Sept. 25, 1928. 1,685,139

E. A. RICH, JR

SAND CUTTING, SCREENING, AND PILING MACHINE

Filed Aug. 29, 1923 4 Sheets-Sheet 1

Fig. 2.

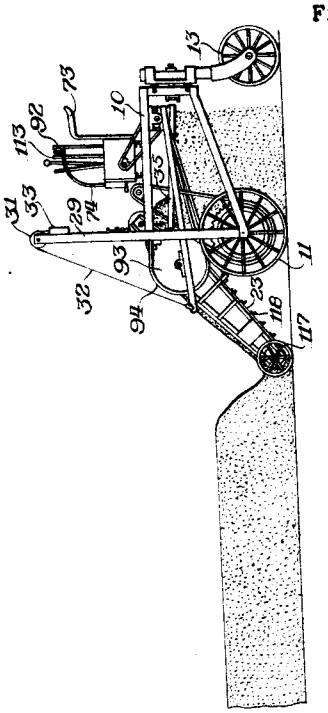


Fig. 3.

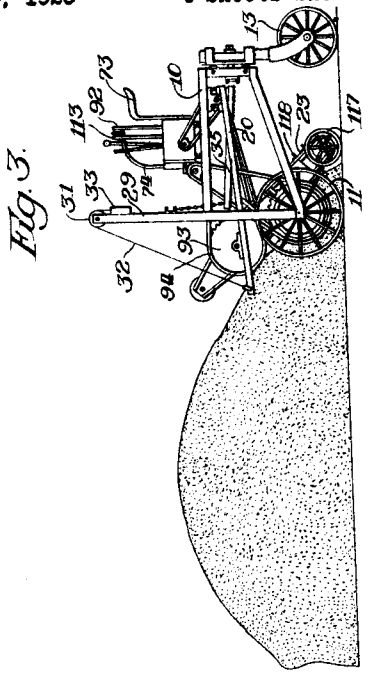


Fig. 1.

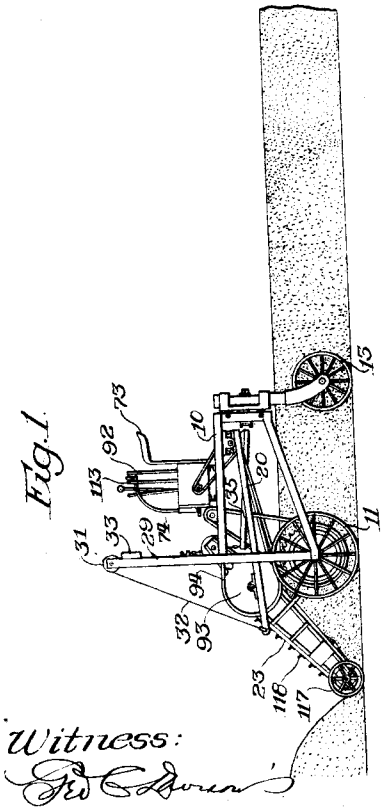
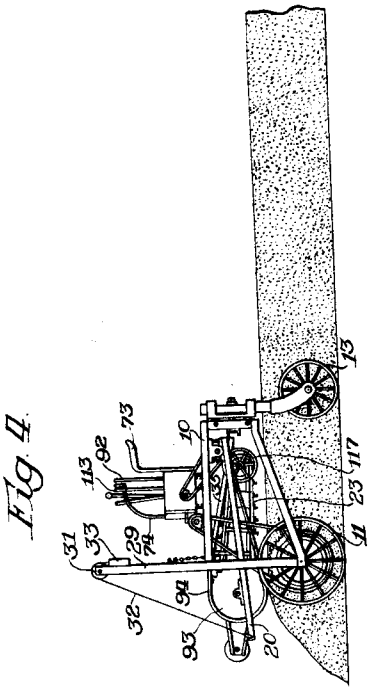


Fig. 4.



