A. CURRIE.

GRADING, SEPARATING, AND LOADING MACHINE.

APPLICATION FILED JAN. 4, 1917.

1,287,648.

Patented Dec. 17, 1918.

2 SHEETS—SHEET 1.

Fig. 1.

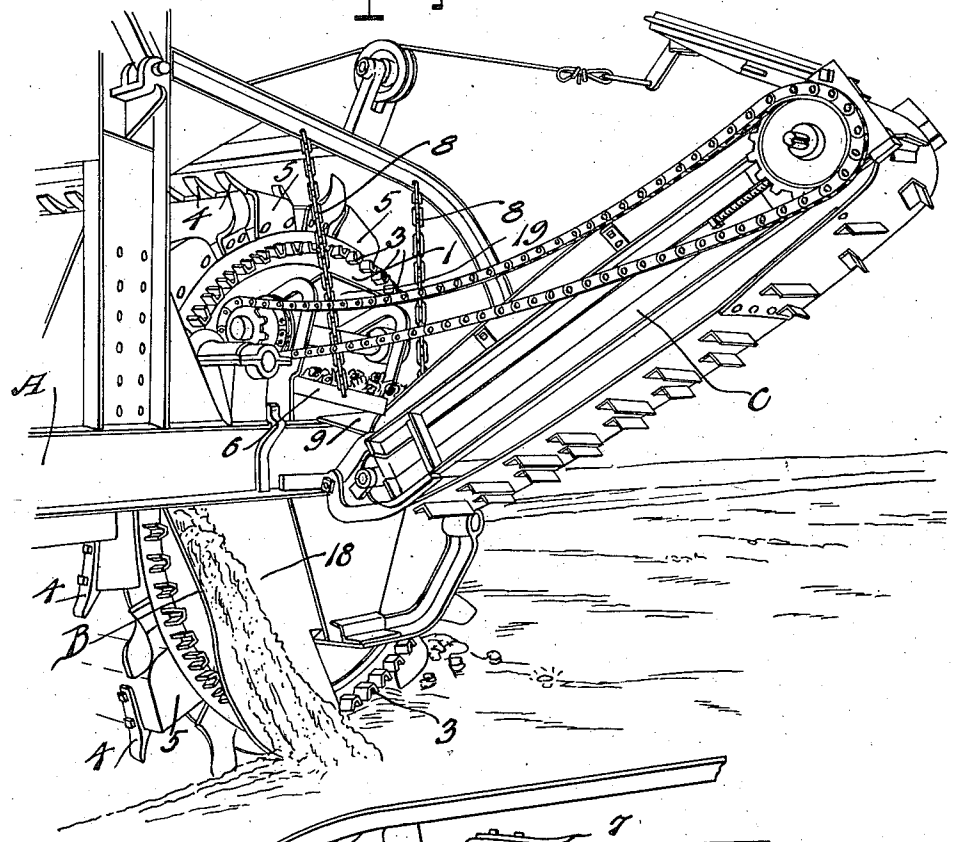
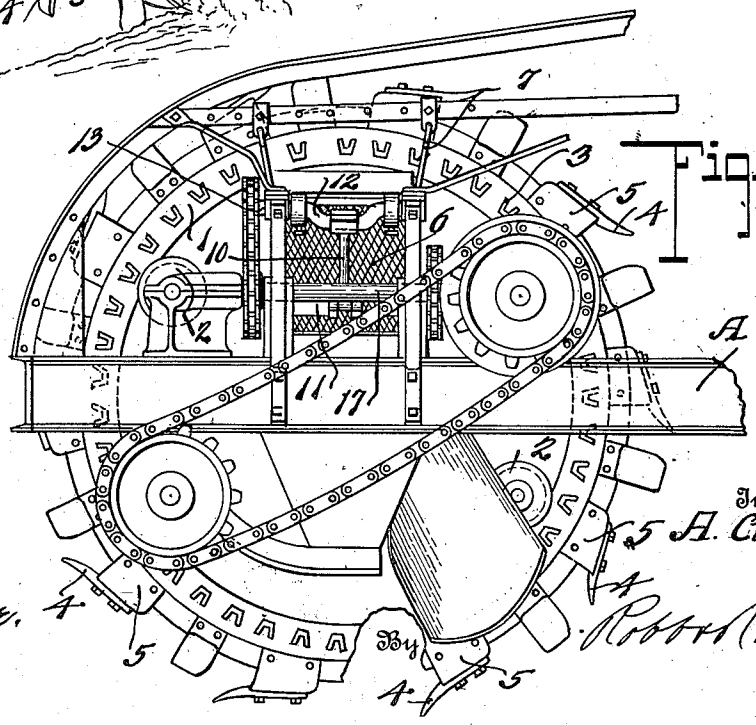


