

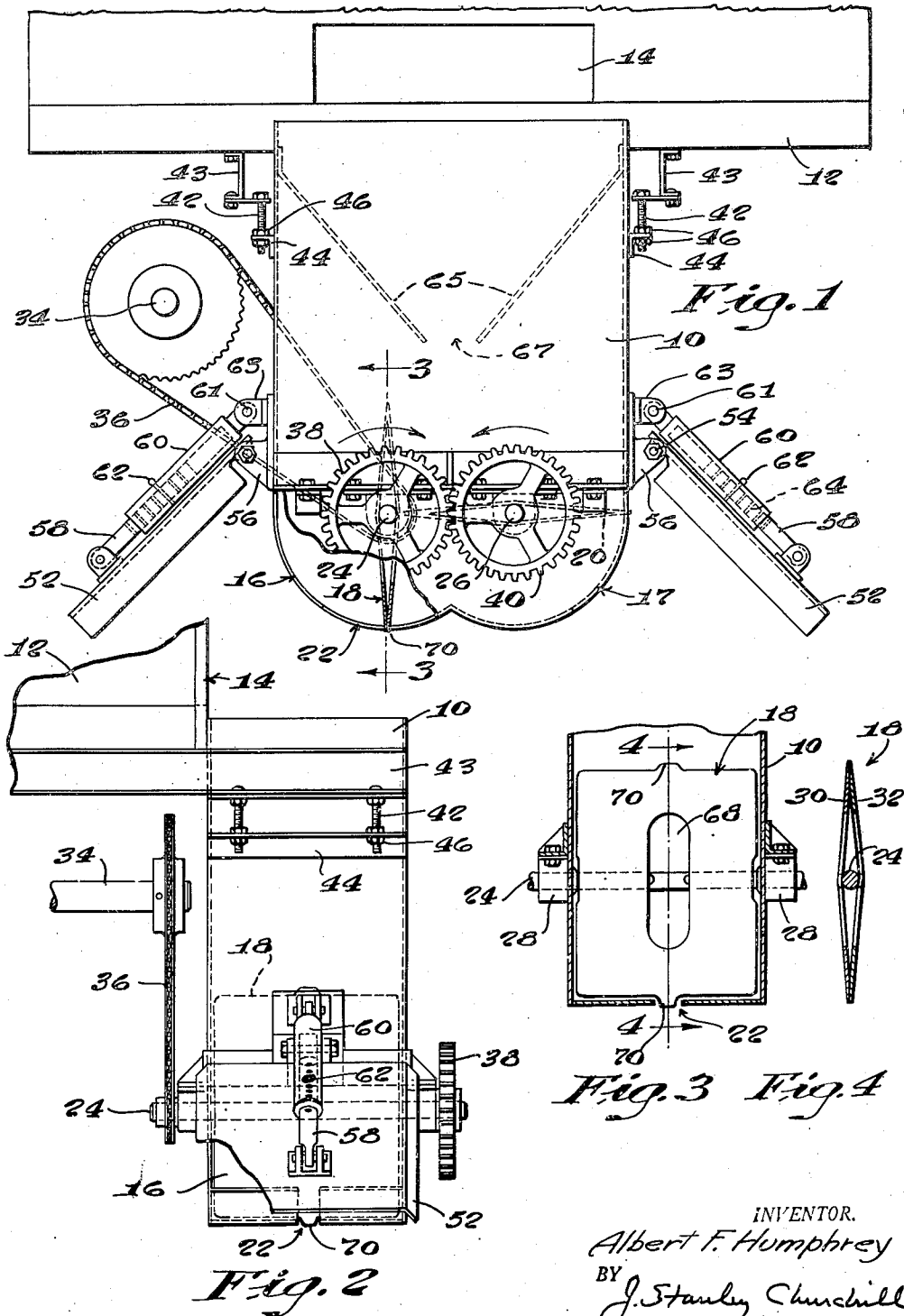
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SAND SPREADING APPARATUS

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SAND SPREADING APPARATUS

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4 Claims. (Cl. 275-8)

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This invention relates to sand spreading apparatus.

The invention has for an object to provide novel and improved apparatus adapted to be attached to the back of a vehicle for spreading sand or other loose granular material upon the roadway in a uniform and efficient manner as the vehicle proceeds along the road.

With this general object in view, and such others as may hereinafter appear, the invention consists in the sand spreading apparatus and in the various structures, arrangements and combinations of parts hereinafter described and particularly defined in the claims at the end of this specification.

