Nov. 28, 1939. B. H. FLYNN 2,181,320

ROAD MACHINE

Filed Dec. 23, 1937 3 Sheets-Sheet 1

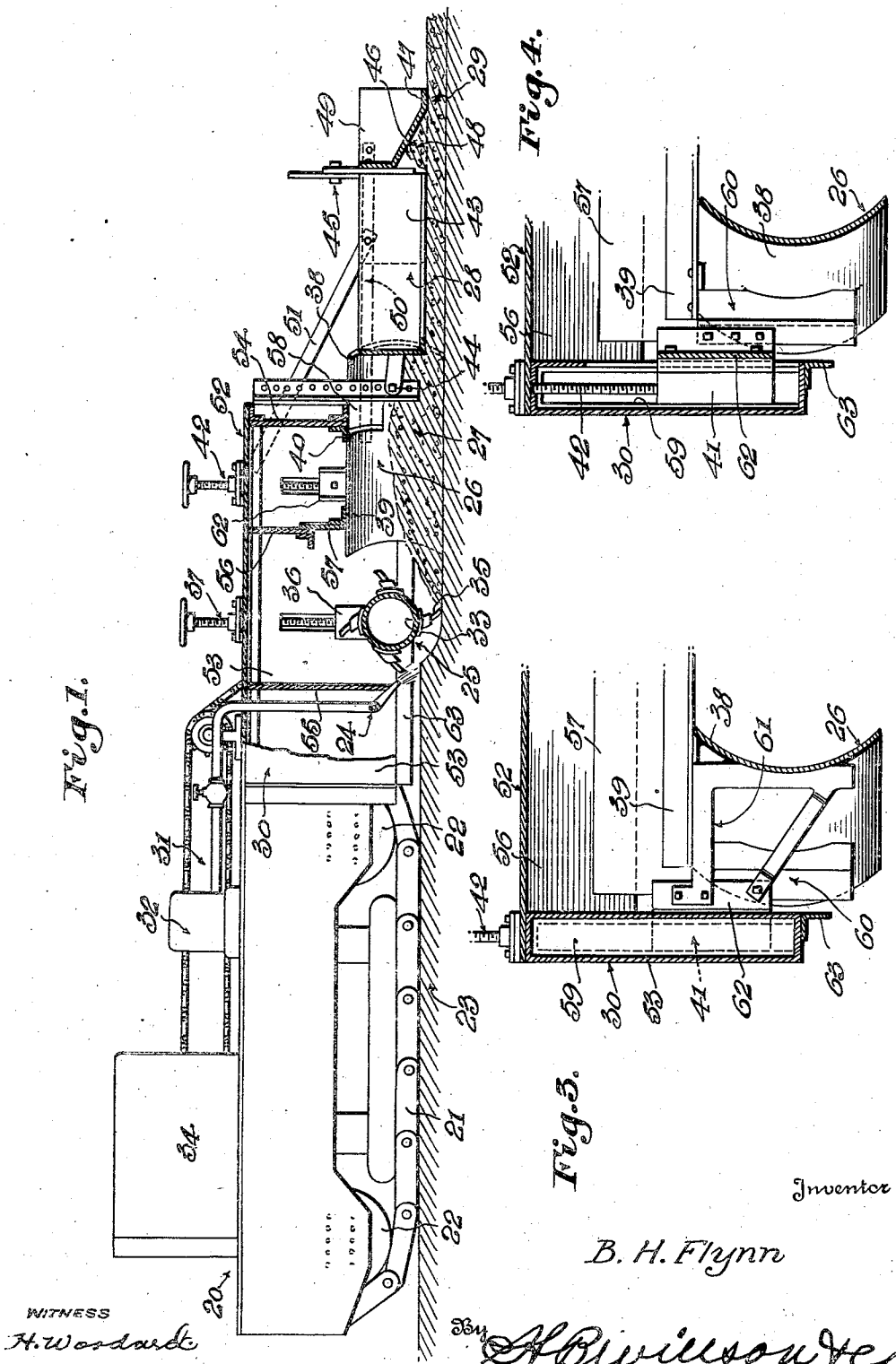


Fig. 1.