Fig. 2.



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2 SHEETS—SHEET 2.

Fig. 3.

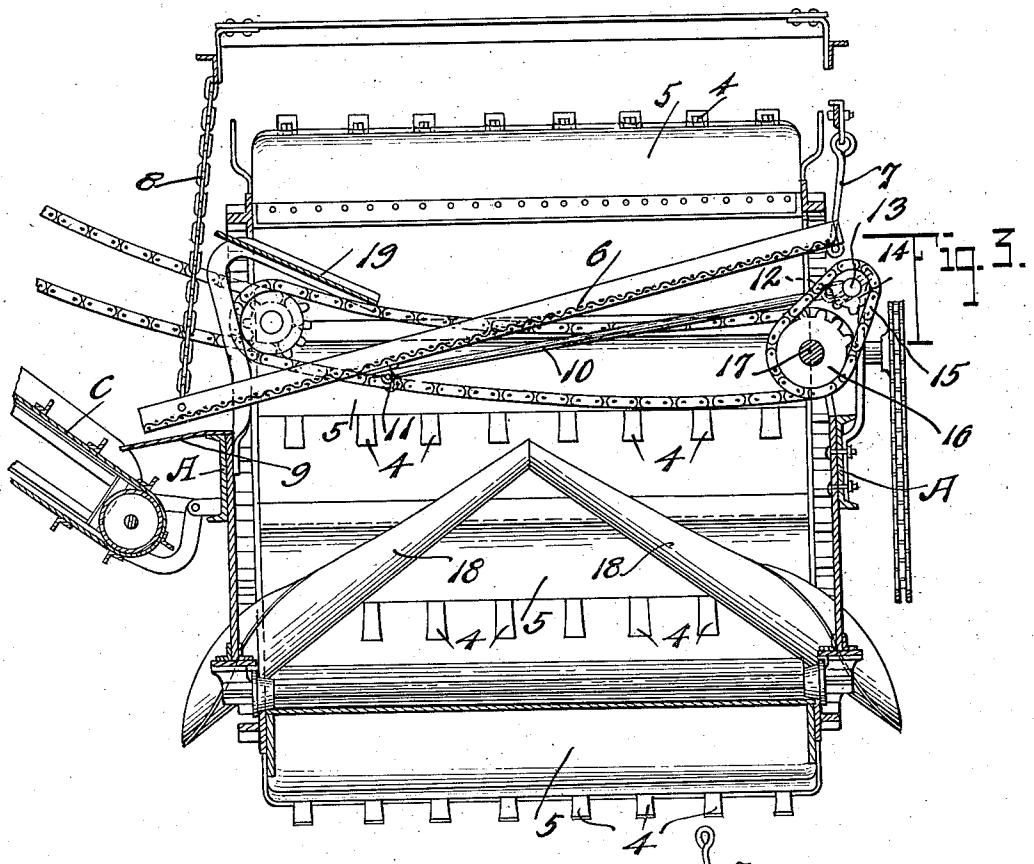
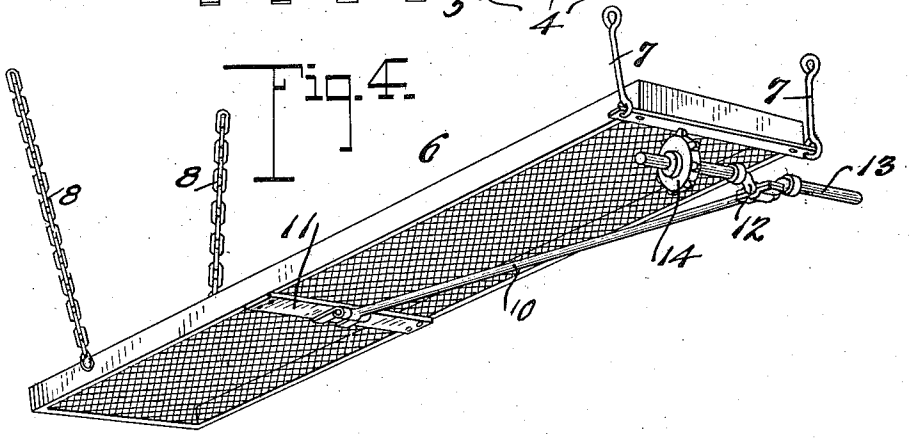


