Aug. 29, 1961 J. P. RUTH 2,997,798

JOLTER ADJUNCT FOR SCRAPER-LOADER UNITS

Filed Oct. 27, 1958

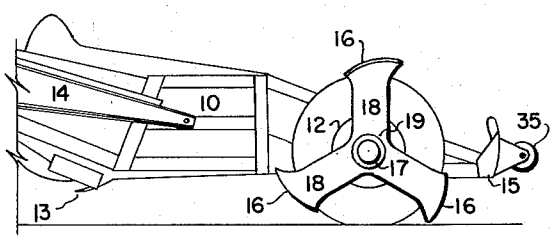


Fig. 1

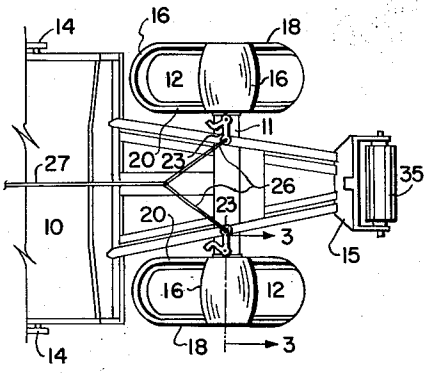


Fig. 2

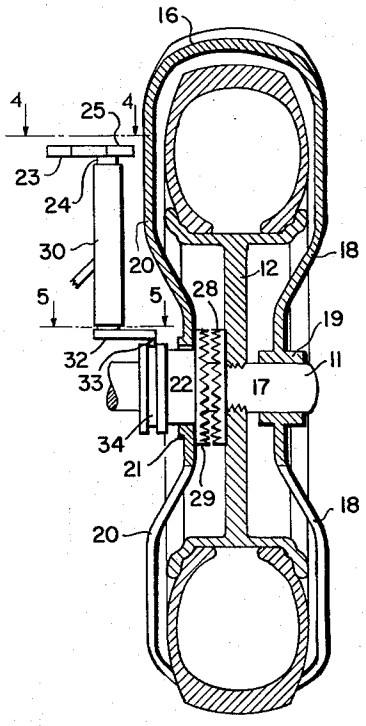


Fig. 3

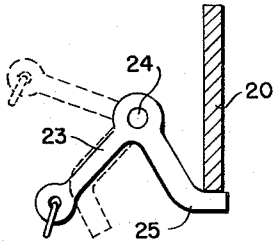


Fig. 4

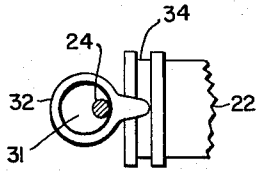


Fig. 5

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JOLTER ADJUNCT FOR SCRAPER-LOADER UNITS

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This invention relates to powered excavating and earth-moving equipment of scraper-loader type extensively in use in some diversity of structural particularity and characterized by a wheel-supported, tractor-coupled bowl furnished with a forwardly-directed, transverse blade and selectively tiltable about a transverse axis to raise and lower said blade relative to underlying earth areas for bowl-charging, excavating effect and alternative free translation of the unit as optional incidents of unit forward travel, and has as an object to provide novel and improved means operable in conjunction with such equipment to enhance the excavating potential thereof.

A further object of the invention is to provide novel and improved means operable in conjunction with scraper-loader equipment to altitudinally agitate the same during and as an incident of its excavating travel.

A further object of the invention is to provide novel and improved means for intermittently and repetitiously varying the bite of associate scraper-loader equipment during excavating travel thereof.

A further object of the invention is to provide a novel and improved jolter effective to altitudinally agitate associated scraper-loader equipment during and in automatic reaction to excavating travel thereof.

A further object of the invention is to provide a novel and improved jolter for scraper-loader equipment that is adaptable to operative association with diverse makes and constructions thereof.

A further object of the invention is to provide a novel and improved jolter for scraper-loader equipment that is convenient of selective control between operative and inoperative relation with the associated equipment.

A further object of the invention is to provide a novel and improved jolter for scraper-loader equipment that is economical of production and operative installation, that is practical and advantageous in use, and that is efficient in attainment of the ends for which designed.

With the foregoing and other objects in view, my invention consists in the construction, arrangement, and operative combination of elements as hereinafter set forth, pointed out in the appended claims, and illustrated by the accompanying drawing, in which—

FIGURE 1 is a side elevation of the bowl and associated portion of a typical scraper-loader unit as equipped with the improvements of the instant invention, completing elements of the conventional unit not essential to an understanding of the invention being omitted.

FIGURE 2 is a top plan view of the major portion of the organization according to FIGURE 1.

FIGURE 3 is a vertical section, on a relatively-enlarged scale, through the wheel shown in FIGURE 1 and taken substantially on the indicated line 3—3 of FIGURE 2.

FIGURE 4 is a fragmentary, detail view, partly in section, taken substantially on the indicated line 4—4 of FIGURE 3.

