

May 17, 1932.

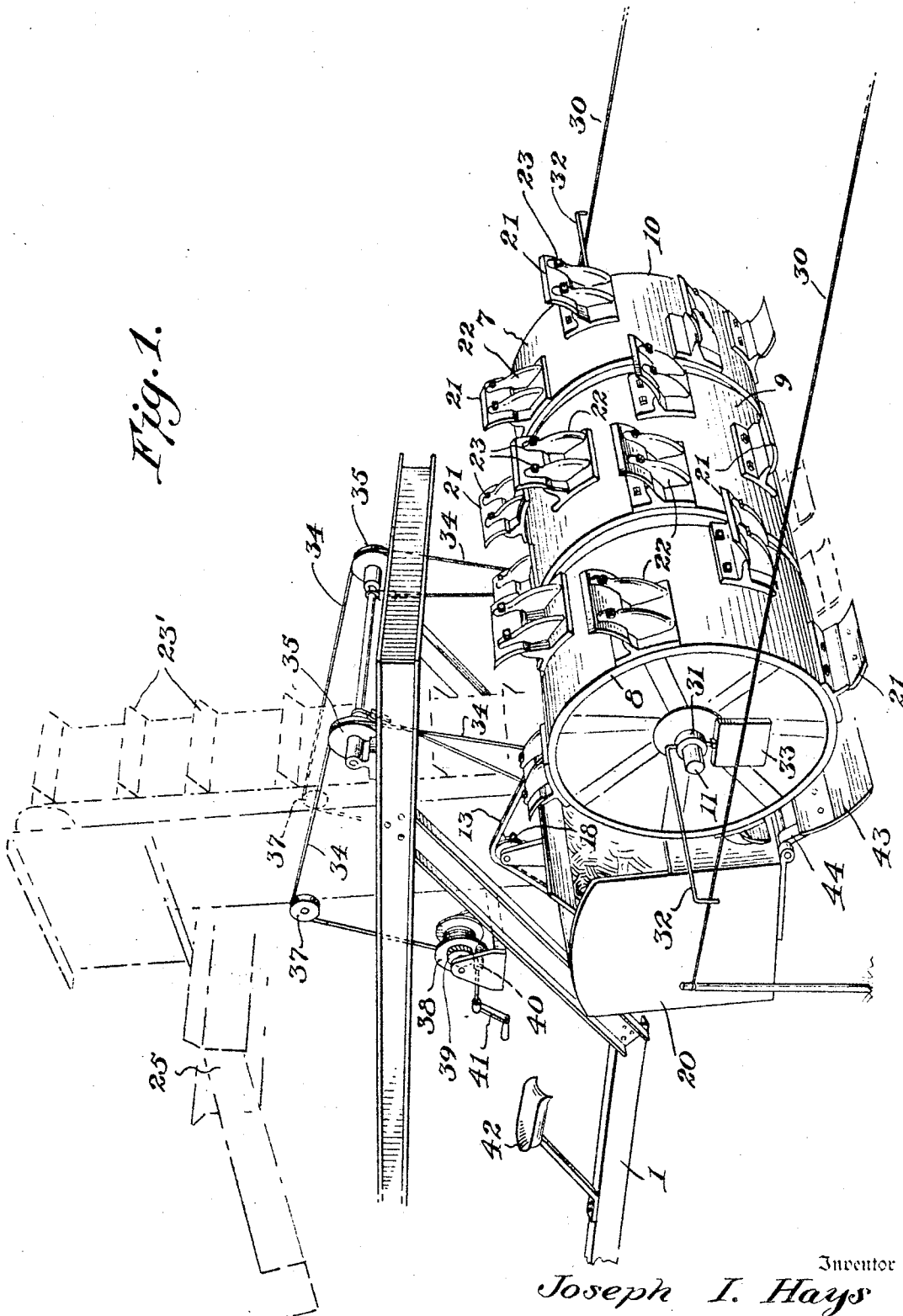
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CHANNELING MACHINE