Fig. 4.



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UNITED STATES PATENT OFFICE.

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GRADING, SEPARATING, AND LOADING MACHINE.

1,287,648. Specification of Letters Patent. Patented Dec. 17, 1918.

Application filed January 4, 1917. Serial No. 140,585.

To all whom it may concern:

Be it known that I, ADAM CURRIE, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Grading, Separating, and Loading Machines, of which the following is a specification.

The present invention involves improvements in grading and loading machines of a type adapted particularly for the grading of streets as well as for highway grading. With a view to presenting most fully the objects of the invention it may be noted that a grader for which these improvements are especially designed comprises a rotary digger or excavator in the form of a drum equipped upon its periphery with digging teeth or points, together with adjacent cooperating buckets or shovels, the former adapted to dig or break up the surface operated upon while the buckets or shovels elevate the broken up portions of the surface until the latter is raised by the rotation of the digger until reaching about the highest point of movement of the buckets, at which point the materials broken up and elevated are adapted to drop by gravity onto suitable means such as a conveyer, the latter extending off from the machine at one or both sides and being constructed to carry the excavated materials to wagons, receptacles or other places of deposit at the side of the machine.

In the use of graders of the kind above mentioned the machine operates ordinarily under its own power, being equipped with powerful traction devices, and the action of excavation and loading is continuous as the machine progresses over the surface operated upon. Now it is found that where a street surface is being dug up as for the establishment of a new grade, or for resurfacing, where in practice the surface is comprised of aggregates such as gravel, small stone, asphalt, etc., it is advantageous in the operation of excavating and loading to effect a separation of the materials excavated whereby certain of these materials susceptible of being used again may be segregated from other of the materials while the traction grading machine is performing its grading and loading work.

In breaking up the surface of an asphalt paved street, for instance, many of the materials operated upon by the grader, especially broken stone, gravel and the like, are desirable for use in repaving or other work, and with this in mind certain novel separating and conveying devices are employed according to the present invention, the same receiving the broken up materials elevated by the rotary digger and shovel, screening said materials so as to separate therefrom the dirt and finer substances not required to be carried off from the site of the grading, and thus separating certain of the aggregates such as gravel, stone and broken asphalt in such a manner that the latter is conveyed or carried off from the grader and loaded into vehicles for transportation and in a condition in which they may be readily put to second use.

In the carrying out of the improvements of this invention it is contemplated to employ separating means in the form of a vibratory screen disposed within the drum-like framework of the rotary digger, means for actuating the screen continuously during the operation of the digger and the forward or advancing movement of the grading machine, suitable conveying means associated with the screen to receive the larger materials excavated, together with a special arrangement of chutes or deflecting members on which the smaller materials such as dirt, sand and other finer substances not required to be removed from the surface being graded may be conducted from the machine at opposite sides thereof and deposited upon the surface being graded, at the sides of the machine or where it will not interfere with the progress of the grader when in operation.