FIGURE 5 is a fragmentary, detail view, partly in section, taken substantially on the indicated line 5—5 of FIGURE 3.

As typified by FIGURES 1 and 2, scraper-loader equipment of conventional type whereto the improvements of the instant invention are applicable with advantage is characterized by a bowl 10 frame-supported at its trailing end on and tiltable about a transverse axle 11 in turn carried by wheels 12 journaled for free rotation on the opposite ends thereof, which wheels 12 are customarily equipped with pneumatic tires. The bottom member of the bowl 10 is formed or furnished with a transverse, forwardly-directed blade 13 adapted for excavating engagement, at times, with underlying earth areas, and said bowl is hingedly linked, as at 14, to a tractor unit, not shown, in a manner and through the agency of controls operable to steerably translate the unit and to selectively adjust the bowl about its tilt axis for altitudinal regulation of the blade 13 relative to the underlying ground area. Thus, with the blade 13 lowered into engagement with the ground, forward travel of the unit develops a scraping, excavating action effective to charge the dislodged material within the bowl 10 wherein it may be transported, after tilting of the bowl to elevate the blade 13 away from ground engagement, to dump delivery at a desired site. Resistances encountered during excavating and loading operations of the conventional unit frequently exceed the capability of the associated tractor, for which reason the frame support of the bowl 10 is extended rearwardly beyond the wheels 12 to terminate in a plate or block 15 against and through which the thrust of auxiliary tractor units may be applied to supplement the power of the towing tractor when needful.

As is well understood, the excavating effect of a blade pressure-urged into material to be dislodged may be much facilitated and greatly enhanced through a lifting and rocking of the blade as it is caused to penetrate, and the instant invention is hence directed to the provision of means for intermittently and repetitiously varying the bite of the blade 13 in practical and efficient reaction to application of the blade for excavating effect.

The excavating blade of conventional scraper-loaders being fixed relative to the associated bowl and adjustable therewith to excavate on a plane parallel to that traversed by the supporting wheels 12, it is manifest that altitudinal displacements of said wheels 12 will be reflected as corresponding altitudinal deflections of the blade working with excavating effect, to which end a principal feature of the instant invention is an adjunctive arrangement selectively employable in association with said wheels 12 to momentarily elevate and altitudinally jolt the same as they travel in support of the blade during excavating operations and to free the associated wheel for normal smooth rolling action when excavation is not in progress.

Susceptible of production and practical application in a variety of constructions, the principal feature of the invention is a jolter constituted as a unitary assembly of angularly-spaced shoes or lugs 16, preferably three in number, engaged transversely over and as radial extensions of each wheel 12 for selectively independent or conjoint rotation. As represented by the views of the drawing, the shoes 16 are generally U-shaped members adapted to span in clearing relation over the tread of the associated wheel with their individual ground-engaging areas eccentric to the wheel circumference at an inclination convergent with the latter in the direction of wheel rotation during forward travel of the unit, the arms of said members at each side of the associated wheel converging radially and inwardly of the latter to unite in com-

mon support of a journal revolubly coactable with the wheel hub 17, or a concentrically-associated axle or spindle element. As illustrated, outer side arms 18 of the shoes 16 merge in and support a journal sleeve 19 revolubly seated on the outer end of the wheel hub 17 and the inner side arms 20 of said shoes merge in and support a journal sleeve 21 which is splined to and hence rotatable with a tubular clutch member 22 axially shiftable and freely rotatable on said hub 17, as hereinafter more fully described. However particularly constructed and operatively correlated with an associated wheel 12, each jolter assembly of shoes 16, arms 18 and 20, and journal sleeves 19 and 21 is arranged to rotate at times with its wheel for consequent elevation and drop of the latter as the shoes 16 successively contact with the ground, or, alternatively, to remain at rest while the associated wheel rotates therewith.

The frictions inevitably obtaining between each jolter assembly and the associated wheel may well serve to initiate and to maintain conjoint rotation thereof, when such action is appropriate or desired, but immobilization of the jolter assembly during rotation of the associated wheel, as is appropriate for translation of the equipment apart from excavating operations, requires positive, selectively-actuable means effective to retain the jolter assembly against rotation with its shoes 16 in clearing relation with the ground. A simple and practical arrangement for selectively immobilizing both of the jolter assemblies of the scraper-loader unit in like, ground-clearing dispositions for subsequent, synchronous rotation with their respective wheels is represented as a bell-crank 23 journaled to rock on a vertical axis 24 fixed to the bowl frame inwardly adjacent the upper arc of each wheel 12 in a manner to at times project the free end 25 of one of its arms across the orbital path of the adjacent jolter assembly inner arms 20 as a stop against which the said assembly rests with its shoes 16 out of engagement with the ground, as in FIGURE 1. Simultaneous actuation of both bell-cranks 23 is conveniently attained through the provision of links 26 pivotally connecting inwardly-directed arms of said cranks with one end of a shift rod 27 manipulable by the unit operator, whereby selective control of jolter assembly operation is established.