Fig. 4.

Fig. 3.

Inventor

B. H. Flynn

By H. Bivillson & Co

ATTORNEYS

WITNESS

H. Woodard

Nov. 28, 1939. B. H. FLYNN 2,181,320

ROAD MACHINE

Filed Dec. 23, 1937 3 Sheets-Sheet 2

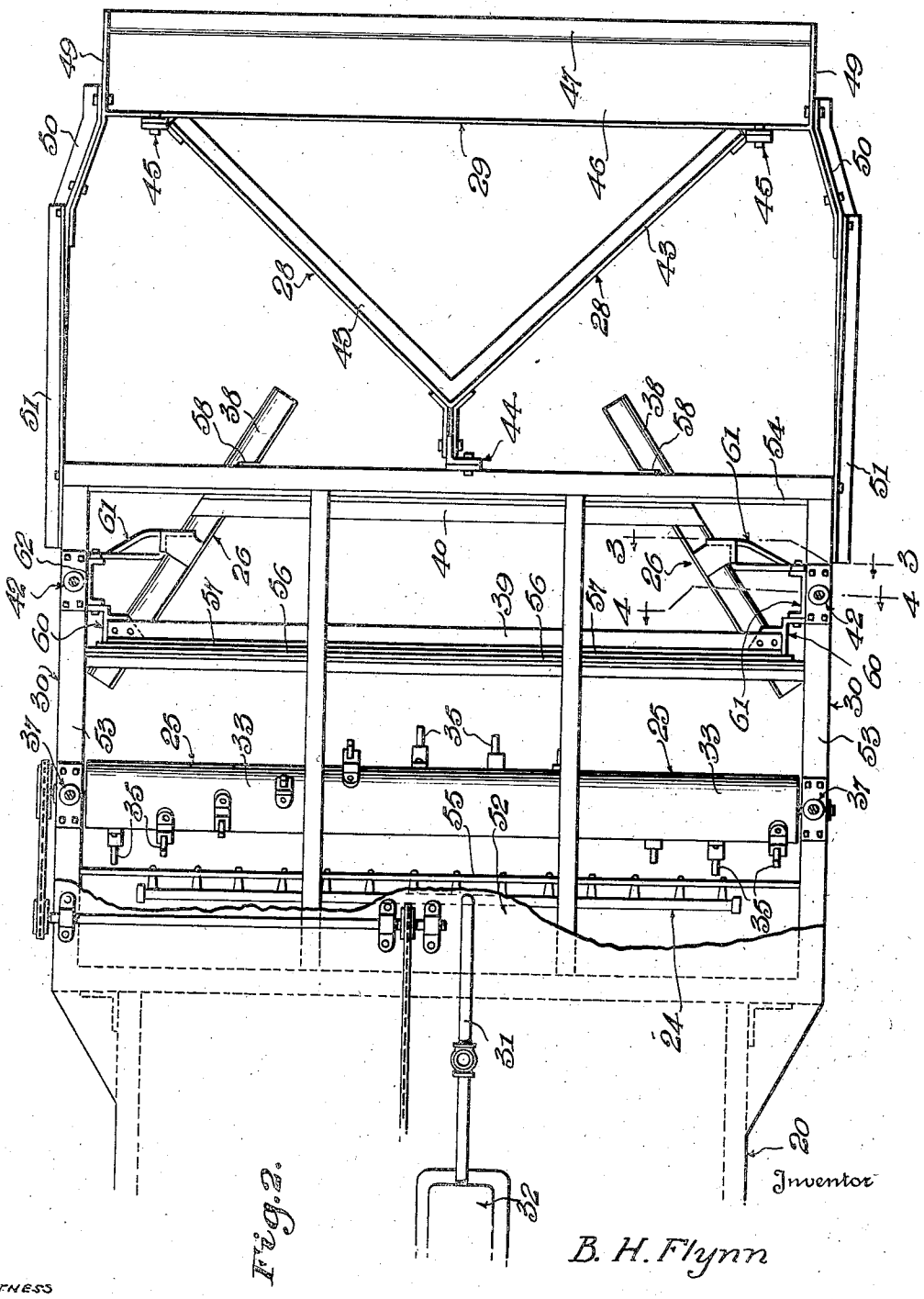


Fig. 2.

