Sept. 17, 1957 H. A. WIND 2,806,304

EARTH MOVING MACHINE

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FIG. 1.

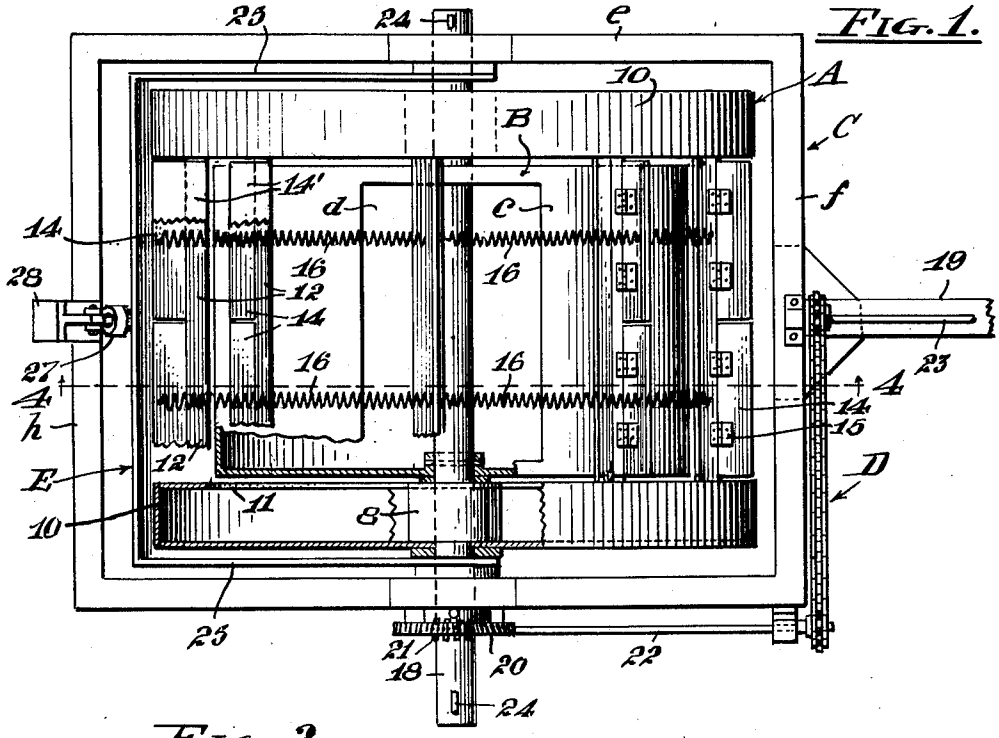
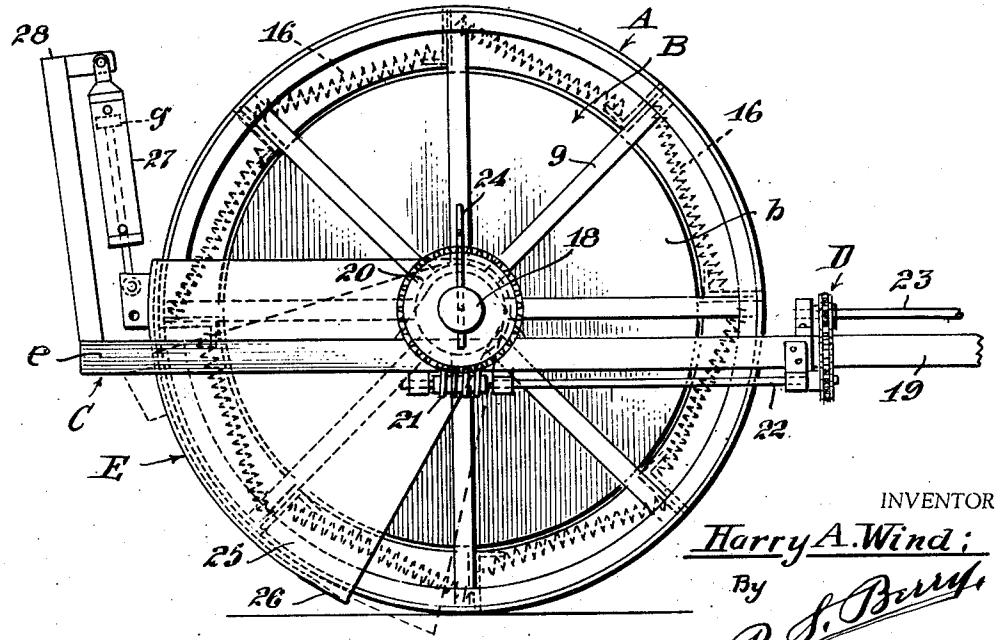


FIG. 2.