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SAND CUTTING, SCREENING, AND PILING MACHINE

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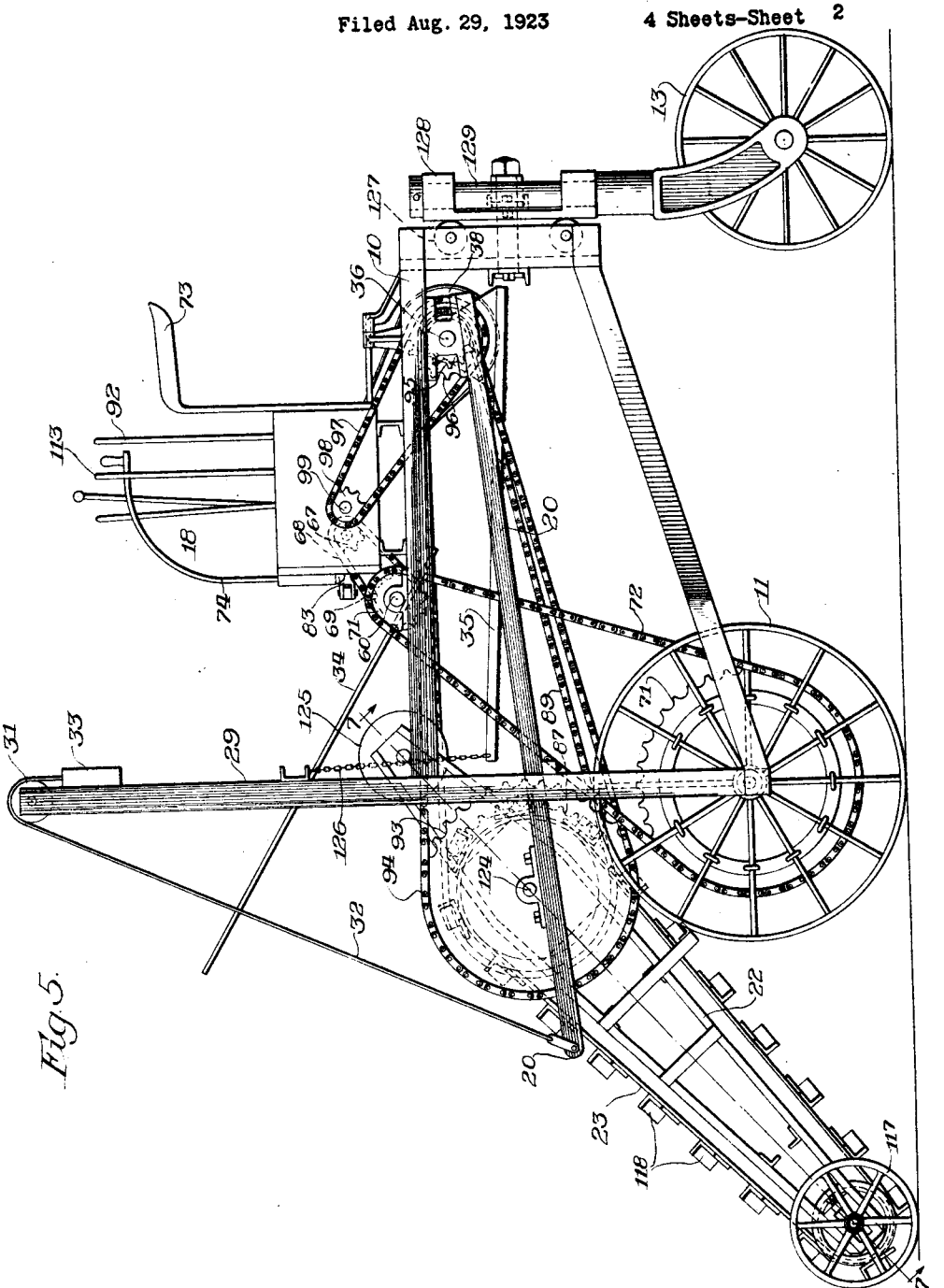


Fig 5.