Inventor

B. H. Flynn

WITNESS

H. Woodard

By H. B. Williamson & Co

ATTORNEYS

Nov. 28, 1939. B. H. FLYNN 2,181,320

ROAD MACHINE

Filed Dec. 23, 1937 3 Sheets-Sheet 3

Fig. 5.

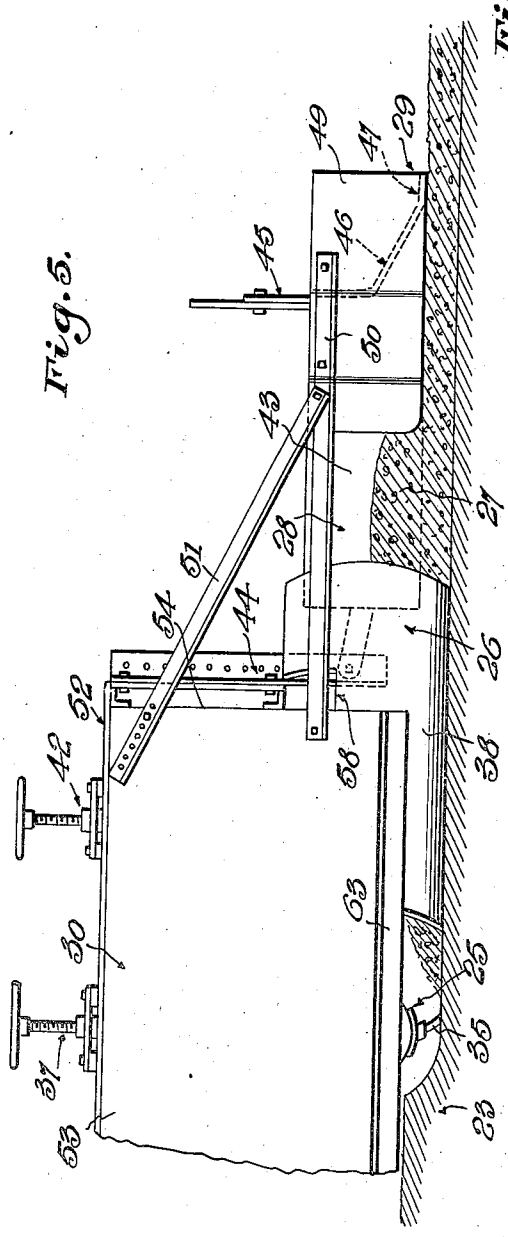


Fig. 7.