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FIG. 3.

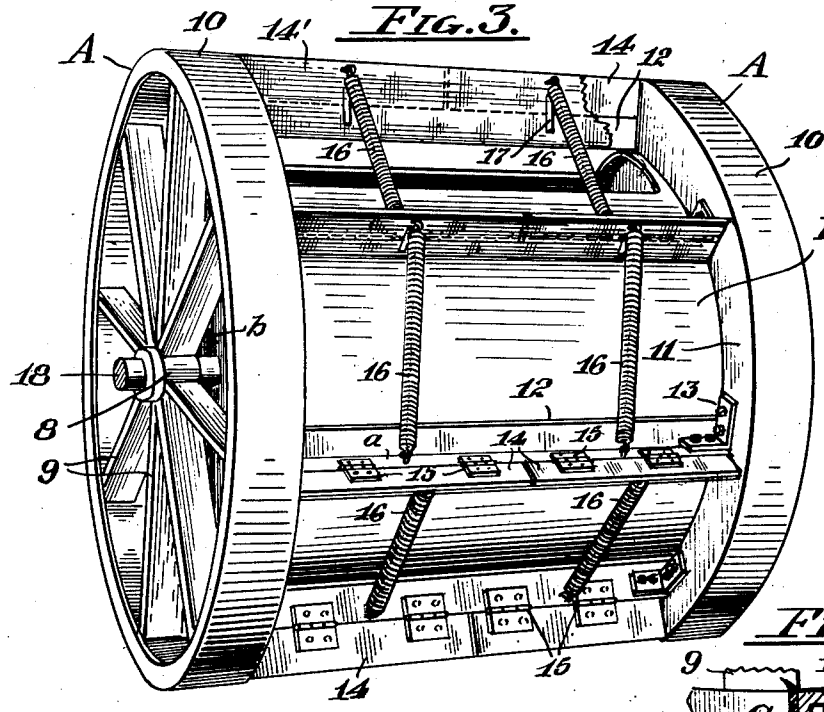


FIG. 5.

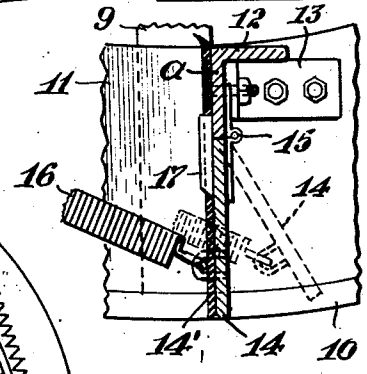


FIG. 4.

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EARTH MOVING MACHINE

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Application November 18, 1955, Serial No. 547,775

2 Claims. (Cl. 37—9)

This invention relates to earth moving machinery and particularly pertains to improvements in a combined earth scraping and transporting machine of the type set forth in United States Letters Patent No. 2,138,820 in which a turnable cylindrical hopper is horizontally mounted between a pair of opposed transport wheels carrying a series of parallel earth elevating blades arranged to circumferentially traverse the hopper on rotation of the wheels and adapted to lift material collected by a scraper carried on the machine and thereby deliver the materials into the hopper through an opening in the latter. The hopper is designed to serve as a receptacle by which the materials may be conveyed and is adapted to be turned on its axis to an inverted position to thereby effect discharge of materials therefrom.

A particular object of the present invention is to increase the efficiency of the machine by forming the elevating blades with hinged spring pulled edge sections which will yield and swing upwardly when in operation in event striking an unyielding protrusion such as a stone, hard clod, pieces of metal, wood, etc. so as to pass over the protrusion, thereby obviating lifting of the machine, as is ordinarily occasioned when riding over such protrusions which movement momentarily lifts the scraper and interferes with its action and will also yield in event obstructions are interposed between the edge sections and the scraper so as to prevent jamming and consequent damage to the machine.

Another object is to provide a machine of the above character in which the turnable hopper may be rotated on its axis and brought to rest in any desired position and whereby the discharge of materials therefrom may be regulated and either quick dumping or slow feeding effected.