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SAND CUTTING, SCREENING, AND PILING MACHINE

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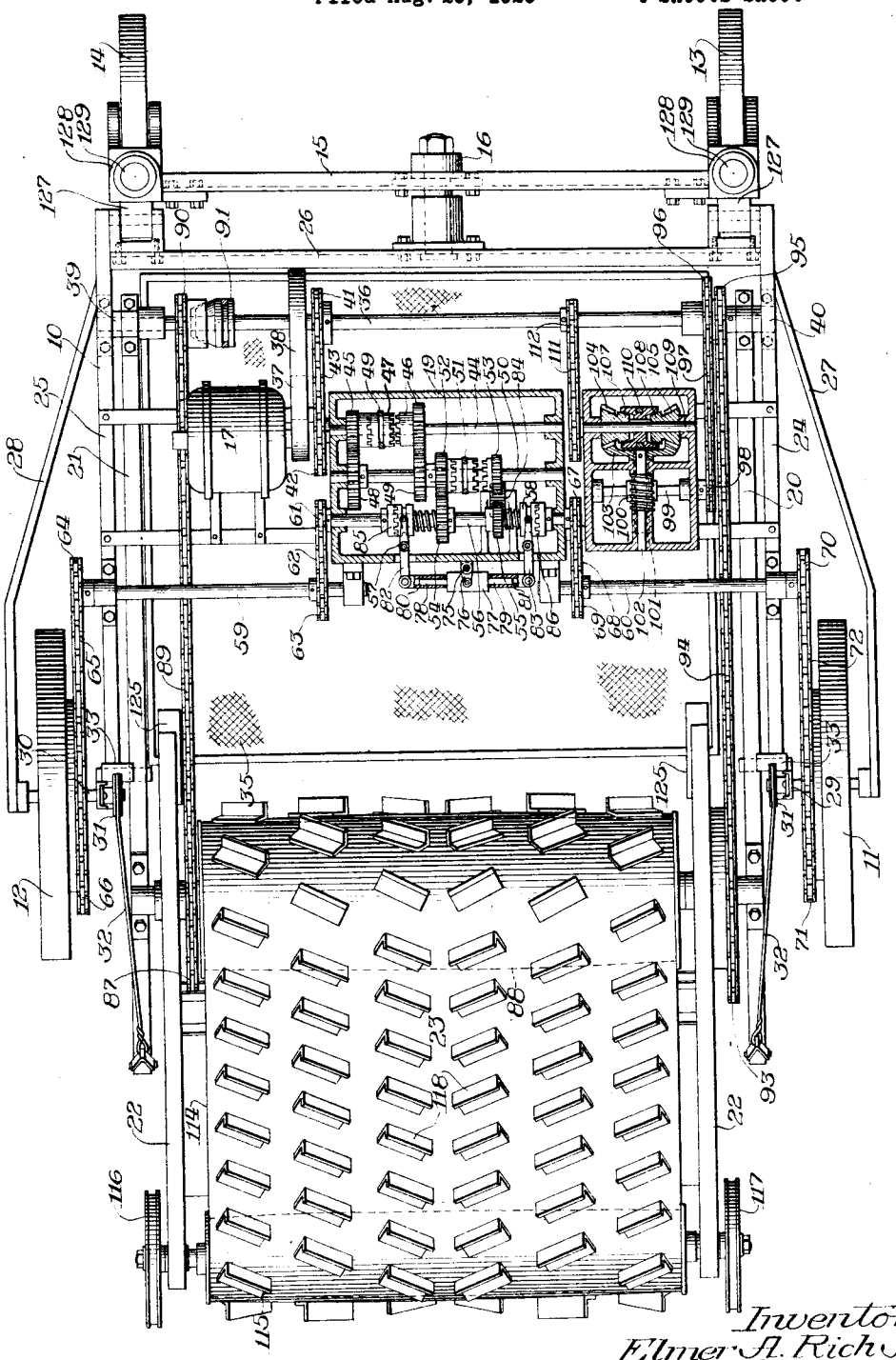