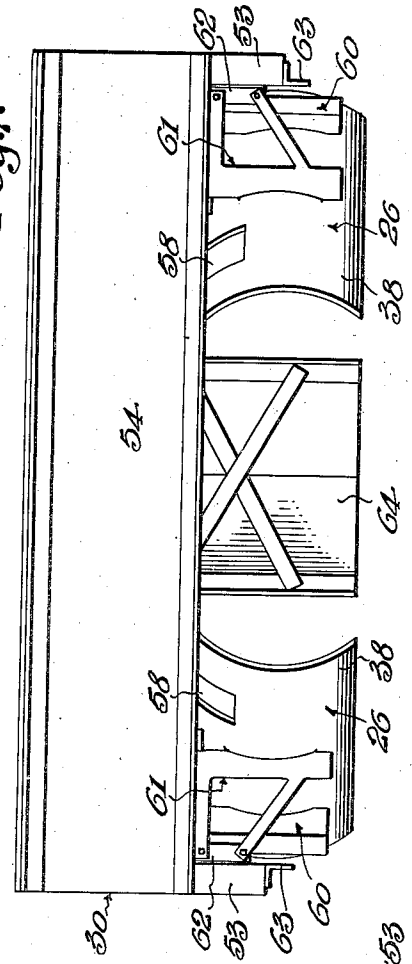
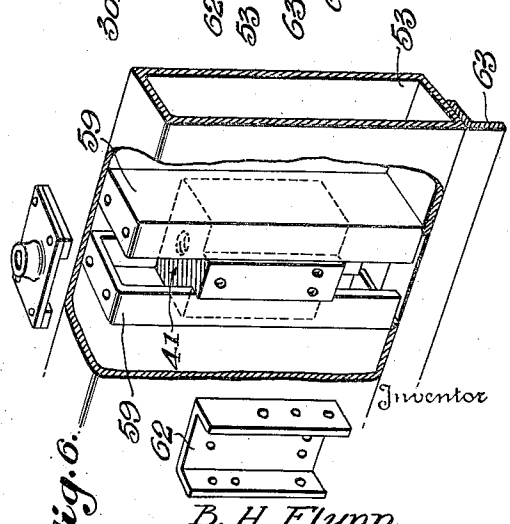


Fig. 6.



WITNESS

H. Woodard.

Inventor

B. H. Flynn

By H. B. Williamson & Co

ATTORNEYS

Patented Nov. 28, 1939 2,181,320

UNITED STATES PATENT OFFICE

2,181,320

ROAD MACHINE

Benjamin H. Flynn, Alexandria, La.

Application December 23, 1937, Serial No. 181,422

8 Claims. (Cl. 94—39)

The invention relates to mobile machines for road construction and maintenance purposes and although it is useable in new road construction, it aims primarily to provide for the effective reconstruction of old roadways which have become broken up, rutted, wavy or otherwise in bad condition. Ordinarily, in reconditioning such roads, several separate machines are necessary for disintegrating the old road and preparing the disintegrated material for re-compaction. My invention, however, provides a single machine for accomplishing most of the necessary steps, as the machine proceeds along the roadway, and it further provides for mixing a binder or other desired liquid with the disintegrated road material much more thoroughly than heretofore possible. If the roadway be of bituminous-bound or similar construction, hot asphalt, oil or the like is mixed with the disintegrated material, but if a water-bound road is being reconditioned, or one in which cement is to be embodied, the liquid used is, of course, water. In either instance, the preferred embodiment of the machine thoroughly disintegrates the old road, mixes the liquid with the disintegrated material, evenly distributes the mixture, levels-off and initially compacts said mixture in readiness for rolling. In recent years, laboratory and field experiments and tests have shown the practicability of "soil-cement" roads, particularly for secondary road systems. In constructing a new "soil-cement" road, or converting an ordinary soil road into a "soil-cement" road, according to present-day practice, the principal steps are as follows, although a number of intermediate steps are also necessary. The road or right-of-way, after proper grading, is dug up and pulverized to a desired depth. The pulverized material is then leveled off and a layer of dry Portland cement is spread upon it. The soil and pulverized material are then dry-mixed and another leveling operation is performed. Water is then added to the dry mixture and another mixing operation is carried out. The damp mixture is then leveled off, harrowed, re-leveled and compacted. This process has necessarily been arduous and has required the use of a number of expensive machines which could otherwise be in use on other projects, but the present invention provides, in one machine, all equipment necessary except graders, cement spreader and roller. Moreover, the same machine is useable where asphaltic oils, calcium chloride or other binders are to be mixed with soil in constructing or reconstructing soil roadways.

Fig. 1 of the accompanying drawings is a side elevation, partly broken away and in longitudinal section.

Fig. 2 is a top plan view with a portion of the cover plate removed.