With the foregoing objects in view together with such other objects and advantages as may subsequently appear, the invention resides in the parts and in the combination, construction and arrangement of parts hereinafter described and claimed and as illustrated by way of example in the accompanying drawings in which:

Fig. 1 is a plan view of the machine, with portions broken away and parts shown in section:

Fig. 2 is a view of the machine as seen in side elevation:

Fig. 3 is a perspective view of the conveyor and hopper portion of the machine with the draft frame and scraper portions removed:

Fig. 4 is a view in cross section taken on the line 4—4 of Fig. 1 with parts removed:

Fig. 5 is an enlarged detail in section and elevation of the conveyor blade and its mounting.

Referring to the drawings more specifically A—A indicates a pair of transport wheels each of which embodies a hub **8**, spokes **9** leading radially from the hub, a cylindrical tread rim **10** carried by the spokes **9**, and an annular flat wall **11** leading inwardly from and affixed to the inner margin of the rim **10**.

The wheels A—A are suitably spaced apart and are

rigidly connected together in axial relation to each other by a series of spaced parallel angle bars **12** affixed at their ends to the walls **11** by angle brackets **13** bolted to the walls **11** and bars **12**.

One of the webs *a* of the bars **12** transversely extends radially of the wheels and has its outer margin spaced inwardly from the outer periphery of the wheel rims **10**, and mounted on said webs *a* are flat rectangular leaves **14** which are attached to the webs *a* by hinges **15** with inner longitudinal edges of the leaves normally abutting the adjacent edges of the webs *a* and with the leaves extending in alignment with the contiguous webs *a*. The leaves have a width substantially corresponding to the space between the webs *a* and the periphery of the wheel rims so that their outer edges align with such peripheries or nearly so. Any suitable number of the leaves **14** may be mounted on a bar **12** arranged with their adjacent ends nearly abutting, two of such leaves being here shown as carried on each bar, with the outer ends of the leaves extending close to the walls **11**. Attached to each leaf **14** is one end of a coiled pull spring **16**, the other end of which is connected to the adjacent bar **12**, the spring being arranged to normally maintain the leaf in alignment with the web *a* of the bar **12** to which it is attached. A stop **17** affixed to the leaf projects from the inner margin of the leaf so as to abut the web *a* when the leaf is aligned and co-planar therewith so as to limit movement of the leaf under the pull of the spring **16**.

The leaves **14** and the webs *a* of the bars **12** constitute collectively elevator blades for elevating earth scooped thereby as the wheels A—A revolve as will presently be described. The blades thus formed are covered throughout on their working sides with rubber facings **14'** the inner margins of which protrude from the inner margins of the bars **12**.

The wheels A—A are revolubly mounted on an axle **18** which extends axially through the hubs **8** and axially through a cylindrical hopper B fixedly mounted on the axle **18** which hopper B embodies parallel flat end walls *b—b* disposed close to the wheels A—A and a cylindrical shell *c* extending close to the inner peripheries of the annular walls **11** and the surface of which lies close to but spaced from the angle bars **12**.

The shell *c* is formed with an opening *d* extending longitudinally thereof substantially throughout its length. The end portions of the axle **18** project beyond the wheels A—A and are journalled on the side rails *e—e* of a rectangular frame C which encompasses the wheel and hopper assemblage and has a front rail *f* from which leads a tongue **19** by means of which the assemblage may be towed as by a tractor.

As a means for rotating the hopper B so as to dispose the opening *d* in various positions around the axis of the hopper, the axle **18** is fitted with a worm wheel **20** which is engaged by a worm **21** on a shaft **22** which may be driven in any conventional manner but being here shown as connected by a sprocket chain and gear assembly D to a drive shaft **23** leading from any suitable source of power.

As a means for enabling an operator to determine the position of the opening *d*, the ends of the axle **18** are fitted with fixed radially extending pointers **24** projecting on a plane leading through the longitudinal center of the opening *d*.

The machine embodies an arcuate scoop E overlying the lower rear portions of the wheel rims in spaced relation thereto and having end parallel portions **25** which are pivotally supported on the axle **18** adjacent the outer sides of the wheels A—A whereby the scoop may be swung up or down. The lower margin of the scoop E is formed with a scraper blade **26** which is designed to be placed in scraping engagement with the ground or to be

elevated clear of the ground by lowering or raising the scoop E.

