No. 858,008. PATENTED JUNE 25, 1907.

E. H. MESSITER.

APPARATUS FOR RECLAIMING LOOSE MATERIALS.

APPLICATION FILED APR. 8, 1905.

4 SHEETS—SHEET 1.

Fig. 1.

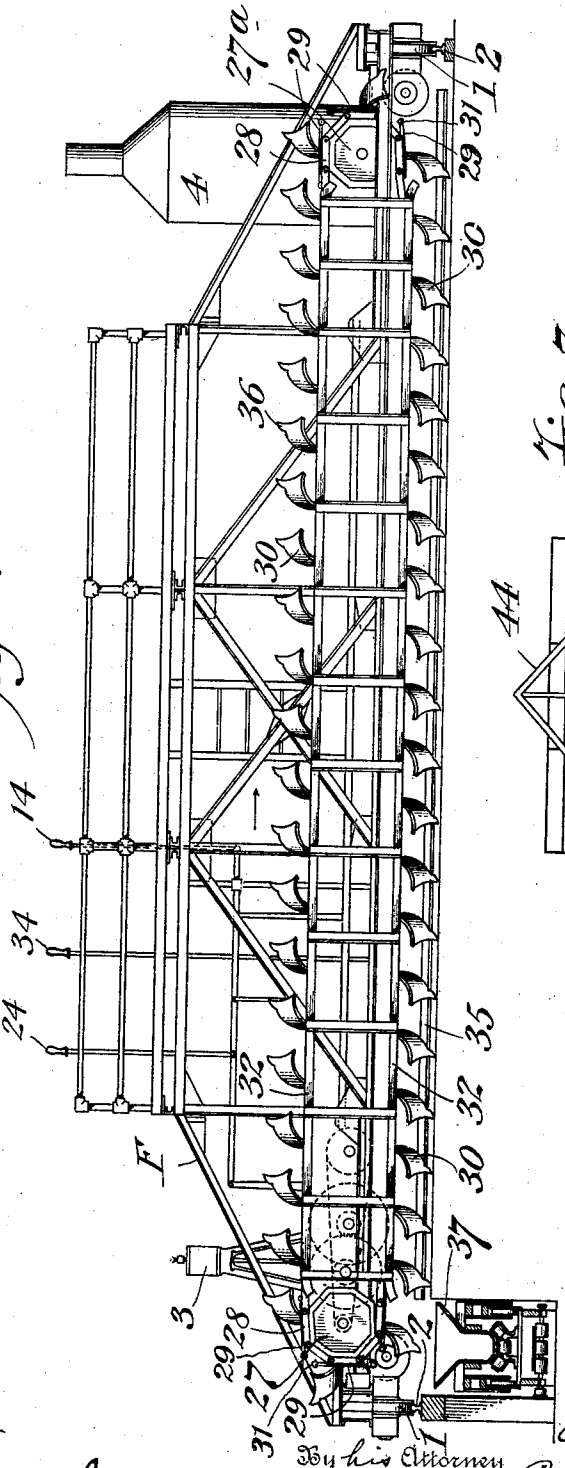
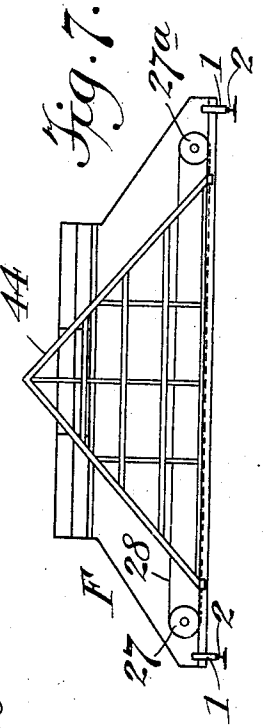


Fig. 7.



Witnesses
A. R. Appleman
Ralph A. Hancock

Inventor
Edwin H. Messiter
By his Attorney
Baxter & Morton

No. 858,008. PATENTED JUNE 25, 1907.