Filed March 12, 1931

2 Sheets-Sheet 1



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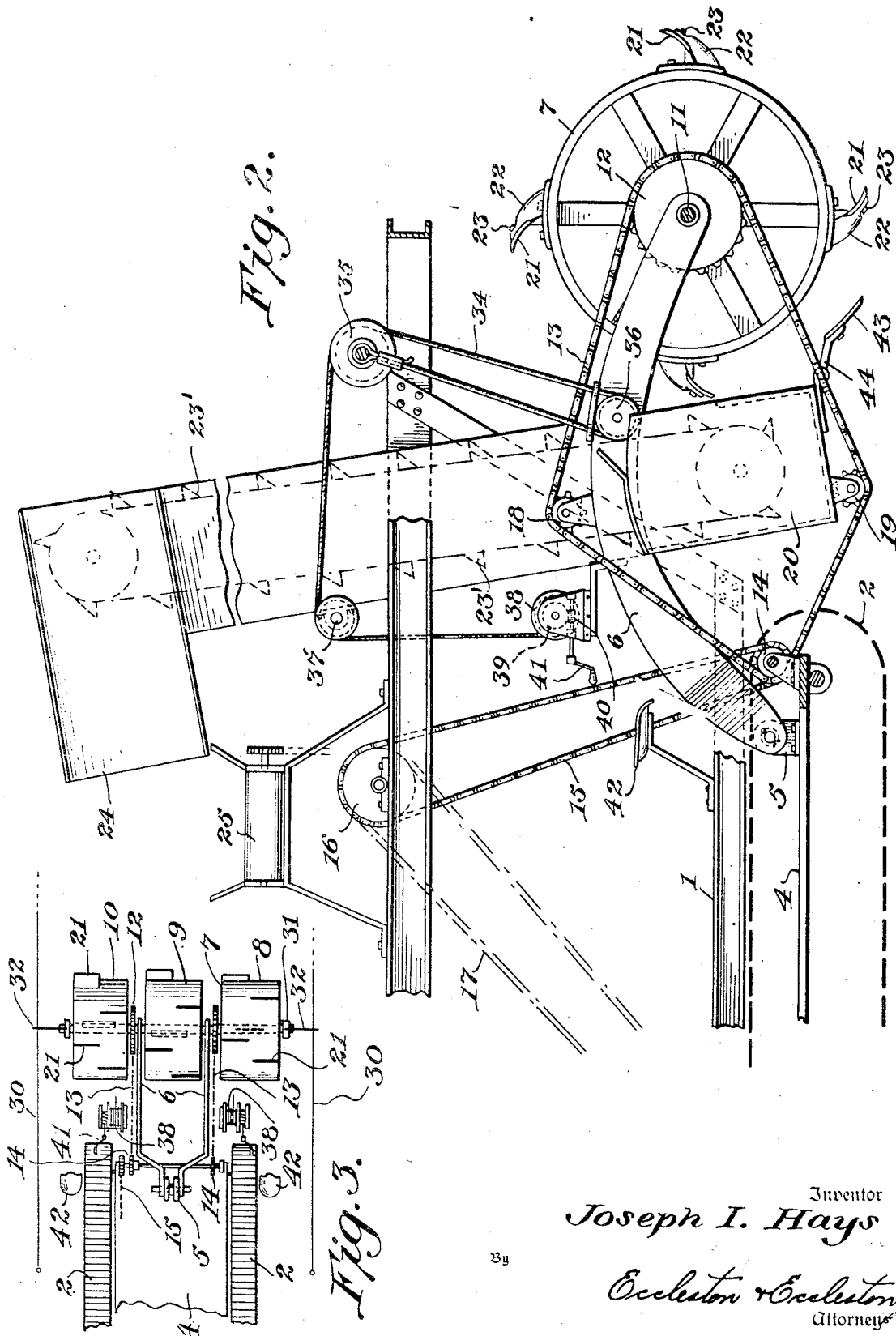
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UNITED STATES PATENT OFFICE

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CHANNELING MACHINE

Application filed March 12, 1931. Serial No. 522,085.

This invention relates to machines for use in preparing the subgrade of a road which is to receive a foundation or base on which concrete, asphalt, or other road surfacing material is laid.

In preparing the subgrade of a road heretofore it has been necessary to employ a number of shovels, mules, scrapers, wagons, trucks and other machines, as well as a large number of laborers. Hence, the preparation of the roadbed formed a major portion of the expense involved in building the road. Cutting machines have been built having the purpose of cutting down the roadbed to the proper level and carrying off the dirt, etc., to the side of the road. Such prior machines, however, have not proved satisfactory for the reason that they have not been sufficiently flexible to meet the varying conditions encountered in roadbed construction, and required that a considerable amount of time and labor be employed in supplementing the work of the machine before the subgrade was placed in condition to receive the foundation material, etc.

