Sept. 11, 1956 W. C. GOGGINS 2,762,616

SAND CLEANING MACHINE

Filed May 26, 1954 2 Sheets-Sheet 1

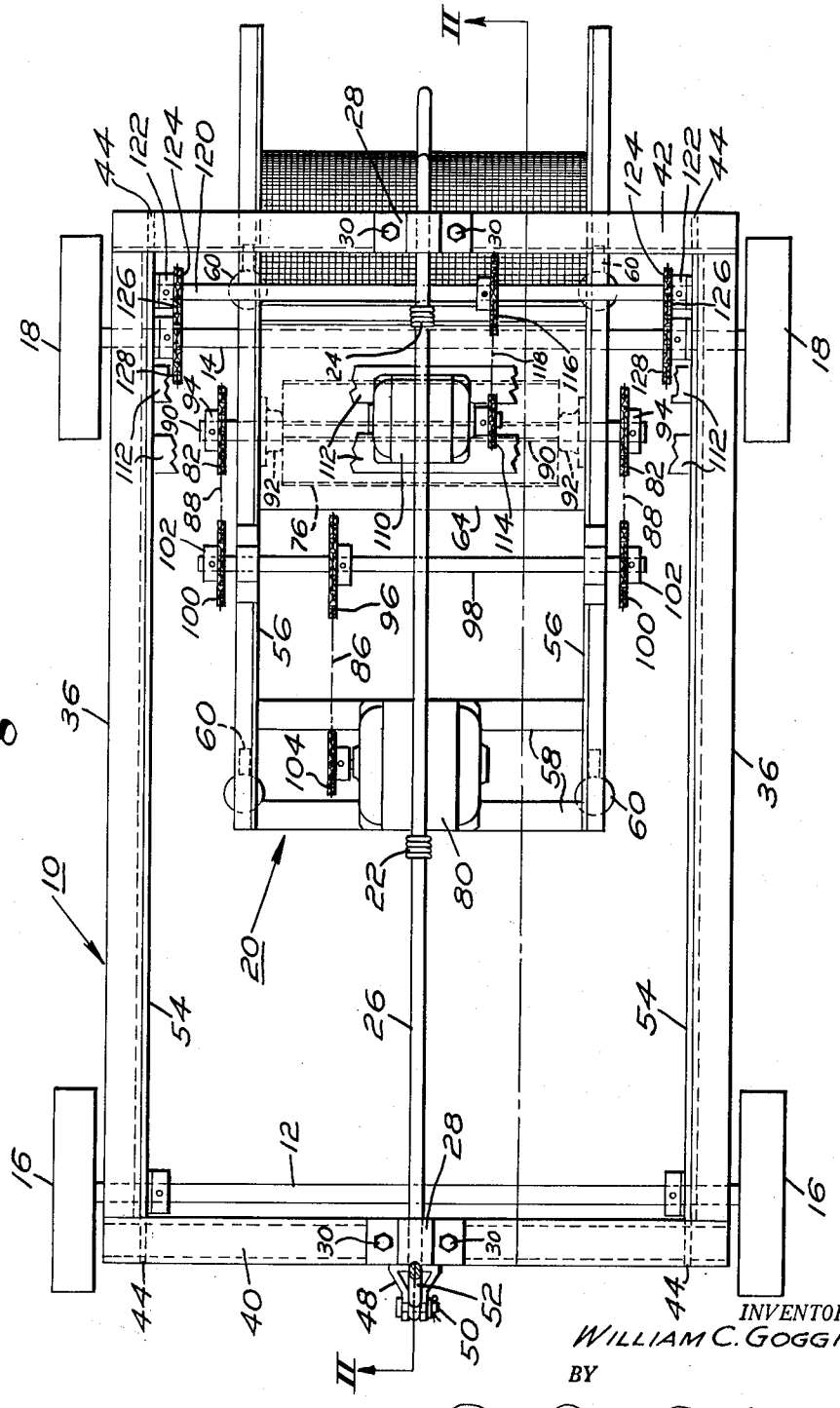


Fig. 1

INVENTOR.
WILLIAM C. GOGGINS,
BY
Beau, Brooks, Buckley & Beau,
ATTORNEYS.