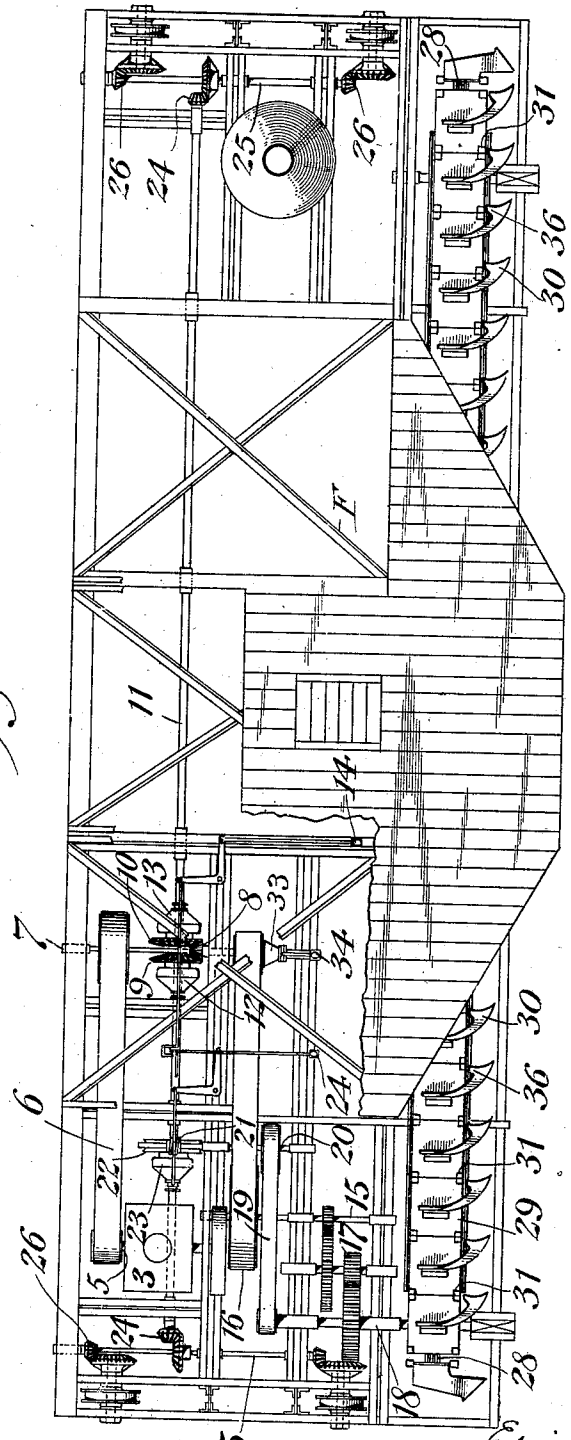
E. H. MESSITER.

APPARATUS FOR RECLAIMING LOOSE MATERIALS.

APPLICATION FILED APR. 8, 1905.

4 SHEETS—SHEET 2.

Fig. 2.



Witnesses
A. Applewan
Ralph A. Hancock

Inventor
Edwin H. Messiter
By his Attorney
Baxter Morton

No. 858,008. PATENTED JUNE 25, 1907.

E. H. MESSITER.

APPARATUS FOR RECLAIMING LOOSE MATERIALS.

APPLICATION FILED APR. 8, 1905.