Fig. 6

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Sept. 25, 1928. 1,685,139

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SAND CUTTING, SCREENING, AND PILING MACHINE

Filed Aug. 29, 1923 4 Sheets-Sheet 4

Fig. 7

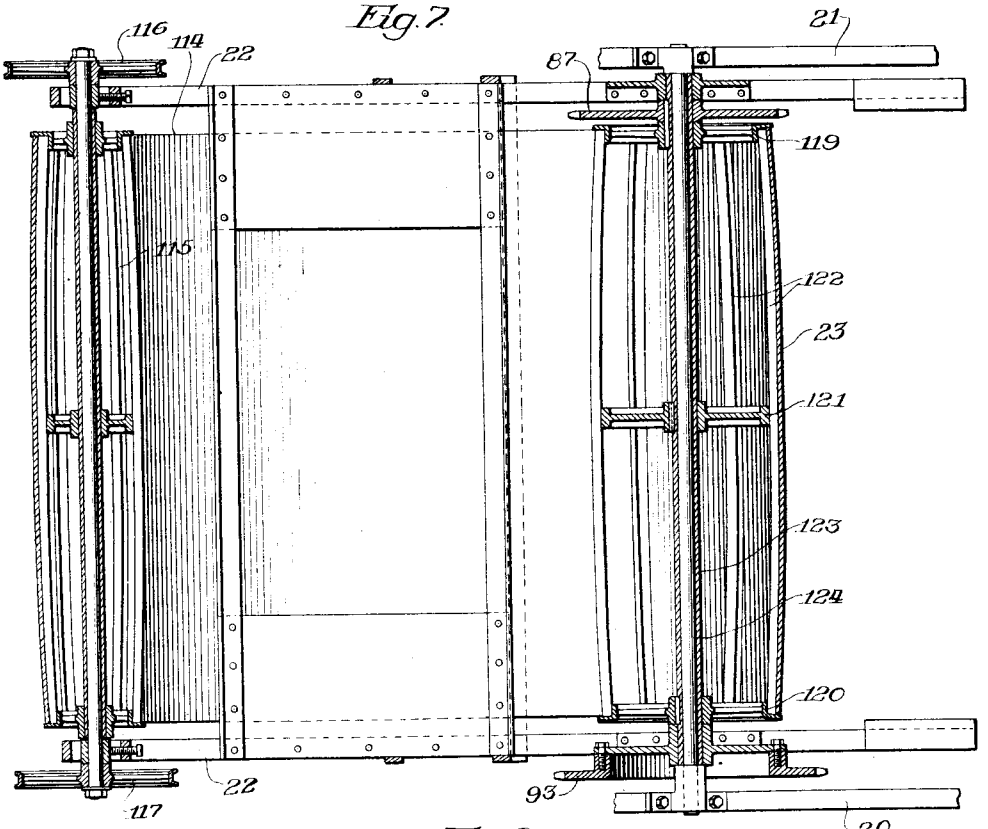
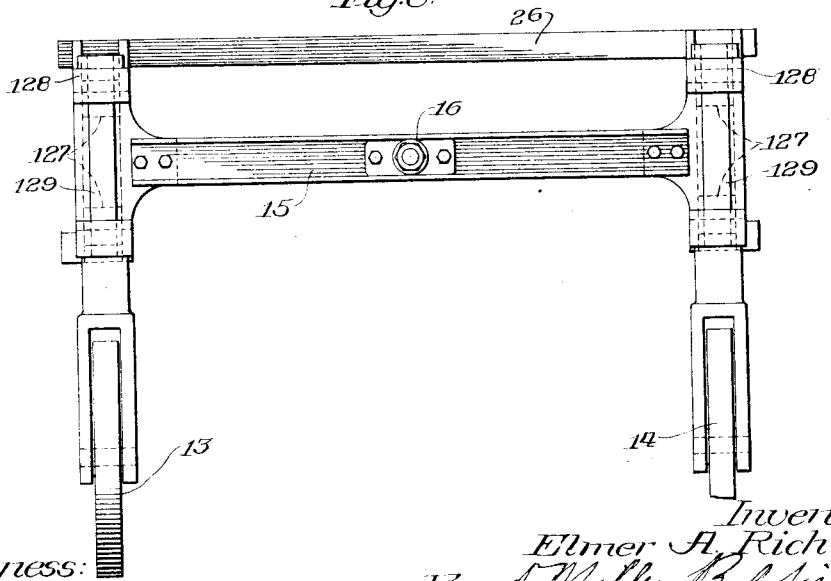


Fig. 8.



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Patented Sept. 25, 1928. 1,685,139

UNITED STATES PATENT OFFICE.

ELMER A. RICH, JR., OF CHICAGO, ILLINOIS, ASSIGNOR TO THE AMERICAN FOUNDRY EQUIPMENT COMPANY, OF NEW YORK, N. Y., A CORPORATION OF OHIO.

SAND CUTTING, SCREENING, AND PILING MACHINE.