Sept. 11, 1956 W. C. GOGGINS 2,762,616

SAND CLEANING MACHINE

Filed May 26, 1954 2 Sheets-Sheet 2

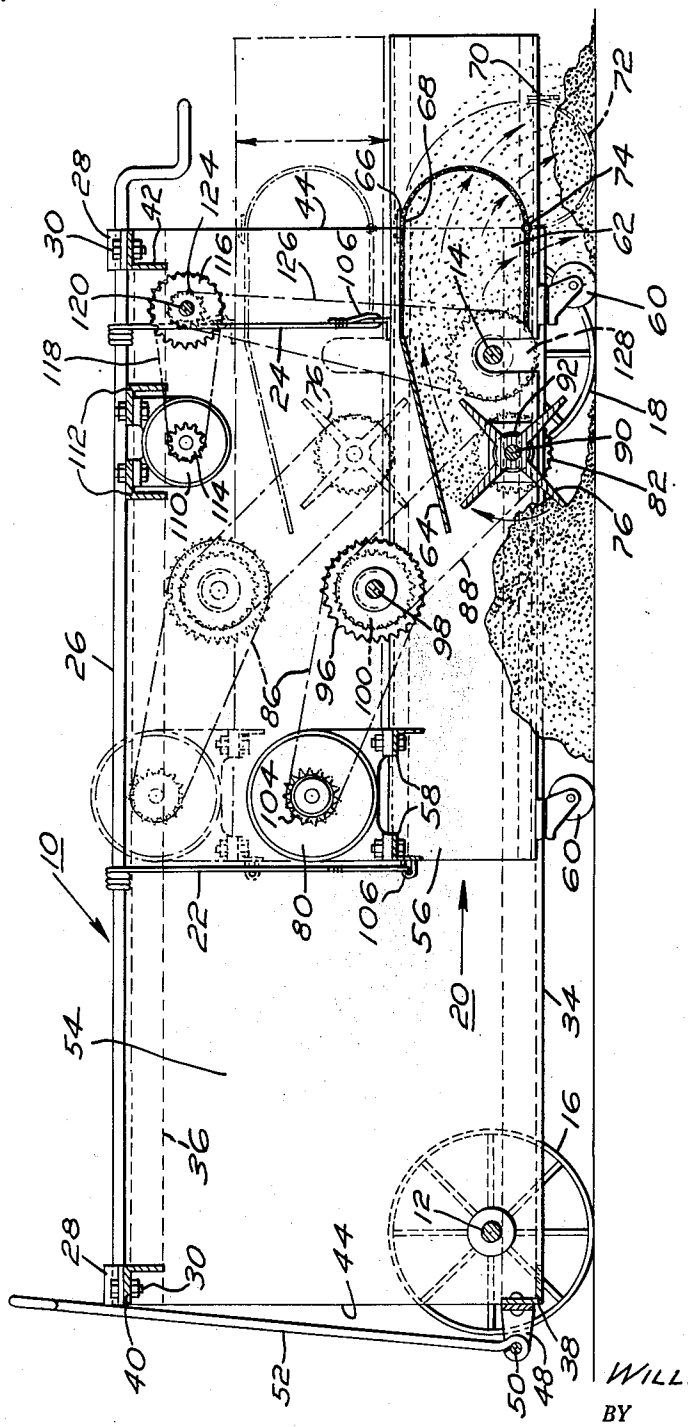


Fig. 2

INVENTOR.
WILLIAM C. GOGGINS.
BY
Beau, Brooks, Buckley & Beau,
ATTORNEYS.