Figs. 3 and 4 are detail vertical sectional views on lines 3—3 and 4—4 of Fig. 2.

Fig. 5 is an enlarged side elevation of the rear portion of the machine.

Fig. 6 is a sectional perspective view showing one of the many ways in which the windrow-forming blades and/or the rotary cutter may be mounted for vertical adjustment.

Fig. 7 is a rear elevation with parts omitted showing a center dividing board which may be used if desired.

The general construction shown by the drawings may well be followed, but it is to be understood that the present disclosure is illustrative rather than limiting.

A mobile machine 20 is shown, of self-propelled nature and provided with suitable endless tracks 21 upon which the supporting wheels 22 travel. It will be understood, however, that the supporting and propelling means for the machine could well be of some other suitable form. For example, a machine could be provided with flanged wheels to travel upon fixed side forms or rails. The machine is to be driven forwardly over an initially smoothed-off roadway 23 and in its present embodiment, said machine comprises means 24 for spraying or otherwise discharging a liquid (binder or water) onto said roadway, means 25 behind said means 24 for disintegrating the roadway to the desired depth, means 26 behind the disintegrating means 25 for inwardly moving the disintegrated material and forming a windrow 27 thereof, means 28 behind said means 26 for re-distributing the material from said windrow 27, and means 29 for compacting the re-distributed material. By first discharging the desired liquid upon the roadway from the means 24 and by then having the means 25, 26 and 28 successively act upon the liquid-treated material, it is insured that an unusually thorough mixture of this material with the liquid, shall be effected. In most instances, the road material along the center and the material along the edges have become non-uniform, and by having the means 26 and 28 successively act upon this material, thorough re-mixture thereof is attained, insuring a homogeneous completed road. All of the means 24, 25, 26, 28 and 29 are mounted on the main frame 30 of the machine and said means will be independently explained.

The means 24 may well be in the form of a

liquid spray pipe supplied with the liquid through a valved pipe 31 from suitable supply means 32, said means 32 embodying means for heating the liquid if desired. The spraying of the liquid onto the roadway before said roadway is acted upon by the disintegrating means 25, is of particular advantage on dry roads and serves to restrict dust throwing to the minimum.

The means 25 preferably consists of a transverse, rotary motor-driven drum 33 driven by any preferred operating connections suitably associated with the propelling motor 34, said drum 33 being provided with circumferentially and longitudinally spaced road disintegrating teeth 35, said teeth and drum jointly forming a rotatable toothed cutter for over-cutting to thoroughly disintegrate the roadway 23 to the desired depth and to rearwardly throw the disintegrated material forcibly under the cutter. During this effective disintegrating operation, any liquid which has been supplied to the road surface by the means 24, is effectively worked down into and mixed with the material as the latter is disintegrated. The ends of the drum 33 are supported by suitable bearing blocks or the like 36 which may be vertically adjusted by any preferred means 37.

The windrow-forming means 26 preferably comprises two rearwardly converging scraper blades 38 tied in fixed relation with each other by transverse bars 39 and 40, said blades being mounted upon vertically slidable blocks 41 which may be vertically adjusted by screws or the like 42.

The re-distributing means 28 preferably comprises two rearwardly diverging blades 43 adjustably connected at their front ends to the rear of the frame 30, by any appropriate hitch 44, the rear ends of said blades 43 being adjustably connected at 45 with the compacting means 29.

During operation of the machine, the latter vibrates vigorously, the vibration being caused primarily by the action of the rotary cutter 25. Due to the construction of the compacting means 29, I utilize this machine vibration to jostle the re-distributed material and to downwardly press this material, thus providing for effective initial compaction, preparatory to final rolling. To attain these ends, the means 29 is preferably in the form of a transverse pressure plate having a forwardly inclined front portion 46 and a horizontal rear portion 47 integral with or otherwise connected with the lower edge of said inclined portion 46. Some of the loose re-distributed material accumulates as shown at 48 under the inclined plate portion 46 and due to the violent vibration of the machine, this material is vigorously jostled, and at the same time, the plate presses downwardly on said material, to initially compact the same, striking-off or smoothing being accomplished by the plate portion 47.