Application filed August 29, 1923. Serial No. 659,896.

My invention relates to machines for preparing sand for use in foundries and other industries in which this or similar material is used.

The invention has among its various objects the provision of a machine of this character which is capable of cutting, screening and piling the sand.

It is another object of the invention to construct a machine having the above characteristics which is capable of engaging a pile of sand to cut it and which is operable in either a forward or backward direction, and in addition may be steered in any desired direction while in operation and thereby cause the sand to be distributed and the machine arranged at any desired location.

It is a further object to provide a machine of the above character with a means which will perform the several functions of cutting the material, conveying it from the pile of material being prepared, screening it, and in addition pile the material, should this be found necessary or desirable.

It is also an object of the invention to construct said last mentioned means so that it may be adjusted to meet various contingencies which may be encountered in performing the above functions and which is also capable of being arranged to allow the entire machine to travel along the pile of sand without interference therewith.

In addition to the above it is a further object to provide a simple and inexpensive structure which may be cheaply manufactured and which is not liable to become out of order or otherwise rendered useless.

The invention will be explained in detail and more readily understood when read in conjunction with the accompanying drawings which illustrate one embodiment thereof.

In the drawings, Fig. 1 is a view showing the machine cutting a pile of material and traveling in the direction of the arrow;

Fig. 2 is a view similar to Fig. 1, showing the machine traveling in the opposite direction, in the act of conveying sand to the screen;

Fig. 3 is a side elevation of the machine showing certain portions thereof positioned to engage the material and pile the same;

Fig. 4 is a side elevation of the machine showing the relative position of certain portions of the structure when arranged to allow the machine to travel along a pile without interference therewith, or to permit the machine to be transported from one place to another;

Fig. 5 is a side elevation of the structure shown in Figs. 1 to 4;

Fig. 6 is a plan view of the machine, certain portions thereof being shown in section;

Fig. 7 is a plan sectional view of the conveyor and cutter frame taken on line 7—7 of Fig. 5; and

Fig. 8 is an elevation of an end of the structure shown in Figs. 1 to 6.

The structure illustrated contemplates the use of a truck 10 mounted upon wheels 11, 12, 13 and 14. The wheels 13 and 14 are mounted upon the frame 15 which is pivotally connected at 16 to the truck frame 10, upon the latter of which is mounted the motor 17, steering levers generally designated 18, transmission generally designated 19 and other elements of the structure.

A frame consisting of the parallelly arranged separated members 20 and 21 is connected for pivotal movement relatively to the truck frame and said frame provides a support for the frame 22 and the traveling member 23 supported thereby to assume the various positions illustrated in Figs. 1 to 4.

The truck frame 10 includes the parallel side members 24 and 25, the cross or end member 26, the brace bars 27 and 28, and the uprights 29 and 30, which terminate a substantial distance above the truck frame and are each provided adjacent said terminations with a pulley 31 over which cables 32 respectively ride. These cables have one of their ends secured to each of the parallel frames 20 and 21, and have weights 33 provided at their opposite ends to partially counterbalance the weight of the frame 22—22 and the weight of the element 23 carried thereby. A plate 34 is also mounted upon the truck frame and extends across the frame between the uprights 29 and 30 and extends toward and beyond the upper end of the element 23 to provide a means for deflecting the material towards the screen 35

as it is discharged from said element. This plate also protects the adjacent mechanism from dust, etc.