United States Patent Office

2,762,616

Patented Sept. 11, 1956

2,762,616

SAND CLEANING MACHINE

William C. Goggins, Buffalo, N. Y.

Application May 26, 1954, Serial No. 432,449

11 Claims. (Cl. 262—2)

This invention relates generally to sifting apparatus, and more particularly to an improved apparatus of this type adapted for continuous sifting operations on heaps of comminuted materials such as for example sand which may be encountered in metal casting foundries, or the like.

An object of this invention is to provide a highly simplified apparatus of the above type which is adapted to be very inexpensively manufactured, while at the same time comprising a rugged and durable structure which will give many years of trouble-free service.

A further feature of this invention is to provide an apparatus having an improved structural arrangement of parts including a rotatable bladed impeller and being adapted to be passed over a hill of sand, or the like, to cause the impeller blades to bite into the sand for lifting it upwardly and then directing it tangentially outwardly to impinge against a deflector to be directed rearwardly into a screen pocket to impinge against the screen for sifting therethrough in cleaned condition and then to be deposited behind the sand cleaning apparatus.

A still further object of this invention is to provide improved highly simplified means for raising and lowering the sand cleaning contrivance between its inoperative and operative positions, respectively, in order that the apparatus of the invention may be highly maneuverable for transportation to sand piles at various points of storage.

A still further object of this invention is to provide an apparatus of the aforesaid type having its journal boxes and driving mechanisms disposed so as to be clear of the material to be sifted to keep them free of foreign matter which might otherwise cause premature wearing of parts or frequent breakdowns of the apparatus.

And, a still further object of this invention is to provide an apparatus of the aforesaid type which is arranged for mounting suitable driving means whereby the apparatus may be made to be self-propelled at a predetermined rate of speed depending upon the sifting capacity thereof whereby the apparatus may be continuously operable without clogging of the screening chamber.

Further objects and advantages of this invention will appear in the specification hereinafter.

In the drawings:

Fig. 1 is a generally plan view of an embodiment of the invention; and Fig. 2 is a partly sectional view taken generally along the line II—II of Fig. 1.

Referring now to the drawings, the embodiment of the invention shown therein generally includes a rectangular structural framework or chassis **10** which is mounted at its forward and rear ends, respectively, by means of front and rear axle members **12** and **14** journaled through the sides thereof for connection to pairs of front wheels **16—16** and rear wheels **18—18**, an auxiliary mechanism **20** suspended by means of a pair of flexible cables **22** and **24** at its forward and rearward ends from an elongate crank supporting member **26** which is supported at its ends on the forward and rearward upper parts of the frame **10** in sockets formed in a pair of shaft brackets **28—28**

bolted to the framework by means of a plurality of bolts as indicated at **30** in Figs. 1 and 2.

The structural framework **10** will be formed from angle-shaped structural members of standard sizes rolled from any standard quality steel, or the like. The bottom and top sides of the framework **10** are formed with pairs of parallel opposed members **34—34** and **36—36**, respectively, arranged in superposed relation relative to each other. The forward ends of these side frame members **34—34** and **36—36** will be integrally interconnected at the bottom and top by means of a pair of cross members **38** and **40** which will be arranged to be parallel and in substantially superposed relation to each other. The rear end portions of the upper frame members **36—36** will likewise be integrally connected by a cross member **42**. Then, a plurality of upright corner post members **44** will be fixed to support the corners of the frame **10** to provide a rigid and durable framework for carrying the auxiliary sand cleaning apparatus inwardly thereof as shown at **20**. A yoke and pin arrangement **48—50** may be provided to extend forwardly from the bottom cross piece **38** medially of its ends to pivotally mount one end of a suitable handle member **52** which may be used to manually pull the apparatus along a floor. It will be appreciated, although not shown in the drawing, that the yoke **48** readily may be connected to the axle member **12** which may be made movable relative to the framework **10** as is well known in the art for purposes of steering the apparatus.