The ends of the plate 46, 47 are welded or otherwise secured to end plates 49 suitably secured to the rear ends of longitudinal draw bars 50 which extend rearwardly from the frame 30 and are adjustably connected therewith. Inclined brace bars 51 also adjustably connected with the frame 30, are provided for the bars 50.

All of the means 24, 25 and 26 are disposed under a top plate 52 which covers the frame 30 and cooperates with the longitudinal side members 53 and with the rear end member 54 of said frame in forming a hood. Extending transversely across the interior of this hood between the liquid-discharge means 24 and the disintegrating means 25, I provide a partition 55, and I also provide a transverse member 56 extending across the interior of said hood behind the means 25, said member 56 cooperating with the plate 57 secured to the front blade-connecting bar 39 in forming a baffle to prevent the rotary cutter from rearwardly throwing the material over the scraper blades 41. The rear blade-connecting bar 40 contacts with the front side of the rear frame member 54 to generally brace the blades 38, and the upper edges of these blades are preferably notched at 58 to straddle the lower portion of said rear member 54 when said blades are raised.

The side members 53 of the frame 30 are preferably of rectangular tubular cross section, and within them vertical guides such as 59, may be provided for the blocks 41 which carry the scraper blades 38, and for the bearing blocks 36 which carry the rotary cutter 25. The inner walls of the frame side members are of course slotted to allow the required vertical adjustment of the blocks and cutter, and to connect the blades 38 rigidly with the blocks 41, appropriate front and rear brackets 60 and 61 are provided, said brackets being preferably welded to said blades and to vertical channel bars 62, these bars being bolted to said blocks 41. The bars 63 shown extending longitudinally under and secured to the side members 53 of the frame 30 are simply material-retaining bars.

If the roadway to be reconditioned, be of bituminous-bound or similar construction, hot asphalt, oil or the like is discharged onto the initially smoothed road surface as the machine progresses along said surface, such discharge being effected by the means 24. The rotary toothed cutter 25 immediately acts upon the binder-treated roadway, thoroughly disintegrating the latter to the desired depth and effectively mixing the disintegrated material with the binder. This mixture is thrown rearwardly by the cutter 25 and is intercepted by the scraper blades 38 which move the material inwardly and form a windrow thereof. The material is so forcibly thrown rearwardly by the rotary cutter that a large percentage of said material is deflected inwardly by the blades 38 as it is thrown against these blades, thereby forming part of the windrow without the necessity of actually scraping the material inwardly, thereby economizing in operating power. The windrow is longitudinally split by the distributing blades 43 and these blades effectively and smoothly redistribute the treated material. The jostling and pressure plate 29 then initially compacts this material in readiness for final rolling.

If the roadway is to be converted into a "soil-cement" road, or if an entirely new "soil-cement" road is to be constructed, proper grading is done, and the cement is suitably spread upon the roadway in advance of the machine, and either the means 24, or some other suitable means is used to discharge water onto the cement immediately ahead of the rotary cutter 25. The action of this cutter will then thoroughly mix the disintegrated road material with the cement and water, and the mixture will be further mixed and redistributed by the means 26 and 28, and will be jostled, initially compacted and smoothed by the means 29.

In Fig. 7, I show a center dividing board 64 which may be suitably secured to the machine frame between the scraper blades 38, immediately behind the rotary cutter 25. This dividing

board will outwardly throw the material cut from the center of the road, while the front portions of the scraper blades 38 are inwardly directing the material cut from the sides of the road and all of this material will thus be mixed before it is formed into the windrow by the rear portions of said blades 38. The dividing board 64 may or may not be used, as the character of the road may determine.