One of the objects of the present invention resides in the provision of a single machine having sufficiently flexible controls and adjustments to permit it in one operation to cut the roadbed down to the level determined by the road engineers, regardless of whether the roadbed to be prepared is to be horizontal or inclined, curved or straight.

Another object of the invention consists in the provision of guiding mechanism on the machine which will cooperate the strings and stakes positioned by the surveyors, so as to indicate the proper adjustments to be made to the machine as it travels along its course.

A further object of the invention resides in the provision of a cutter drum in combination with a receiver for the dirt, etc., the cutter traveling at a constant rate of speed such that the dirt will always be thrown into the receiver.

Other objects and advantages of the invention will be apparent from the following description when taken in connection with the accompanying drawings; in which

Figure 1 is a perspective view of the forward end of a channeling machine embodying the present improvements.

Figure 2 is a side elevational view of the construction of Figure 1, partly shown in section; and

Figure 3 is a fragmentary diagrammatic view of the apparatus.

Referring to the drawings in more detail the numeral 1 indicates a portion of the frame of the vehicle which is preferably of channel iron and mounted on caterpillars 2. These caterpillars may be driven from any suitable source of power as by sprocket chains.

Mounted on a base plate 4 at the front end of the machine are lugs 5 on which are pivotally mounted arms 6. These arms, which are spaced laterally of the machine and extend forwardly of the front end thereof, form spaced supports for a drum 7. This drum is preferably composed of three separate cylinders 8, 9 and 10 keyed to a shaft 11.

Also keyed to shaft 11 are two sprocket wheels 12 which mesh with chains 13 driven from sprocket wheels 14 mounted on the forward end of the base plate 4. The sprocket wheels 14 are driven by means of sprocket chains 15 which are in turn driven by sprocket wheels 16, the latter wheels receiving their power from a sprocket chain 17 having a connection with a source of power for driving the caterpillars.

The sprocket chains 13 for driving the drum 7 preferably have their upper and lower runs spaced apart a substantial distance and for this purpose idler gears 18 and 19 are provided; the former being mounted on the arms 6 and the latter on the bottom of a box or receiver 20. This receiver is secured to the arms 6 and is adapted to be raised and lowered as the latter are raised and lowered in the manner to be described.

Mounted on the drum 7 are a plurality of cutting teeth 21 which are provided with oppositely disposed cutting edges as indicated in Figure 2, and are therefore reversible to provide a new edge when one of the edges becomes worn. These blades 21 are mounted on brackets 22, as by means of bolts 23 which permit

ready removal of the blades for substitution or reversal. By inspection of Figures 1 and 3 it will be noted that the brackets 22 are spaced both circumferentially and longitudinally of the drum in regular order so that on any longitudinal line on the circumference of the drum there will be not more than one blade. By reason of this particular spacing of the blades it will be apparent that only one blade at a time will be brought into contact with the surface being operated upon, and hence the placing of an undue load on a drum is avoided.

Dirt, stone, or the like, excavated by the rotating drum 7 is carried part way around the drum and is then projected into the upper end of the open receiver 20. In this connection it is to be noted that if the drum rotates too fast the material carried by the teeth 21 will not be released, but will be continuously carried around as the drum rotates; and if the drum rotates too slowly the material instead of being projected into the open top of the receiver 20 will fall through the space between the drum and the receiver and be deposited on the road. It has been found that by rotating the drum at a constant speed of about forty-two revolutions per minute, the separate masses of earth carried by the teeth will each be projected thereby into the open upper end of the receiver when the tooth is approaching the receiver in its rearward movement.

The material deposited in the receiver 20 is being continuously removed therefrom by means of a conveyor 23' driven by any suitable power means. The conveyer raises the material and deposits it in a chute 24 from which it descends to a conveyor belt 25 which carries the material laterally of the machine where it may be deposited on the side of the road or in trucks, or the like, if the material is to be removed from the base of operation.

In the surveying and laying out of roads it is usual to drive stakes and attach a cord at the proper points in the length of the several stakes so as to indicate the depth to which the roadbed is to be cut down to provide the desired subgrade. In the use of this machine advantage is taken of these cords to furnish the necessary guiding means for the cutting machine. The cords are indicated in Figures 1 and 3 by numerals 30, and it will be noted that on each end of the shaft 11 of the drum 7 is a loosely mounted collar 31 to which is secured a resilient guide finger 32 adapted to extend axially of the drum and overhang the cords 30. The collar 31 is preferably provided with a weight 33 which serves to maintain the collar in a position shown in Figure 1 with the finger 32 in its uppermost position.