Furthermore, a pair of side panels **54—54** will be provided to extend between the superposed longitudinal side frame members **34** and **36** at each side of the apparatus. This will provide a main framework which is substantially clear throughout its length from its forward to its rear end portions to permit it to be passed over mounds of comminuted particles for sifting thereof by the auxiliary mechanism **20** which is supported in the above described manner within the rear end portion thereof.

The auxiliary mechanism **20** will be constructed to include a pair of elongate opposed channel members **56—56** arranged parallel with the sides of the frame **10** and being connected by a pair of rigidly fixed cross members **58—58** at their forward upper ends as shown in Figs. 1 and 2. The auxiliary mechanism **20** will then be mounted on a plurality of casters **60** to permit rolling movements thereof along a supporting surface when in its operative position as shown most clearly in Fig. 2.

A material screen arrangement as indicated at **62** will be fixed between the back end portions of the webs of the members **56—56** and will be provided with a sand deflector member **64** fixed to extend in a forwardly and downwardly inclined position therefrom. The screening **62** will be fixed along its upper end to a crosswise plate member **66** secured at its ends to the underside of the opposed upper flange portions of the channel members **56—56**.

The rear edge portion of the plate **66** will be positioned to extend over a conjoined portion of the screen **62** as shown at **68** and will be arranged for connection to a suitable latch **70** secured to the edge of such conjoined portion which will be formed into a generally circular cross-sectional shape as shown at **72** which is hingedly connected to the screen **62** in the manner indicated at **74**. Thus, the back end portion **72** of the screen **62** will be adapted to be swung outwardly and downwardly to provide easy accessibility to the interior of the screen housing **62** for purposes of cleaning, or the like.

A bladed impeller wheel **76** will be arranged to be rotatably mounted beneath the forward end portion of the deflector plate **64** as shown in Fig. 2, it being positioned near the bottom of the auxiliary device **20** in

order that during rotation of the impeller blades when the device **20** is lowered into its operative position and is directed over a pile of sand, the blades will continuously bite into the sand and impel it upwardly against the deflector plate **64** from whence it will be deflected rearwardly into the screen enclosure **62** at a constant predetermined rate depending upon the speed of the apparatus which is arranged to be related to the capacity of the screen **62** for full utilization of the sifting potential thereof without clogging as noted above.

The impeller **76** is driven by a motor **80** which is connected to an impeller sheave **8** by means of a speed reduction sheave arrangement and a pair of endless chain force transmitting members **86** and **88**. This impeller **76** will be keyed to an elongate shaft **90** journaled in the opposed web portions of the channel members **56—56** and stuffing boxes **92—92** thereto. The opposite end portions of the shaft **92** will terminate in keyed relation with the sheaves **82—82** outwardly of the channel web portions and being retained against disengagement by stop devices **94—94** (Fig. 1).

The speed reducing sheave arrangement **84** (Fig. 2) will comprise a sheave member **96** in keyed relation to an elongate shaft member **98** which is journaled through the web portions of the channel members **56—56**. The shaft **98** will be rotatably supported at a position between the impeller **76** and the motor **80** and will have its opposite end portions extending outwardly of the channel web portions for keyed connection to a pair of opposed sheave members **100—100** which will be retained by a pair of opposed clamp devices **102—102**.

Thus, it will be appreciated that the motor **80** will be provided with a drive sheave **104** arranged in substantially coplanar relation with the sheave **96** for operative connection thereto by the endless chain **86**. Hence, the motor **80** will rotatably drive the shaft **98** which in turn will, by means of the sheaves **100—100** and endless chains **88—88**, drive the sheaves **82—82** for rotatably driving the shaft **90** which carries the impeller **76**. In this way, substantially balanced driving forces will be applied to the opposite ends of the impeller shaft **90** at points of connection externally of the auxiliary mechanism **20** to provide a highly efficient transfer of the power output of the motor **80** to the impeller wheel **76**. The auxiliary frame **20** will be supported at its forward and rear end portions by the lower ends of flexible lift cables **22–24** attached to a pair of integral eye portions **106—106** fixed at the forward and rear end portions of the frame **20**, respectively.