Positive, and desirably synchronous, rotation of the jolter assemblies with their respective wheels is readily had through the agency of the clutch member 22, hereinabove mentioned, or functionally equivalent arrangements. With the clutch member 22 rotatable independently of the associated wheel 12 and splined to rotate with the jolter assembly, complementary toothed clutch elements 28 and 29 carried by said wheel and the adjacent end of the clutch member, respectively, are interengageable upon appropriate axial shift of the member to interlock said wheel and jolter assembly for conjoint rotation, and release of the bell-cranks 23 from their arresting engagement with the jolter assemblies may be applied to engage the clutch elements 28 and 29 at each wheel in any desired feasible manner. As shown, each bell-crank 23 is fixed to its vertical pivotal axis 24 which is extended as a shaft through a bearing 30 carried by the bowl frame to engagement with an eccentric 31 working in a strap 32 connected by a pin 33, or fork, with a shift collar 34 on the adjacent end of the clutch member 22, the correlation of the eccentric 31 with its pivotal axis 24 being in each instance such as to shift the clutch member 22 for interengagement of the elements 28 and 29 when the bell-cranks 23 are rocked to release the jolter assemblies and to retract said clutch elements out of interengagement when the bell-cranks are shifted to interpose their arms 25 across the paths of jolter assembly inner arm rotation.

Since operation of the jolter assemblies when rotating with their wheels 12 results in intermittent, repetitious vertical oscillations of the plate or block 15, the latter is preferably furnished with a horizontal roller 35, or the equivalent, against which supplementary thrust of auxiliary tractors may be applied without undesirable frictions during excavating and loading operations.

Equipped with the jolter assemblies, controls, and roller 35, as shown and described, conventional scraper-loader units are capable of superior performance and more efficient use of power available. With the jolter assemblies immobilized under control of the operator, the equipment unit is operable in the usual way. Excavating and loading being in order, the jolter assemblies are released to rotate with their wheels, the blade 13 is lowered to excavating position, and supplementary power is applied through the roller 35 and its mounting, whereupon forward travel of the unit results in a succession of vertical jolts, or bumps, as the shoes 16 ride under their wheels 12, the blade 13 is correspondingly lifted and rocked with loosening effect upon the material under excavation, and the load received within the bowl 10 is shifted and compacted with consequent realization of the full carrying capacity thereof.

Since changes, variations, and modifications in the form, construction, and arrangement of the elements shown and described may be had without departing from the spirit of my invention, I wish to be understood as being limited solely by the scope of the appended claims, rather than by any details of the illustrative showing and foregoing description.

I claim as my invention:

1. In jolter assemblies cooperable in alternative conjoint and independent rotational relation with the wheels of conventional scraper-loader equipment wheel-supported for translation to altitudinally agitate the associated wheels when rotating therewith as an incident of equipment translation having each a journal concentric with the wheel axis at each side of the wheel rotatable independently of the latter and angularly-spaced arms similarly outstanding radially from each said journal at and in clearing relation with the opposite sides of an associated wheel, like, U-shaped shoes fixedly intercoupling outer ends of corresponding arms across and in clearing relation with the wheel tread as radial enlargements of the associated wheel, and ground-engaging areas on said shoes eccentric to the wheel circumference at an inclination convergent with the latter in the direction of wheel rotation during loading translation of the equipment.

2. In jolter assemblies cooperable in alternative conjoint and independent rotational relation with the wheels of conventional scraper-loader equipment wheel-supported for translation to altitudinally agitate the associated wheels when rotating therewith as an incident of equipment translation having angularly-spaced arms similarly radial of and in clearing relation with the opposite sides of an associated wheel, like, U-shaped shoes fixedly intercoupling outer ends of corresponding said arms across and in clearing relation with the wheel tread, and exposed areas on said shoes smoothly conformed circumferentially and transversely of the wheel tread for ground engagement in an eccentric, generally-tangent relation with the wheel circumference convergent to the latter in the direction of wheel rotation during loading translation of the equipment.

3. In jolter assemblies cooperable in alternative conjoint and independent rotational relation with wheels of conventional scraper-loader equipment wheel-supported for translation to altitudinally agitate the associated wheels when rotating therewith as an incident of equipment translation having angularly-spaced arms similarly radial of and in clearing relation with the opposite sides of an associated wheel, like, U-shaped shoes fixedly intercoupling outer ends of corresponding said arms across and in clearing relation with the wheel tread, and exposed, smoothly-conformed areas on said shoes adapted for ground engagement in overlying relation with the wheel tread tangentially correlated with the circumference of

the associated wheel for initial gradual elevation and subsequent abrupt drop of the wheel as an incident of arm and shoe rotation with the wheel during loading translation of the equipment.

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