4 SHEETS—SHEET 3.

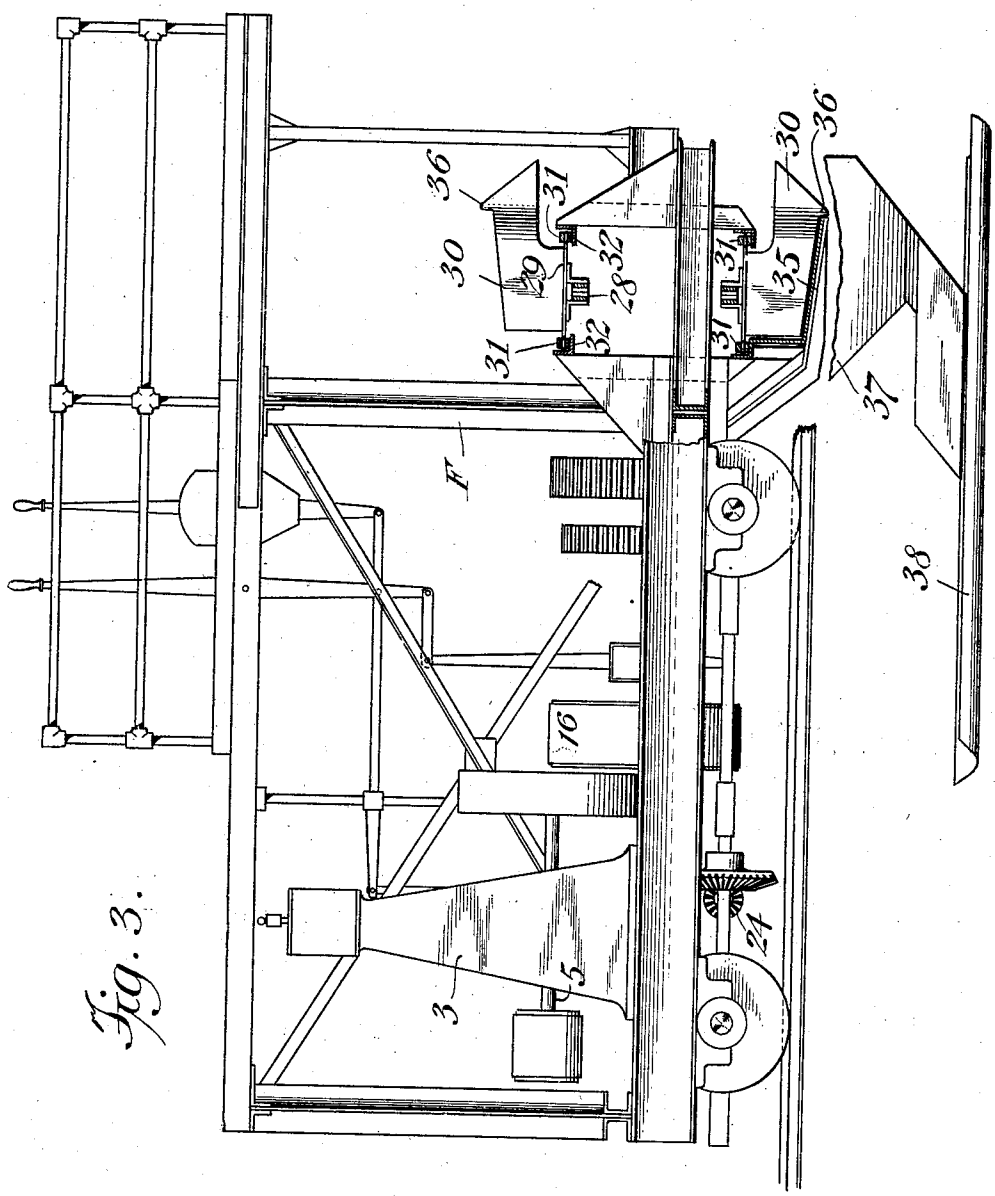


Fig. 3.

Witnesses
A. R. Appleman
Ralph A. Hancock

Inventor
Edwin H. Messiter
By his Attorney
Baxter & Morton

No. 858,008. PATENTED JUNE 25, 1907.

E. H. MESSITER.

APPARATUS FOR RECLAIMING LOOSE MATERIALS.

APPLICATION FILED APR. 8, 1905.