Thus, the auxiliary mechanism **20** is adapted to be lifted upwardly into inoperative position as shown in dotted lines in Fig. 2 simply by cranking the handle portion of the crank member **26** for winding the flexible suspension cables **22–24** thereon. It will be appreciated that any suitable ratchet device or the like (not shown) may be easily provided to retain the auxiliary frame against unwinding of the cables **22–24** under the weight of the mechanism **20** for maintaining it in its inoperative position within the frame **10**.

It will also be appreciated, that a motor **110** may be arranged to be mounted on a pair of spaced cross bars **112—112** extending between the upper frame members **36—36** of the frame **10** as shown most clearly in Fig. 2. The motor **110** will be provided with a drive sheave **114** operatively connected to a sheave **116** by means of an endless chain **118**. The sheaves **116** will be keyed to an elongate shaft **120**, the shaft **120** being arranged to be rotatably supported at its opposite end portions in a pair of journal box devices **122—122** positioned slightly inwardly of the main frame member **36—36** whereby this shaft will not interfere with the upward and downward movements of the auxiliary mechanism **20**. The shaft **120** will also be provided with a pair of sheave members **124—124** at its opposite ends which will be drivingly connected by means of a pair of endless chains **126—126** to a pair of opposed sheaves **128—128** keyed to the end portions of the wheel axle **14** at positions slightly inwardly of the lower frame members **34—34**.

Thus, the motor **110** may be arranged to drive the rear wheels of the main frame **10** at a certain predetermined speed relative to the speed of rotative movement of the impeller wheel **76**. This will permit the sand cleaning apparatus of the invention to be driven over piles of sand to give substantially uniform cleaning treatments with minimum attention by an operator of the apparatus. Furthermore, the above speeds may be adjusted in order that the machine may be operated at its maximum capacity without clogging of the screening apparatus.

While I have particularly described one embodiment of the invention, it will be appreciated that other changes and modifications may be therein without departing from the spirit of the invention or the scope of the appended claims.

What is claimed is:

1. A sand cleaning apparatus comprising a main body framework being open at its forward and rearward end portions, a plurality of wheel members rotatably mounted at the side of said main frame, crank means rotatably supported at the upper end portions of said main frame in alignment with the longitudinal center line thereof, flexible cables training around said crank portions and depending downwardly therefrom for connection to an auxiliary frame located inwardly of said main body frame, the crank being operable to raise and lower the auxiliary frame between inoperative and operative positions, respectively, said auxiliary frame including a pair of opposed elongate channel members disposed parallel to the opposite side portions of the main frame, caster means fixed to the ends of said channel members for supporting said auxiliary frame in its operative position for rolling movements along a floor, a screen pocket formed to extend between the webs of said channel members, the bottom end of said pocket being of generally circular form and pivotally connected so as to be adapted to be opened rearwardly and downwardly to provide access into the interior of said pocket, latch means for holding said circular form in closed position, a deflector plate arranged to extend forwardly from the upper forward edge of said pocket in a downwardly inclined position, an elongate impeller wheel rotatably supported by said auxiliary frame below said deflector plate, said impeller wheel being arranged to bite into a pile of sand when in operative position to continuously lift the grains thereof upwardly and tangentially outwardly to impinge against said deflecting plate to be directed rearwardly into said screen pocket to impinge against the screen for sifting therethrough.

