gravity and moves the caster **69** clear of the road surface.

From the foregoing it will be seen that the machine is rugged in construction, and due to its circulating lubricating system, which is well sealed, the running parts are insured maximum life. The means for shifting the weight on the grinding head or disk and for adjusting the machine vertically has been designed with simplicity of construction and operation in view, it being understood that various modifications may be adopted within the spirit and scope of the invention to obtain the same result.

I claim:—

1. In a road surfacing machine, a surfacing unit, supporting frame members, wheels and a crank axle on which the rear extremities of said members are mounted, an adjusting lever for adjusting the machine vertically and provided with a quadrant fixed to the crank portion of said axle, said quadrant and frame members being provided with spaced adjusting holes adapted to register at varying arcuate positions of said quadrant, detachable means for fixing the quadrant to the frame, means for movably supporting the frame on the axle, and means for adjusting said last-named means to shift the machine relatively to the axle and vary the weight on the surfacing unit, said last-named adjusting means being coordinated with said first-named adjusting means so that the adjusting holes will register at varying positions of adjustment.

2. In a road surfacing machine, a rear truck, a main supporting frame mounted on said truck, and a caster assembly for carrying the front portion of the machine, said assembly comprising a counterbalanced pivotally mounted frame, a caster carried by one end of said frame, and a latch journaled in the main frame of the machine and adapted to engage the caster frame and hold the latter in carrying position.

3. In a road surfacing machine, a surfacing unit, a supporting frame, wheels and a crank axle on which said frame is mounted, means for adjusting the machine vertically including a quadrant fixed to the crank portion of said axle and detachably fixed to the frame, said quadrant and frame being provided with spaced adjusting holes adapted to register at varying arcuate positions of said quadrant, means for movably supporting the frame on the axle, and means for adjusting said last-named means to shift the machine relatively to the axle and vary the weight on the surfacing unit, said last-named adjusting means being coordinated with said first-named adjusting means so that the adjusting holes will register at varying positions of adjustment.

4. In a road surfacing machine, a surfacing unit, a supporting frame, wheels and a crank axle on which said frame is mounted, means connected to the crank portion of said axle and detachably connected to the frame for swinging the crank in an arc to thereby adjust the machine vertically, means for positively fixing the crank in its adjusted position, and means coordinated with said crank-adjusting means for shifting the machine forwardly or rearwardly relatively to the axle to vary the weight on the surfacing unit.

5. In a road surfacing machine, a surfacing unit, a supporting frame, wheels and a crank axle on which said frame is mounted, means connected to the crank portion of said axle and detachably connected to the frame for swinging the crank in an arc to thereby adjust the machine vertically, means coordinated with said crank-adjusting means for shifting the machine forwardly or rearwardly relatively to the axle to vary the weight on the surfacing unit, and means for positively fixing the adjusted parts in both positions of adjustment.

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