4 SHEETS—SHEET 4.

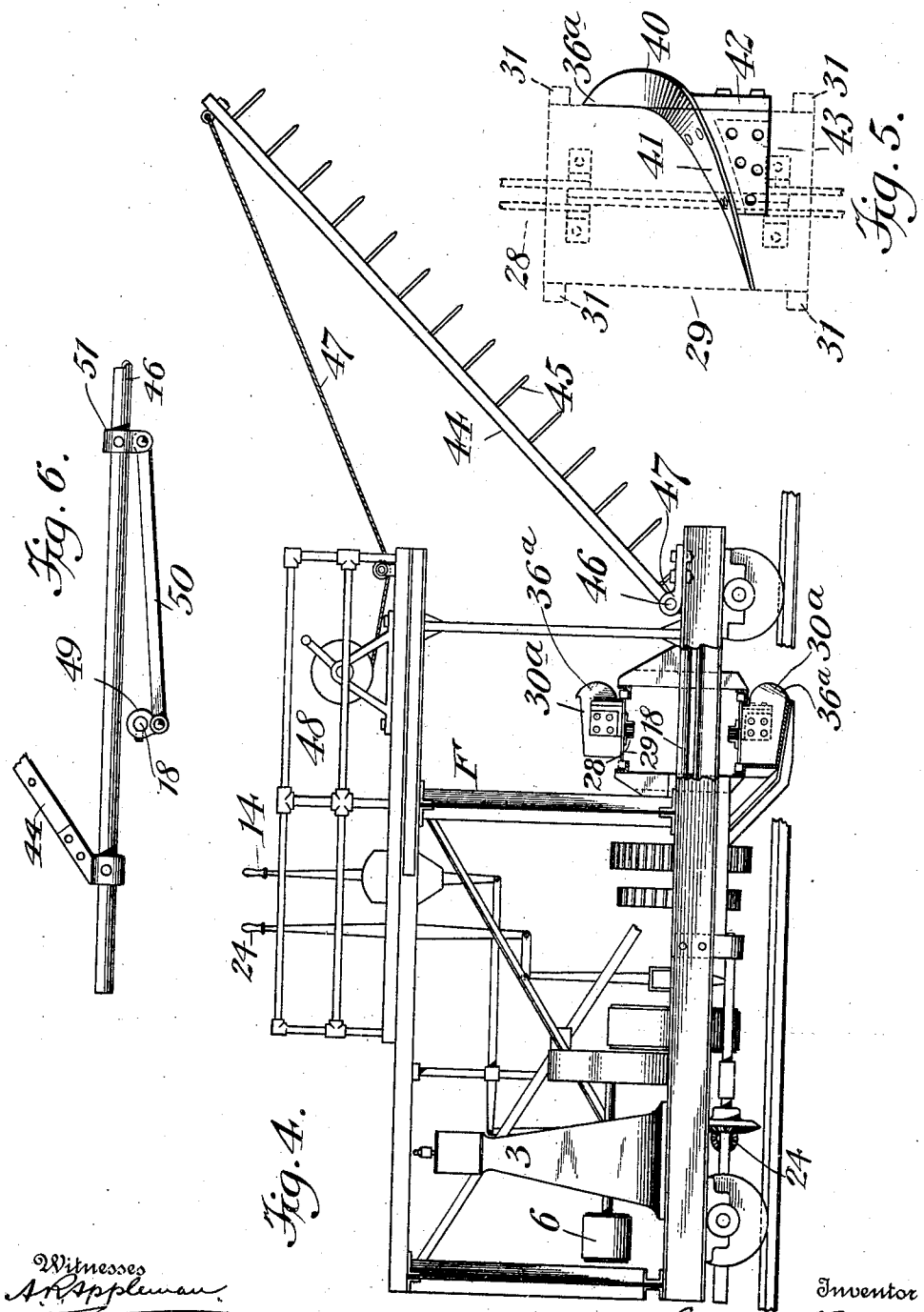


Fig. 5.

Fig. 6.

Fig. 4.

Witnesses
A. K. Appleman
Ralph A. Hancock

Inventor
Edwin H. Messiter
By his Attorney
Baxter & Morton

UNITED STATES PATENT OFFICE.

EDWIN H. MESSITER, OF NEW YORK, N. Y.

APPARATUS FOR RECLAIMING LOOSE MATERIALS.

No. 858,008. Specification of Letters Patent. Patented June 25, 1907.

Application filed April 8, 1905. Serial No. 254,483.

To all whom it may concern:

Be it known that I, EDWIN H. MESSITER, a citizen of the United States, residing in the city, county, and State of New York, have invented new and useful Improvements in Apparatus for Reclaiming Loose Materials, of which the following is a specification.

This invention relates to apparatus for reclaiming loose materials from storage, though it is to be understood that the apparatus is capable of use for other analogous purposes.

The primary object of the invention is to produce a self-propelled machine by means of which all the material in an elongated pile of ore or the like may be reclaimed, the machine working in a substantially uniform manner with respect to a transverse section taken through the pile.

Further objects of the invention are to provide a reclaiming machine adapted for operation upon a large pile of material and so constructed that it will remove material simultaneously across the entire face of the pile and maintain a steady supply of material to the gatherers or scoops of the machine.