The details of the invention will be clearly comprehended upon reference to the construction illustrated in the accompanying drawings, in which—

Figure 1 is a perspective view showing the rear end of a traction grader and loader

equipped with the means comprising the invention;

Fig. 2 is a side elevation showing more particularly the excavating wheel or rotary digger, the driving means for the vibratory screen mounted therein, and the arrangement of the chutes or deflectors extending from the interior of the digger, one of which is provided at each side of the machine;

Fig. 3 is a cross sectional view of the excavating wheel bringing out more fully the arrangement of parts forming the invention in connection with the customary parts of the grader construction;

Fig. 4 is a detail perspective view showing more particularly the separating screen and the suspending and actuating devices therefor.

Describing the traction grader illustrated in the drawings, or as much thereof as is illustrated, in a general way, A denotes the framework of the machine including horizontal beams upon which the rotary digger B is mounted. The digger itself embodies a circular frame 1 supported by rollers 2, a number of which are mounted on brackets or similar members carried by the beams of the frame A. The manner of supporting the digger B is immaterial to the invention and it suffices to say that the digger is equipped with teeth 3 adapted to be engaged by suitable gears operated by the powerful driving means of the machine so as to rotate the digger in such a manner as to cause the teeth 4 of the latter to break up the surface operated upon, the buckets 5 adjacent to the teeth and actually carrying the same, elevating the broken up portions of the surface in a manner previously described herein.

There is arranged transversely of the machine and practically passing through the drum-like frame structure of the digger B, an inclined screen 6. The screen 6 is suspended from a pair of links 7 connected with one end of the screen and suspended from and loosely supported themselves by the framework of the machine, as seen best in Figs. 2 and 3. At its other end, which is lower than that carried by the links 7, the screen 6 is supported by the flexible members 8 preferably consisting of chains. The lowermost end of the screen 6 extends over a shelf 9 carried by the frame A of the machine at the delivery side of the machine and the materials rest upon the screen 6 and when sifted therethrough as an incident to the operation of the screen are adapted to pass by gravity to the endless conveyer C which extends from the last mentioned end of the screen. The conveyer C is of any suitable and conventional type, inclines upwardly to a sufficient extent to permit a wagon or vehicle to pass beneath the same, and operates in a well known manner to deliver the materials received thereon into such vehicle, or other receptacle, as may be desired.

For the purpose of operating the screen 6 a pitman rod 10 is employed, the same being connected with a cross piece 11 carried by the frame of the screen 6. The pitman rod 10 is also attached to the crank 12 of a crank shaft 13 located near the upper end of the screen and adjacent to one end of the digger B. The crank shaft 13 is constantly driven by a sprocket wheel 14 thereon, about which passes a sprocket chain 15, the latter connecting with a sprocket 16 on a shaft 17. The shaft 17 constitutes one of the driving members of the machine, said shaft being in turn constantly driven owing to its connection, directly or indirectly, with the main driving instrumentalities of the grader. In view of the fact that the particular connections supplied for driving the parts just mentioned are not material to the invention, they will not be further detailed.

Located beneath the screen 6 and extending preferably from a central point between the ends of the rotary digger B, are the downwardly arranged chutes or conductors 18. These conductors may be of any suitable shape or size, have an opposite inclination, and are so disposed that their outer ends project slightly beyond the ends of the digger B so that as materials sifted through the screen 6 drop upon the chutes 18 they will be conducted by gravitative movement down the chutes to suitable points of deposit at opposite sides of the machine and preferably not in the path of movement of traction driving members customarily arranged at the rear of the excavating means B. Preferably the area of the chutes 18 will be larger at their upper ends than at their lower, in order that the effectiveness of these members to receive the sifted materials passing through the screen 6 may be subserved.

Situated above the screen 6 adjacent to its delivery end, but located substantially within the digger B, is a retarding return plate or member 19. The member 19 inclines upwardly from the screen toward the uppermost portion of the excavator B and is so located as to tend to retard the passage of materials dropped upon the screen 6 by buckets 5 sufficiently to insure that the screen will operate long enough upon these materials to perform the effective separation desired. Should a somewhat excessive deposit of the excavated materials be received by the screen 6, therefore, the member 9 is so arranged that a portion of the materials may ride up said member and thereafter gravitate back upon the screen as soon as the load on the latter is relieved somewhat by the separating action of the

same and the passage off of a portion of the materials to the loading conveyer C. The tendency toward choking of materials at the lower end of the screen is thus obviated.