2. A sand cleaning apparatus comprising a main body framework being open at its forward and rearward end portions, a plurality of wheel members rotatably mounted at the side of said main frame, crank means rotatably supported at the upper end portions of said main frame in alignment with the longitudinal center line thereof, flexible cables training around said crank portions and depending downwardly therefrom for connection to an auxiliary frame located inwardly of said main body frame, the crank being operable to raise and lower the auxiliary frame between inoperative and operative positions, respectively, said auxiliary frame including a pair of opposed elongated channel members disposed parallel to the opposite side portions of the main frame, caster means fixed to the ends of said channel members for supporting said auxiliary frame in its operative position for rolling movements along a floor, a screen pocket formed to extend between the webs of said channel members, the bottom end of said pocket being of generally circular form and pivotally connected so as to be adapted to be opened rearwardly and downwardly to provide access into

the interior of said pocket, latch means for holding said circular form in closed position, a deflector plate arranged to extend forwardly from the upper forward edge of said pocket in a downwardly inclined position, an elongate impeller wheel rotatably supported by said auxiliary frame below said deflector plate, said impeller wheel being arranged to bite into a pile of sand when in operative position to continuously lift the grains thereof upwardly and tangentially outwardly to impinge against said deflecting plate to be directed rearwardly into said screen pocket to impinge against the screen for sifting therethrough, first drive means supported by said main frame member so as not to interfere with said auxiliary frame, said first drive means being connected to drive the wheel members mounted on said main frame at a certain predetermined rate of speed, second drive means arranged to be mounted on said auxiliary frame for driving said impeller wheel at a certain predetermined rate of speed relative to the speed of said first drive means, whereby said apparatus may be driven over sand piles for uniform cleaning thereof.

3. In a sand cleaning apparatus, crank means having an elongate end support portion journalled at its ends in journal boxes mounted at spaced positions on said apparatus, a pair of flexible support cables being fixed at spaced positions along said end support portion and depending downwardly, therefrom for connections to the opposite end portions of an auxiliary mechanism, said mechanism being movable upwardly and downwardly between inoperative and operative positions, respectively, by turning said crank means, said auxiliary mechanism comprising a pair of parallel opposed channel support members mounted on a plurality of caster means, a screen wall being arranged to extend between the web portions of said channel members, said wall being fitted with a hingedly connected central wall portion adapted to be swung outwardly to provide access to the inside wall face, latch means for maintaining said wall portion in its closed position, the forward end of said screen wall being provided with a particle deflecting plate extending forwardly thereof in a downwardly inclined position, a bladed impeller wheel rotatably supported by said channel web portions at a position slightly below the forward end of said deflector plate so that the blades of said impeller wheel in its operative position will be adapted to bite into a pile of sand to direct it upwardly and tangentially outwardly to impinge against said deflector plate to be directed to impinge against said screen wall to be sifted therethrough.

4. A sand cleaning apparatus comprising, a generally rectangular main frame body being open at its forward and rear end portions, front and rear main body axle means journaled through the side portions of said main frame at their ends for rotatably supporting a plurality of wheel means, a crank member rotatably supported by the upper end portions of said main body frame, flexible cable means connected to said crank at spaced positions thereon and depending downwardly therefrom for connection to the opposite end portions of an auxiliary frame, said frame being movable between operative and inoperative positions by actuation of said crank means, said auxiliary frame comprising a pair of opposed channel members mounted on a plurality of supporting casters for movably supporting it in its operative position on a floor, a wire screen fixed between the web portions of said channel members and being fitted with a hinged door adapted to be opened to provide access from rearwardly of the auxiliary frame to the inside of said wire screen, the upper forward end of said wire screen ending in a deflector plate which is inclined downwardly, an elongate bladed impeller wheel being positioned beneath the front end of said deflector plate, a pair of spaced cross members at the upper forward portion of said channel members for supporting a first driving means, a first power transfer shaft being rotatably supported at its ends by