Other minor objects of the invention will appear as the same is hereinafter disclosed, and the scope of the invention will be clearly pointed out in the appended claims, it being understood that changes in the construction may be made within the scope of the claims without departing from the spirit of the invention.

In the drawings, accompanying this specification and forming a part thereof, Figure 1 is a view in front elevation of the reclaiming machine and in transverse section through the trench conveyer to which the machine delivers material, the bearings for the drum shafts being omitted. Fig. 2 is a top plan view of the machine with parts of the operator's platform broken away to show connecting rods for the operating levers. Fig. 3 is a view partly in end elevation and partly in section showing the machine on a larger scale. Fig. 4 is a view in end elevation of a machine provided with an agitating device to insure the proper supply of material to the gatherers or scrapers. Fig. 5 is a top plan view of one of the scrapers in operative position, the carrier plate to which the gatherer or scraper is attached being indicated in dotted lines. Fig. 6 is a detail view of the mechanism employed in reciprocating the agitating devices. Fig. 7 is a diagrammatic view in front elevation of the machine shown in Fig. 4.

Referring to the drawings, and more particularly to Figs. 1, 2 and 3, F designates generally the supporting frame-work of the machine which is preferably mounted on flanged wheels 1 which rest upon rails 2 spaced at suitable distances apart. The machine extends transversely of the space between the rails and is provided with suitable means for propelling itself. This means may be of any character best adapted to the conditions under which the machine is to be operated. In the present instance the motive power is derived from a steam engine 3 mounted upon the frame of the machine near one end and supplied with steam from a boiler 4 which is arranged near the other end of the machine to distribute the weight to advantage. From the main driving shaft 5 of the engine power is transmitted by a belt 6 to a counter-shaft 7 which bears a bevel pinion 8 fast thereon. The bevel pinion engages constantly with two oppositely arranged bevel gears 9 and 10 which are loose upon a shaft 11 extending longitudinally of the machine and clutches 12 and 13 are provided in order to secure the corresponding bevel gears to the shaft at will. These devices which are controlled by means of the operating lever 14 serve to drive the machine forward or backward at high speed.

Power is transmitted from the counter-shaft 7 to another counter-shaft 15 by means of a belt 16 running over suitable pulleys provided on the shafts and from the shaft 15 motion is transmitted through a train of gearing 17 to the shaft 18, the function of which will presently appear. From the shaft 18 power is transmitted by means of a belt 19 and suitable pulleys to a shaft 20 which extends rearward over the shaft 11 and bears a worm 21 which drives a corresponding worm wheel 22 which is loose on the shaft 11. A clutch 23 which is operated by means of the lever 24 serves to lock the worm wheel on the shaft 11 when desired. The gearing 17 and the pulleys over which the belt 19 runs are arranged to effect a very considerable reduction in speed between the shaft 15 and the shaft 20 and consequently

the rate of rotation imparted to the shaft 11 through the worm 21 and worm wheel 22 is very slow.

The shaft 11 may be termed the propulsion shaft as power is supplied from it to all the wheels upon which the machine is supported. To this end bevel pinions 24 are provided at the ends of the shaft 11 and cooperating bevel gears are provided on transversely disposed shafts 25. These shafts drive the traction wheels by means of sets of pinions and gears 26.

The shaft 18 above referred to affords a support for a sprocket drum 27 preferably of octagonal form and a similar drum 27ª is provided at the opposite end of the machine. Over these two drums runs an endless chain 28 which bears a series of plates 29 which are suitably secured to the chain and afford support for a corresponding number of gatherers or scrapers 30. Each plate is provided at its corners with anti-friction rollers 31 as shown in Fig. 3 and these rollers rest upon suitable tracks 32 formed of angle bars or the like. The tracks 32 extend between the two sprocket drums 27 and 27ª and insure the movement of the gatherers or scrapers and their plates in straight lines.

The pulley from which the belt 16 takes its power is loosely mounted on the shaft 7 and a clutch 33, which is controlled by means of the operating lever 34 serves to lock the pulley to the shaft when it is desired to transmit power to the belt 16 and from it through the intervening transmission devices to the shaft 18 and the sprocket drum 27 carried thereby.