The motor 17 is connected so as to propel the entire machine both forwardly and rearwardly, to actuate the element 23 and cause it to be raised and lowered. To perform these functions a connection is formed between the motor and the shaft 36 through the medium of the gears 37 and 38, one of which is connected to the shaft 36. This shaft extends transversely of the truck frame and is mounted in bearings 39 and 40. A sprocket 41 is secured to the shaft and co-operates with a sprocket 42 through the medium of the sprocket chain 43 with the shaft 44 of the transmission generally designated 19. Pinions 45 and 46 are arranged upon the shaft 44 and each of said pinions is provided with one part of a clutch element with which the clutch 47 is designed to cooperate to transmit the motion of the shaft 44 to either of the pinions 45 or 46, depending upon the relative position of the clutch element 47. The pinion 45 meshes with a pinion 48 and the pinion 46 meshes with a pinion 49. Both of the pinions 48 and 49 are secured to the shaft 50 which will therefore have the motion of the shaft 44 transmitted to it, depending upon the position of the clutch element 47. It will be noted that the pinions 45 and 46 are of a relatively different diameter, and will therefore cause a differential speed to be imparted to the shaft 50, depending upon which of the pinions 45 and 46 the clutch element 47 is in engagement with. The shaft 50 has a clutch element 51 mounted thereon which is adapted to be thrown into and out of engagement with clutch portions respectively provided upon the pinions 52 and 53, which respectively mesh with pinions 54 and 55 arranged upon a shaft 56. Clutch elements 57 and 58 are also mounted upon said shaft 56 and are provided to cause the shafts 59 and 60 to be actuated and thereby drive the wheels 11 and 12 to cause the device to be propelled in either a forward or rearward direction. To transmit the motion of the shaft 56 to the shafts 59 and 60, the shaft 56 is provided with a sprocket 61 which through the medium of the sprocket chain 62 is connected with the sprocket wheel 63 mounted upon the shaft 59. The opposite end of the shaft 59 is provided with a sprocket 64 which through the medium of the sprocket chain 65 is connected with the sprocket 66 connected with the wheel 12.

The motion of the shaft 56 is transmitted to the shaft 60 through the medium of a sprocket wheel 67 provided upon said shaft, the sprocket being connected with the shaft 60 by means of the sprocket chain 68 which rides over the sprocket wheel 69 provided upon said shaft 60. The outer end of the shaft 60 is provided with a sprocket 70 which is connected with a sprocket wheel 71 through the sprocket chain 72, it being understood that the sprocket 71 is connected with and made secure to the wheel 11 which will thus be driven when the shaft 60 is actuated. The clutches 57 and 58 are employed to permit the device to be steered either to the right or to the left when traveling in either a forward or rearward direction. The means for controlling the direction in which the device is being propelled is designed to be controlled from the seat 73 and includes the lever 74 which is pivoted at 75 and has its lowermost end provided with an extension or lever 76 which is secured to the element 77 having lateral extensions 78 and 79, which respectively extend into the tubular members 80 and 81, the latter of which are respectively connected with the clutch levers 82 and 83, which respectively cooperate with the clutches 57 and 58. The structure which includes the extensions 78 and 79, and tubular portions 80 and 81, is employed to allow one clutch such as 57, to be thrown out of operation without affecting the driving connection of the other, and thereby drive one of the wheels 11 or 12 and cause the machine to be propelled either to the right or left, depending upon necessity or desire.

When the device is being propelled at low speed in a forward direction the clutch 47 will be in the position shown in Fig. 6, or in driving engagement with the pinion 45 which will thus transmit the motion of the shaft 44 to the pinion 48, clutch element 51, pinions 52 and 54, and shaft 56, which as before stated, drives both of said shafts 59 and 60. Should it be desired to propel the machine forwardly, at a relatively higher speed, the clutch element 47 will be thrown into engagement with the gear or pinion 46 which will actuate the shaft 50 at a relatively higher speed. It is evident that when the clutch 51 is thrown into the clutch portion of the pinion 53, the shaft 56 will be driven in the reverse direction because of the cooperation of the idler pinion 84 with the pinions 53 and 55. It is further evident that should either of the clutches 85 or 86 at this time be thrown out of the position thereof illustrated in Fig. 6, that one or the other of the shafts 59 or 60 would be actuated, thus permitting the device to be steered when driven in either a forward or rearward direction.

From the foregoing it is evident that this arrangement just described provides a means whereby the entire structure may be propelled either forwardly or rearwardly at different speeds, and may be steered when driven in either of these directions.

As before stated, the machine is designed to allow the element 23 to be driven to cause

the sand or other material to be cut and conveyed to a screen, or piled, depending upon the desire or necessity and in addition may have an end raised and lowered to allow the machine to be transported without interference between the element 23 and a pile of material or objects in the path of travel of the machine.

The means for driving the element 23 includes a sprocket wheel 87 secured to the barrel 88, over which the element 23 travels, and also the sprocket chain 89 and the pinion 90, the latter being loosely arranged upon the shaft 36 and designed to be controlled through the medium of the friction clutch 91 which is operable from the seat 73 through the lever 92.