It will be observed that the means B comprises virtually an excavator so constructed as to form a drum-like frame providing a drum-like chamber inclosed by the excavator and into which chamber the materials excavated and elevated by the excavator may drop so as to be received upon the screen 6, located within the excavator chamber. Furthermore the parts 18 and 19 and the main operating parts of the screen are practically disposed within the excavator chamber, the whole affording a very desirable construction of combined excavating and separating instrumentalities. Except in so far as the provision of the chamber above mentioned is concerned, it will be noted that the excavating and digging means might be of any suitable detailed construction, the present invention not having particularly to do with this portion of the grading machine.

It will be observed from the foregoing that a simple and practical separating means of the type set forth may be operated from the driving mechanism of the traction grader and loader as an incident to the usual operation of the latter, and that an effective separation of small stone or certain of the materials excavated, from other of the materials, may be performed by the use of the invention during the actual operation of excavating, therefore eliminating the requirement that later on the separation be effected independently of the action of the grader. On account of the desirability of using again certain of the materials excavated, a saving of time and expense is therefore afforded by the use of the invention, for obvious reasons, and in the employment of grading machines the factor of minimum cost of operation of the machine with maximum efficiency of the machine to perform the required work is a factor of great importance.

Having thus described the invention, what is claimed as new is:—

1. In a machine for grading streets, roads and the like, the combination with a supporting frame and suitable power driven means for advancing said frame over a surface, of a rotary excavating device mounted on said frame, means for operating said device, a screen mounted within the excavating device and arranged so that material excavated and elevated by said device may be dropped onto said screen, a chute arranged beneath the screen and extended laterally to a side of the machine and adapted to receive siftings passing through the screen and to convey said siftings to a point of discharge beside the machine, and a conveyer supported on said frame and extending laterally from the machine so as to carry large materials passing from the screen off to one side of the machine for discharge into a wagon or the like, the conveyer and the screen being relatively arranged so that said larger materials failing to pass through the screen are discharged onto the conveyer.

2. A machine substantially as claimed in claim 1, wherein the screen is loosely mounted for vibration within the excavating device, combined with means to vibrate the screen back and forth, and a chute similar to the chute set forth in said claim but extending to the opposite side of the machine to discharge sifted materials in an opposite direction and to the side of the machine opposite that at which the first chute discharges.

3. In combination, an excavator comprising a drum-like structure forming an interior drum-like chamber, a supporting frame for said excavator, means for operating the excavator, a separating device disposed within the excavator and adapted to receive materials deposited thereon as an incident to the operation of the excavator, conducting means located beneath said screen and substantially inclosed within the chamber of the excavator to conduct screened materials from the excavator to a point at a side of the latter, members carried by the framework supporting the excavator and connected with opposite ends of the screen whereby to loosely support the latter, and means for causing a vibratory movement of the screen within the chamber of the excavator.

4. In combination, an excavator comprising a drum-like structure forming an interior drum-like chamber, a supporting frame for said excavator, means for operating the excavator, a separating device disposed within the excavator and adapted to receive materials deposited thereon as an incident to the operation of the excavator, conducting means located beneath said screen and substantially inclosed within the chamber of the excavator to conduct screened materials from the excavator to a point at a side of the latter, members carried by the framework supporting the excavator and connected with opposite ends of the screen whereby to loosely support the latter, means for causing a vibratory movement of the screen within the chamber of the excavator, and a retarding member disposed within the said excavator chamber adjacent to the end of the screen and adapted to receive and convey materials dropped thereon to the screen, said screen being inclined downwardly toward the said retarding member, and arranged below and spaced therefrom.

5. In combination, a machine as described including a drum-like chamber and elevat-

ing means to carry materials upward and drop the same in the said chamber, an inclined screen disposed within the chamber to receive the dropped materials thereon, and a member above said screen and inclined in a direction opposite said screen, said member being in the line of drop of a portion of the materials elevated, and arranged to direct such of the materials as are received thereby to the screen as the bulk of materials on the latter reduces incident to the screening action.

In testimony whereof I affix my signature.

ADAM CURRIE.