being journalled through the web portions of said channel members at a position intermediate said impeller wheel and said first drive means, first sheave means keyed to the opposite end portions of said first power transfer shaft at positions outwardly of said channel members and being operatively connected to the opposite end portions of an impeller wheel mounting shaft, second sheave means mounted intermediate the ends of said first power transfer shaft being operatively connected to be driven by said first drive means in order to provide a balanced application of driving forces at the opposite end portions of said impeller wheel mounting shaft, second drive means arranged to be mounted on the upper portion of said main body frame and being operatively connected to drive a second power transfer shaft positioned adjacent thereto and arranged so as not to interfere with movements of said auxiliary frame, third sheave means connected at opposite ends of said second power transfer shaft for operative connections to the opposite end portions of the rear axle means supporting said rear wheels of said main body frame, whereby said drive means may be operated at predetermined relative speeds to utilize the full sand sifting capacity of said wire screen without possibility of overdriving said impeller wheel as might otherwise jam the sand sifting screen.

5. A sand cleaning apparatus comprising a main chassis provided with wheels to permit rolling movements on a floor surface, a height adjustable auxiliary chassis inwardly of said main chassis being movable into operative position, said auxiliary chassis including a pair of outwardly faced elongate channels disposed parallel with the sides of said main chassis, the auxiliary chassis being mounted on casters for permitting rolling movements of said auxiliary chassis along the floor when in its operative position, a screen pocket formed to extend between the webs of said channel members, a deflector plate arranged to extend forwardly from the upper forward edge of said pocket in a downwardly inclined position, an elongate impeller wheel being rotatably suported below said deflector plate, said impeller wheel being arranged to bite into a pile of sand when in operative position to beat the grains thereof upwardly and tangentially outwardly to impinge against said deflecting plate to be directed rearwardly into said screen pocket to impinge against the screen for sifting therethrough.

6. A sand cleaning apparatus comprising a main chassis, crank means rotatably supported in said main chassis for supporting spaced flexible cables arranged to depend downwardly therefrom for supporting an auxiliary chassis inwardly of said main chassis, the crank means being operable to raise and lower the auxiliary chassis between inoperative and operative positions, said auxiliary chassis including a pair of spaced support members, a screening chamber provided with a front opening, a deflector plate arranged to extend forwardly from the upper edge portion of said chamber opening in a downwardly inclined position, impeller wheel means below said deflector plate, said impeller wheel means being arranged when in operative position to bite into a pile of sand to continuously lift the grains thereof upwardly and tangentially outwardly to impinge against said deflecting plate to be directed into said screen chamber to impinge against the screen for sifting therethrough.

7. In a sand cleaning apparatus, crank means, a pair of flexible support cables depending from said crank means and connecting to an auxiliary mechanism for movement of the latter upwardly and downwardly between inoperative and operative positions by actuating said crank means, said auxiliary mechanism comprising support members mounted on a plurality of casters for rolling movements along a floor surface, a screen wall arranged between said support members, the upper portion of said screen wall being provided with a particle deflecting plate extending forwardly thereof in a downwardly inclined position, an impeller wheel assembly ro-

tatably supported below said deflector plate whereby the said impeller wheel assembly will be operable to bite into a pile of sand to direct it upwardly and tangentially outwardly to impinge against said deflector plate to be directed to impinge against said screen wall for sifting therethrough, first drive means operable to drive said apparatus at a predetermined rate of speed, and second drive means mounted on said auxiliary frame and operating said impeller wheel assembly at a certain predetermined rate of speed relative to the speed of said first drive means, whereby said apparatus may be driven over sand piles for uniform cleaning thereof.

8. A sand cleaning apparatus comprising, a main chassis being open at its forward and rear end portions, axle means journalled in the sides of said main chassis and mounting a plurality of wheels for supporting said main chassis, a crank rotatably supported by said main chassis, flexible cable means depending downwardly from said crank for supporting an auxiliary chassis, said auxiliary chassis being movable between operative and inoperative positions by actuation of said crank, said auxiliary chassis comprising a pair of opposed channel members mounted on supporting casters for supporting it in its operative position on a floor, a wire screen fixed between the web portions of said channel members, the upper marginal edge of said wire screen being fixed to a deflector plate which is inclined downwardly, impeller wheel assembly positioned beneath said deflector plate, a first driving means being operatively connected to the opposite end portions of said impeller wheel assembly for balanced application of driving forces thereto, a second drive means being operatively connected to the opposite end portions of the main chassis axle means, whereby said drive means may be operated at predetermined relative speeds to utilize the full sand sifting capacity of said wire screen without possibility of overdriving said impeller wheel as might otherwise jam the sand sifting screen.