From the foregoing, taken in connection with the accompanying drawings, it will be seen that novel and advantageous provision has been made for carrying out the objects of the invention, and while preferred features have been disclosed, attention is again invited to the fact that the present showing is to be considered as illustrative rather than limiting.

I claim:

1. A road machine comprising a mobile frame to travel along a roadway, said frame having longitudinal side members and a transverse member connecting the upper portions of said side members, said transverse member having its lower edge spaced upwardly from the lower edges of said side members, a plate cooperable with said side and transverse members in forming a hood, a transverse motor-driven rotary cutter in said hood for disintegrating the roadway and throwing the disintegrated material rearwardly, two rearwardly converging scraper blades carried by said frame and extending under said transverse member to intercept the rearwardly thrown material and form a windrow thereof, means for vertically adjusting said scraper blades, and a transverse vertical plate secured to said scraper blades and lying slidably against one side of said transverse member to close any space which would otherwise exist between the upper edges of said blades and said transverse member.

2. A road machine comprising a mobile frame to travel along a roadway, means on said frame for disintegrating the roadway and loosely redistributing the disintegrated material, said means having a rotary motor-driven cutter which performs the disintegrating operation and vigorously vibrates said frame, and means rigidly mounted on said frame for transmitting the frame vibration produced by said rotary cutter to the loose distributed material, said rigidly mounted means having a forwardly inclined portion for downwardly pressing this material during the vibration of said material.

3. A road machine comprising a mobile frame to travel along a roadway, means on said frame for disintegrating the roadway and loosely redistributing the disintegrated material, said means having a rotary motor-driven cutter which performs the disintegrating operation and vigorously vibrates said frame, and a transverse pressure plate rigidly mounted on said frame for transmitting the frame vibration produced by said rotary cutter to the loose distributed material, said pressure plate having a forwardly inclined portion for downwardly pressing said material during the vibration of said material.

4. A road machine comprising a mobile frame to travel along a roadway, means on said frame for disintegrating the roadway and loosely redistributing the disintegrated material, said means having a rotary motor-driven cutter which performs the disintegrating operation and vigorously vibrates said frame, and a transverse pressure plate rigidly mounted on said frame for transmitting the frame vibration produced by said rotary cutter to the loose distributed material and for downwardly pressing said material, said pressure plate having a forwardly inclined front portion and a horizontal rear portion at the lower edge of said inclined front portion.

5. A road machine comprising a mobile frame to travel along a roadway, means on said frame for disintegrating the roadway and re-spreading the disintegrated material, said disintegrating means being of such nature as to vigorously vibrate, and means for utilizing the vibration produced by said disintegrating means to jostle the re-spread material, said jostling means having a forwardly inclined portion for downwardly pressing this material during the jostling thereof.

6. A road machine comprising a mobile frame to travel along a roadway, means on said frame for disintegrating the roadway and re-spreading the disintegrated material, said means being of such nature as to vigorously vibrate said frame, and means rigidly mounted on said frame for transmitting the frame vibrations produced by the aforesaid means to the loose distributed material, said rigidly mounted means having a forwardly inclined portion for downwardly pressing this material during the vibration of said material.

7. A road machine comprising a mobile frame to travel along a roadway, means on said frame for disintegrating the roadway and re-spreading the disintegrated material, said means being of such nature as to vigorously vibrate said frame, and a transverse pressure plate rigidly mounted on said frame for transmitting the frame vibrations produced by the aforesaid means to the loose distributed material, said pressure plate having a forwardly inclined portion for downwardly pressing said material during the vibration of said material.

8. A road machine comprising a mobile frame to travel along a roadway, means on said frame for disintegrating the roadway and re-spreading the disintegrated material, said means being of such nature as to vigorously vibrate said frame, and a pressure plate rigidly mounted on said frame for transmitting the frame vibration produced by the aforesaid means to the loose distributed material and for downwardly pressing this material, said pressure plate having a forwardly inclined front portion and a horizontal rear portion at the lower edge of said inclined portion.

BENJAMIN H. FLYNN.