Positioning of the scoop E is here shown as effected hydraulically by means of a fluid pressure operated piston *g* in a cylinder **27** pivotally suspended from a standard **28** erected on the rear rail *h* of the frame C, the piston being actuated by hydraulic pressure in a usual manner through the medium of conventional controls (not shown) on a towing vehicle. The scoop E is maintained in its elevated position when the machine is not in operation and while the machine is being towed to haul the hopper without effecting its loading operation.

In the operation of the invention the tongue is attached to a hauling vehicle in a usual manner whereby the machine may be pulled with the wheels A—A rolling on the ground. When it is desired to effect loading of the hopper B the scoop E is lowered to bring the scraper **26** thereof into engagement with the surface of the ground such as to scrape the ground and cause the scraped materials to accumulate in the advancing scoop. The wheels A—A in revolving cause the conveyor blades carried thereon to engage and elevate the materials accumulated by the scraper, the materials being advanced upwardly within the scoop and around the periphery of the hopper B and directed into the hopper through the opening *d* assuming the hopper to then be positioned with the opening *d* uppermost. In this fashion a desired quantity of the scraped materials may be accumulated in the hopper.

If it is desired to transport the materials in the hopper, the scoop E is elevated as before described to clear the scraper **26** from the ground and the machine hauled to the point of discharge. The hopper is then rotated by means of the gears **20—21** as before stated so as to present the opening *d* downwardly, so that the contents of the hopper will pass therethrough. When rapid discharge of the materials is desired, the hopper is turned to dispose the opening *d* lowermost, but if a gradual or slow or even partial discharge of the hopper content is desired, the hopper is turned slowly to gradually lower the opening *d* and thereby gradually feed the materials through the opening *d*. When only a portion of the contents of the hopper are to be discharged at one place, rotation of the hopper is terminated while the machine is advanced to another place of discharge where the hopper is again turned to effect desired delivery of its contents.

This varied operation of the hopper is accomplished by controlling the operation of the shaft **28** by conventional power controls, not shown.

After discharge of the desired amount of the materials from the hopper it is restored to its normal position either by continuing or reversing its rotation. By observing the indicator **24** the operator can determine the position of the opening *d* from the towing vehicle.

The machine herein set forth is particularly adapted for use in working and hauling bedded earth, sand, gravel, and other granular materials, it being especially applicable for use in scraping and conveying gypsum in natural beds thereof.

It may also be employed in screening materials delivered to the hopper which is accomplished by covering the opening *d* with a demountable screen in any suitable manner, after loading the hopper and whereby the machine is adapted to scraping, hauling and screening beach sands.

In event the machine when traversing the ground encounters upstanding obstructions, such as hard clods, stones, and pieces of wood, metal, etc., which are disposed so that the outer edges of the conveyor blades be imposed thereon the blade leaf **14** striking the obstruction will swing upwardly as indicated in dotted lines in Fig. 3 thereby permitting the blade to ride over the obstruction without jambing the scraper or without momentarily lifting the machine and interfering with the action of the scraper. The efficiency of the machine is thus greatly increased over similar machines having rigid blades.

As before stated, on the displaced leaf passing over the obstruction, the spring **16** attached thereto will restore the leaf to its normal position.

I claim:

1. In an earth moving machine having a pair of parallel spaced apart transport wheels revolubly mounted on an axle with a cylindrical hopper axially carried on and affixed to said axle, and embodying a scoop carried on said axle and overlying said wheels and hopper and fitted with a ground scraper on an edge thereof adapted to accumulate earth in said scoop on advance of the machine; the improvement consisting in a series of parallel elevator blades carried by said wheels extending longitudinally of said hopper, said blades each consisting of an angle bar fixed at its ends to said wheels and arranged with an inner portion thereof in proximity to the cylindrical wall of said hopper and having an outer marginal portion spaced inwardly relative to the peripheries of said transport wheels, leaves hinged on the outer margins of said bars and extending longitudinally thereof, springs normally holding said leaves in radial relation to said cylindrical hopper, and means limiting movement of said leaves under the urge of said springs, said leaves being mounted to swing in opposition to said springs on obstructions being imposed rearwardly thereagainst.

2. The structure called for in claim 1 together with a rubber facing on each of said blades overlying the front faces of said elevator blades throughout, and having inner margins contacting the cylindrical wall of said hopper.

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