9. A sand cleaning apparatus comprising a main chassis mounted on a plurality of wheels for rolling movements over a floor surface, a support bar mounted over said main chassis and being provided with a crank handle for turning said bar, a pair of flexible cables fixed to said bar at one of their ends for training around said bar by rotation of said crank handle, said cables depending downwardly for connection at their opposite ends to an auxiliary chassis inwardly of said main chassis, the crank handle being operable to raise and lower the auxiliary chassis between inoperative and operative positions, respectively, said auxiliary chassis being mounted on caster means for suporting said auxiliary chassis in its operative position for rolling movements along the floor surface, a screen pocket having a hinged screen portion being carried by said auxiliary chassis, said hinged portion being adapted to be opened rearwardly and downwardly to provide access into the interior of said screen pocket, means for holding said hinged portion in closed position, a deflector plate fixed to extend forwardly in a downwardly inclined position from the upper portion of said screen pocket, an elongate impeller wheel rotatably mounted below said deflector plate, and being arranged to bite into a pile of material when in operative position to continuously beat it upwardly and tangentially outwardly to impinge against said deflecting plate to be directed rearwardly into said screen pocket to impinge against the screen for sifting therethrough.

10. A sand cleaning apparatus comprising a main chassis mounted on first rollers for movements along a floor, crank means rotatably suported in said main chasis for supporting spaced flexible cables arranged to depend downwardly therefrom for supporting an auxiliary chassis inwardly of said main chassis, the crank means being operable to raise and lower the auxiliary chassis between inoperative and operative positions, said auxiliary chassis including a pair of opposed elongated channel members mounted on second rollers for movably supporting the auxiliary chassis in its operative position, a screen wall in said auxiliary chassis having a hinged door therein to provide access into the interior of said auxiliary chassis, latch means for holding said door in closed position, a deflector plate arranged to extend forwardly from the upper edge portion of said screen wall in a downwardly inclined position, an impeller wheel being rotatably supported below said deflector plate, said impeller wheel being arranged when said auxiliary chassis is in operative position to bite into a pile of sand and to continuously lift the grains thereof upwardly and tangentially outwardly to impinge against said deflecting plate to be directed to impinge against said screen walls for sifting therethrough.

11. In a sand cleaning apparatus, crank means, a pair of flexible support cables suspended from said crank means and connecting to an auxiliary mechanism for movement of the latter upwardly and downwardly between inoperative and operative positions by actuating said crank means, said auxiliary mechanism comprising support members being mounted by means of a plurality of casters for permitting rolling movements along a floor, a screen wall arranged between said support members, the upper portion of said screen wall being provided with a particle deflecting plate extending forwardly thereof in a downwardly inclined position, an impeller wheel assembly rotatably supported below said deflector plate whereby the impeller wheel will be operable to bite into a pile of sand to direct it upwardly and tangentially outwardly to impinge against said deflector plate to be directed to impinge against said screen wall for sifting therethrough.

References Cited in the file of this patent

UNITED STATES PATENTS

549,176	Will	Nov. 5, 1895
1,636,168	Butterfield	July 19, 1927
1,645,625	Slwinski	Oct. 18, 1927
1,659,211	Minich et al.	Feb. 14, 1928
1,675,721	Minich	July 3, 1928
1,678,702	Minich	July 31, 1928
2,567,472	Crandall	Sept. 11, 1951
2,698,977	Smith	Jan. 11, 1955
2,751,205	Peterson	June 19, 1956