In order that the drum 7 may be bodily raised or lowered to provide the desired depth of cut as indicated by the guide cords 30, and

in order to raise one end of the drum and lower the other, or vice versa, as may be necessary to follow the course of the cords 30, as when providing a bank or the like on a curve, chains or ropes 34 are provided. The ropes 34 each have one end secured to the axle of guide pulleys 35 and extend downwardly and around pulleys 36 mounted on the arms 6, and are then passed upwardly around the pulleys 35 over guide pulleys 37 and extend downwardly to winding drums 38. These drums may be operated by any suitable means, but in the present embodiment of the invention worm wheels 39 are provided which are operated by worms 40 driven by hand crank 41.

As already stated, two of these control mechanisms are provided for the two arms 6, and it is highly desirable that two operators be stationed on the machine for operating these control mechanisms; seats 42 being provided for this purpose. When the operators are stationed at the desired positions they can readily observe the position of the guide finger 32 with respect to the cords 30, and by turning the cranks 41 in the proper direction will independently raise or lower the arms 6 and consequently raise or lower the respective ends of the drums 7 so as to cause the desired depth of cut as the machine travels along its course.

Supplemental cutting means are provided to assist the drum 7 and such means is indicated by the numeral 43. This means consists of a single blade which extends the entire width of the machine and is mounted on a fixed bracket 44 preferably secured to the underside of the receiver 20. It will be understood, of course, that this blade 43 is not an essential part of the invention, but is merely an auxiliary cutter adapted to smooth out any part of the subgrade which may be left in an uneven condition by the blades of the cutting drum.

In the operation of the device the cords 30 having been properly positioned to indicate the proper depth of the subgrade, the machine is started and the drum 7 caused to rotate at a constant speed of about forty-two revolutions per minute. Forward movement is then imparted to the mechanism by the caterpillars 2 and the operators, stationed at the positions 42, will constantly observe the position of the fingers 32 with respect to the cords 30 and operate the control mechanisms 41 so as to bodily raise or lower the drum or cant upwardly or downwardly the respective ends thereof, so as to provide a cut which will form the exact subgrade as laid out by the surveyors and indicated by the cords 30. In this connection it will be understood that in the event that the caterpillars should encounter a soft spot in the roadbed and thus allow the frame of the machine to lower, the operators will immediately in response to the movement of the fin-

ger 32, raise the drum by means of the mechanism 41 so as to prevent too deep a cut being made in the road surface. In this operation of the machine the blades 21 will pick up portions of the earth cut by their cutting edges and carry the same upwardly and rearwardly and deposit it in the receiver 20, from whence it is carried upwardly by the conveyor 23' and deposited on the laterally extending belt 25 to be transported to the side of the road, or to a truck as may be desired.

From the foregoing description taken in connection with the accompanying drawings, it will be apparent to those skilled in the art that I have provided a channeling machine especially designed for use in the cutting of subgrades, which is highly flexible in operation so as to perform at one operation the various steps heretofore performed by shovels, scrapers, wagons, trucks, etc.; that it may be readily manipulated so as to produce the desired subgrade both as to depth and elevation (as when forming a curve); that the teeth of the drum are so spaced as to prevent the application of an undue load on the apparatus; that the teeth are reversible so as to increase their length of usefulness, and readily detachable for the purpose of repair; and that the drum is rotated at a constant speed so as to deposit the cut material in the receiver at all times.

In accordance with the patent statutes I have described what I now believe to be the preferred embodiment of the invention, but inasmuch as various minor changes may be made in the details of the construction without departing from the spirit of the invention, it is intended that all such changes be included within the scope of the appended claims.

What I claim is:

1. A channeling machine for roadbeds including a rotatable cutting drum, independent means for supporting each end of the drum, means for independently raising or lowering either of said drum supporting means, and guiding means on each end of said drum.

2. A channeling machine for roadbeds including a rotatable cutting drum arranged horizontally, means for independently raising or lowering the opposite ends of said drum, a guide finger on each end of the drum, and guide cords disposed on opposite sides of the roadbed for cooperation with the guide fingers.

3. A channeling machine for roadbeds including a frame, a cutting drum mounted on the frame, means on the frame for rotating the drum, means for independently raising or lowering either end of the drum, and resilient guide fingers on each end of the drum.

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