It is evident from an inspection of Fig. 6 that when the clutch 91 is thrown into operation, the barrel 88 will be rotated which will actuate the member 23, and should a resistance be offered to the element 23 in excess of the holding qualities of the clutch 91, that said clutch will permit of relative motion between the shaft and clutch and insure against breakage of the parts of the element 23 and the connection with said shaft. The means for causing the member 23 to assume the various positions illustrated in Figs. 1 to 4, includes a sprocket wheel 93 rigidly secured to frame 22. A sprocket chain 94 extends from the sprocket 93 to a pinion 95 loosely arranged upon the shaft 36 but connected with a sprocket 96 also arranged upon said shaft. A sprocket chain 97 extends from the sprocket wheel 96 to the sprocket 98 which is secured to the shaft 99 of the transmission. This shaft 99 is provided with a worm wheel 100 which cooperates with the worm 101 arranged upon the shaft 102. One end of this shaft has a beveled gear 103 secured to it, which cooperates with the pinions 104 and 105, each of which is respectively provided with a conical shaped extension 107 and 108. The pinions 104 and 105 are loosely arranged upon a shaft 109 which also has mounted thereon friction clutch element 110 which is keyed to the shaft and is designed to be moved into and out of engagement with the extensions 107 and 108 of the pinions 104 and 105 to cause the rotation of either one or the other thereof. The shaft 109 is provided with a sprocket which through the medium of the sprocket chain 111 and the pinion 112, causes the shaft 109 to be rotated by the shaft 36 which is driven by means of the motor 17. The clutch element 110 is controlled through the lever 113 which is also operable from the seat and thus permits the element 23 to be moved to the various angular and intermediate positions shown in Figs. 1 and 2, and held in said positions because it is evident that the worm and worm wheel provide a lock which will hold said element in these positions.

As before stated, the element generally designated 23 provides a means for cutting and piling the sand or other material, and also provides a means for conveying the material to the screen 35. This element includes the endless belt 114, which rides over the barrel 88 and the barrel 115, supported at their opposite end in the frames 22. The frames 22 between which the member 23 is supported, are provided at their outermost ends with the wheels 116 and 117 which may be mounted upon the shaft of the barrel 115 and provide supports for this end of this portion of the structure. The outer face of the endless belt 114 is provided with a plurality of lugs or scrapers 118 which are designed to engage the material as the belt 114 travels over the barrels 88 and 115, and cause the material to be cut, conveyed to the screen or piled, depending upon the position of the lower end of the element 23.

By referring to Fig. 7, the construction of the barrels 88 and 115 can be clearly seen, and as the construction of one is substantially identical with that of the other, an explanation of one will suffice for an understanding of both. The particular structure illustrated herein includes the heads 119, 120, the intermediate support 121, and the plurality of slats 122 which extend from one head such as 119, to the other head 120, being supported intermediate their ends through the medium of the support 121. The heads 119 and 120 and intermediate support 121 are mounted upon a tube 123 arranged upon a shaft 124, the latter of which is supported in bearings secured to the pivotal supports 20 and 21, which are permitted to be raised and lowered by virtue of their pivotal connection with the shaft 36. The supporting frames 22—22 between which the element 23 is arranged, are provided at one end with counterweights 125 so as to allow the opposite end thereof to be readily raised when this is desired. The screen 35, on to which the conveyor discharges the material, is supported at one end by means of a chain section 126, being pivotally mounted at its opposite end upon the shaft 36 which will allow the screen to be dropped and the lumps of sand or any foreign material which may have collected therein to be discharged. The frame 15 to which the wheels 13 and 14 are connected, is, as before stated, pivotally connected to the main frame of the machine through the medium of the connection 16 which will allow the frame 15 to rotate and compensate for any inequalities of the surface over which the device is propelled. To reduce the frictional resistance between the frame 15 and the main frame, the latter is provided with the antifriction rollers 127 which

are arranged adjacent the opposite ends of the pivotal frame 15 and bear against the face of a member 128 which provide a journal for the shafts 129 of the respective wheels 13 and 14.

From the foregoing explanation it is evident that a device is provided having means whereby it may be propelled in either a forward or rearward direction, and may be steered to either the right or the left when driven.