In the drawings illustrating the preferred embodiment of the invention, Fig. 1 is a rear elevation of a sand spreader embodying the present invention shown attached to the rear of a vehicle body; Fig. 2 is a side elevation of the same; Fig. 3 is a cross-sectional view taken on the line 3-3 of Fig. 1 illustrating the rotary impellers embodied in the present sand spreader; and Fig. 4 is a cross-sectional detail view of the rotary impeller taken on the line 4-4 of Fig. 3.

In general, the present invention contemplates novel sanding apparatus adapted to be attached to the back of a vehicle body such as a motor truck and which is capable of distributing the sand or other loose or granular material in a novel and efficient manner uniformly over the surface of the roadway as the truck proceeds along the road. The present sand spreading apparatus is preferably provided with a hopper adapted to receive the material to be spread which flows by gravity through an opening in the back of the truck body or in the tailboard of the vehicle. Provision is made for forcibly ejecting the material flowing downwardly through the hopper through openings provided in the lower end thereof to distribute the material evenly over the entire surface of the roadway over which the vehicle is passing. In the embodiment of the invention illustrated herein the sanding apparatus may and preferably will be driven from a source of power taken from the standard transmission of a truck to which the unit is attached.

Referring now to the drawings, 10 represents a hopper attached to the rear of a vehicle 12 and arranged to receive the material to be spread from a bulk supply thereof carried by the vehicle, the material being permitted to flow by gravity through an opening 14 provided in the back of the vehicle body. The lower end of the hopper 10 is provided with side openings 16, 17 through which the material is forcibly ejected during the operation of the device by a pair of rotary impellers or paddles 18, 20. The bottom of the hopper is preferably curved to conform to the path of movement of the free ends of the two rotary impellers, and the bottom of the hopper is provided with a relatively narrow elongated

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opening 22 through which some of the material is permitted to flow in order to sand the roadway immediately beneath the hopper.

As herein shown, the rotary impellers 18, 20 are secured to spaced shafts 24, 26 respectively, which are journaled in bearings 28 attached to the front and rear walls of the hopper. Each impeller comprises two flat plates 30, 32 extending substantially across the full width of the hopper 10, the plates being preferably bent over opposed sides of their impeller shaft to form two opposed radially projecting V-shaped paddles or blades joined at their outer ends, as best shown in Figs. 3 and 4. The plates 30, 32 may and preferably will be secured to the shaft and joined at their outer ends by welding.

As herein shown, the rotating impellers 18, 20 are mounted to rotate in opposite directions and are arranged with relation to each other so as to pass their blades alternately into the path of the material flowing downwardly through the hopper, the impeller 18 being rotated clockwise, viewing Fig. 1, and the impeller 20 being rotated counter-clockwise to alternately deflect the material through the side openings 16, 17 respectively, some of the material being expelled through the relatively narrow elongated bottom opening 22. As illustrated in Fig. 1, the impellers may be arranged with relation to each other so that when one impeller is in a vertical position, the other impeller is disposed in a substantially horizontal position.

The impellers are arranged to be simultaneously rotated in opposite directions through connections from a drive shaft 34 which may form a part of the standard transmission unit of the vehicle. As herein shown, the shaft 34 is connected by a chain and sprocket drive 36 to the impeller shaft 24 and the latter is connected to the shaft 26 by cooperating spur gears 38, 40. Provision may also be made for raising or lowering the sanding unit slightly with relation to the driving unit to effect tightening of the chain connection, and as shown in Fig. 1, vertical adjustment of the unit may be effected by a pair of bolts 42 depending from the vehicle frame 43 and which are secured to angle bars 44 on the hopper by lock nuts 46.

Provision is also made for adjusting the effective size of the openings 16, 17 in order to control the width of the spread of sand along either side of the roadway, and as herein shown, adjustable gates 52 may be provided on either side of the hopper adjacent the side openings and against which some of the sand may strike to limit the extent of the spread of sand. Each gate or guide plate 52 is rockingly mounted on a shaft 54 supported between brackets 56 extending from the side walls of the hopper, and each gate is arranged to be held in its adjusted position by a connection including a rod 58 pivotally carried by the gate which is arranged to telescopically

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extend into a tube 60 pivotally supported on a stud 61 carried in a bracket 63 secured to the hopper. The tube 60 is provided with a transverse opening arranged to receive a detachable pin 62 which extends through one of a plurality of transverse openings 64 formed in the rod 58, as clearly shown in Fig. 1.