It is further evident that a means is provided for cutting, piling or screening the particular material with which the machine is desired to be used, and that said portion of the device whereby the material may be cut and piled is operable to assume various positions and thereby allow it to engage the material and cause it to be cut and piled, or cut, screened and piled, and in addition may be elevated so that it will not interfere with the piled sand or other objects in the path of travel of the machine.

It will be understood that changes and modifications may be made without departing from the spirit of the invention.

What I claim is:

1. A machine of the class specified having a continuous material conveying member and a screening device, the conveying member being movably mounted to permit it to convey material upwardly and discharge it upon the screen or to convey it upwardly and discharge it in a direction away from the screen.

2. A machine of the class specified, having a continuous material conveyor mounted to permit of its conveying and discharging material forwardly or rearwardly.

3. A machine of the character described having a pivoted member provided with an endless traveling element having means for engaging material located at one end of said member and causing said material to be discharged at the opposite end of said member, said member being movably mounted to permit said means to engage said material and to discharge said material at said first mentioned end of said member.

4. A machine of the character described having a member provided with means for engaging material located at one end of said member and causing said material to be discharged at the opposite end of said member, said member being operable to permit said means to engage said material and to discharge said material at said first mentioned end of said member, said member being adjustable to an inoperative position to permit the machine to be transported.

5. A machine of the character described having a pivoted member provided with means for engaging material located at one end of said member and causing said material to be discharged at the opposite end of said member, said member being operable to permit said means to engage said material and to discharge said material at said first mentioned end of said member, said member being movable upon said pivot to lift said member out of the way to permit the machine to be transported.

6. A machine of the class specified having a continuous material conveyor mounted to permit of its conveying and discharging material forwardly or rearwardly, and a screening device arranged in position to receive the material when it is discharged rearwardly.

7. A machine of the class specified having a continuous material conveyor mounted to permit it to swing into either forwardly or rearwardly inclined position, or into a substantially horizontal position.

8. A machine of the class specified having an endless traveling member provided with means for engaging and cutting material to prepare it for foundry use and a traveling vehicle carrying said member and provided with means for propelling it in opposite directions whereby said traveling member may be used to act upon the material in different ways, depending on the direction of motion of the vehicle.

9. A machine of the class specified comprising a self-propelled vehicle and an endless traveling member having transversely extending devices adapted to engage and cut the material whereby said traveling member may be used for different purposes with the vehicle propelled in opposite directions, and a screening device mounted in position to receive material from said traveling member, when the vehicle is propelled in a direction toward the material to be treated.

10. A machine of the class specified comprising a self propelled vehicle, an endless traveling conveyor mounted thereon, and a screening device, said traveling conveyor being mounted for swinging movement to permit it to convey material to said screening device or away from the same.

11. A machine of the class specified comprising a self propelled vehicle provided with propelling means and also provided with an endless traveling member provided with means for engaging and cutting material for foundry purposes, which means are also adapted to project material into the air, said traveling member being mounted for inclination in an upwardly and rearwardly direction and also in an upwardly and forwardly direction.

12. A machine of the class specified comprising a self propelled vehicle provided with propelling means and also provided with an endless traveling member provided with means for engaging and cutting material for foundry purposes, which means are also adapted to project material into the

air, said traveling member being mounted for inclination in an upwardly and rearwardly direction and also in an upwardly and forwardly direction, and also mounted for support in an elevated position.

13. A machine of the class specified comprising a self propelled vehicle provided with means for propelling it in opposite directions and also provided with a traveling endless member carrying means for engaging and cutting material for use for foundry purposes, said traveling member being mounted so as to permit its inclination from the vertical to be varied, and also to permit it to be bodily raised and lowered.

14. A machine of the class specified comprising a self propelled vehicle provided with means for propelling it in opposite directions and also provided with a traveling endless member carrying means for engaging and cutting material for use for foundry purposes, said traveling member being mounted so as to permit its inclination from the vertical to be varied, and also to permit it to be bodily raised and lowered, said last mentioned means being adapted to elevate said traveling member sufficiently to permit it to swing from forwardly inclined to rearwardly inclined position.

In witness whereof, I hereunto subscribe my name this 25th day of July, A. D., 1923.

ELMER A. RICH, JR.