In practice, the stream of material flowing into the hopper 10 from the opening 14 in the back of the vehicle body is arranged to be guided to fall between the spaced cooperating impeller units 18, 20 and in the path of the rotating paddles by diagonally extended guide plates 65 secured to the side walls within the hopper and cooperating to form a relatively narrow mouth 67 at their lower ends. Each impeller unit is also preferably provided with a substantially central elongated opening 68 in the side plates 30, 32 and through which some of the sand may fall or be ejected by an opposing rotating blade. As herein shown, each blade may also be provided with a substantially centrally disposed edge projection 70 at its outer edges which is arranged to extend into the relatively narrow opening or slot 22 to eject any sand in its path through the slot in order to distribute the sand on the roadway immediately beneath the hopper.

From the above description it will be observed that in the operation of the apparatus the stream of material flowing from the mouth 67 into the path of the rotary paddles is alternately deflected by successive paddles of each impeller first to one side of the roadway and then to the other in a substantially continuous and uniform stream and with sufficient force to spread the sand entirely across the roadway. It will also be observed that the openings 68 permit some of the sand to escape through the paddles and to be subsequently engaged by the continuously rotating impellers and deflected through the side openings and also through the slotted opening 22 in the bottom of the hopper to cover the entire surface of the roadway as the vehicle proceeds.

The present rotary impellers, each running continuously in one direction, eliminate the excessive vibration and strains which result from the changes in the direction of motion of the oscillating paddle types of sand spreaders of the prior art, and as a result the present apparatus may be operated at a high speed to obtain maximum capacity and spread and with a minimum amount of vibration.

While the preferred embodiment of the invention has been herein illustrated and described, it will be understood that the invention may be embodied in other forms within the scope of the following claims.

Having thus described the invention, what is claimed is:

1. In a device for spreading sand or other loose flowable material upon a roadway, in combination, a hopper into which the material to be spread is received, said hopper being provided with two opposed side openings, a pair of rotary impellers mounted to rotate in the hopper adjacent their respective side openings, each impeller having at least two blades diametrically opposed to one another and being arranged to present their blades alternately into the path of material falling freely through said hopper to forcibly deflect most of the falling material through said side openings as the impellers are rotated, the blades of each impeller successively engaging the falling material at each rotation of the impeller, and means for continuously rotating said impellers toward one another.

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2. In a device for spreading sand or other loose flowable material upon a roadway, in combination, a hopper into which the material to be spread is received, said hopper being provided with two opposed side openings, a pair of rotary impellers mounted to rotate in the hopper adjacent their respective side openings, each impeller having at least two blades diametrically opposed to one another and being arranged to present their blades alternately into the path of material falling freely through said hopper to forcibly deflect most of the falling material through said side openings as the impellers are rotated, the blades of each impeller successively engaging the falling material at each rotation of the impeller, and means for continuously rotating said impellers toward one another, the bottom wall of said hopper being curved to conform to the path of movement of the free ends of the adjacent blades so that material deposited on said bottom wall will be swept therefrom by the impellers.

3. In a device for spreading sand or other loose flowable material upon a roadway, in combination, a hopper into which the material to be spread is received, said hopper being provided with two opposed side openings, a pair of rotary impellers mounted to rotate in the hopper adjacent their respective side openings, each impeller having at least two blades and arranged to present their blades alternately into the path of material falling freely through said hopper to forcibly deflect the falling material through said side openings as the impellers are rotated, and means for rotating said impellers, the bottom wall of said hopper being curved to conform to the path of movement of the free ends of said blades, said blades having openings therein through which some of the material may fall and be deposited on said bottom wall to be swept therefrom by the impellers.

4. In a device for spreading sand or other loose flowable material upon a roadway, in combination, a hopper into which the material to be spread is received, said hopper being provided with two opposed side openings, and a relatively narrow elongated bottom opening extending between said side openings, a pair of spaced rotary impellers mounted to rotate toward one another in the hopper adjacent their respective side openings, each impeller having at least two blades diametrically opposed to one another and cooperating to present their blades alternately into the path of material falling freely through said hopper to engage and forcibly deflect most of the falling material through the respective side openings and through said bottom opening as the impellers are rotated, the bottom of said hopper being curved to conform to the path of movement of the free ends of said blades, said blades being provided with edge projections arranged to extend into said elongated bottom opening during rotation of the said blades.

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