When the clutch 33 is in operation and the shaft 7 is driven by the engine 3, rotation will be imparted to the sprocket drum 18 which will in turn drive the endless chain 28, the sprocket drum 27ª turning idly with the travel of the chain. If the machine is then caused to move forward at a slow rate of speed by throwing the clutch 23 into operation, the scrapers or gatherers 30 will cut into any material of suitable character in front of the machine. As will be best seen in Fig. 2, all of the gatherers or scrapers 30 are curved so that their free ends are bent forward in the direction in which the scrapers or gatherers travel and it will also be seen that the gatherers or scrapers are so shaped that they barely clear a forwardly and downwardly inclined base plate 35 which is suitably supported beneath the frame F of the machine at the front. The base plate is inclined downward and forward to facilitate the passage of the plate under loose material gathered by the scrapers or gatherers and each scraper or gatherer has an extension or spur 36 which travels in front of the edge of the base plate 35, so keeping the space immediately in front of the base plate entirely clear of material which might interfere with its forward movement.

If the machine is in operation upon loose materials such as bedded ore or stored coal, the gatherers or scrapers 30 will cut into the material as the machine is slowly advanced and will scrape the material up on the inclined base plate 35, over which it will be pushed toward the hopper 37 through which it passes to the conveyer belt 38 which is arranged in a trench at one side of the storage area.

In Figs. 4, 5 and 6 I have illustrated a machine which operates in the same way as that above described but which presents some differences in the form of the scrapers or gatherers employed and has an agitating device by means of which the material upon which the machine operates is constantly stirred very slightiy at the surface to insure the gradual descent of masses from the upper portion of a storage pile while the machine is in operation thereon. In this machine the scrapers or gatherers 30ª are of slightly different form from those illustrated in Figs. 1, 2 and 3, each scraper or gather having its extension or toe 36ª curved and extended forward to a considerable extent, as shown in Fig. 5. In the gatherers or scrapers 30ª there is a forward curve of each scraper or gatherer from the upper margins toward the lower, which makes the general shape of each gatherer or scraper not unlike the point and mold-board of a plow. In this form of the apparatus the scrapers or gatherers are preferably formed in two sections, a point section 40 and a body section 41. The former is preferably cast integral with a shank 42 and the latter is riveted or bolted to a bracket 43 which is securely fastened to one of the plates 29 carried by the chain 28. The point section 40 is secured in position by riveting or bolting the shank 42 to the bracket 43 to which the main or body section of the scraper or gatherer is secured. The agitating device by which a gradual descent of the material toward the bottom of the pile is insured consists preferably of a triangular frame 44 provided with a suitable number of teeth 45 similar to those of an old fashioned harrow, and the frame 44 is carried by a rod 46 which is susceptible of rotation as well as sliding movement in suitable bearings 47. The angle at which the frame 44 is set is determined by any suitable adjusting device, such as the rope 47 and winding reel 48, the latter being mounted on the operator's platform of the machine. The movement of the frame 44 necessary to stir or agitate the material slightly is obtained from the shaft 18 by which the gatherers or scrapers are actuated. This shaft 18 is provided at the end with a small eccentric 49 which actuates a pitman 50 pivoted to a collar 51 which is se-

cured upon a rod 46 upon which the frame 44 is fastened. In this way a small amount of reciprocatory movement is constantly imparted to the frame 44 as long as the scrapers or gatherers are in operation.

By having the sprockets which support the scraper chain turn on axes that are horizontal, the clogging effect of the material which is often a serious drawback to the action of the flight conveyers is avoided, and by having the base plate over which the scrapers travel inclined downwardly and forwardly the tendency of the material to bank at the back of the plate is partially overcome, the inclination of the base plate and the curvature of the scrapers or gatherers being such as to about balance each other. By mounting each gatherer or scraper upon a separate plate and having the plates of such dimensions that they form a substantially continuous structure when alined, the material is prevented from ever rising above the upper edges of the gatherers or scrapers and interfering with the movement of the chain by which the gatherers or scrapers are supported and driven.

From the foregoing description it will be readily seen that the machine can be readily controlled by an operator standing on the platform provided at the top of the machine, and that the machine may be propelled rapidly either forward or backward when it is not desired to operate the scrapers or gatherers. It will also be seen that the rate of travel imparted to the machine by the propulsion devices which are intended for use when the machine is in operation is very slow, a speed of one inch a minute being ordinarily as much as is desirable.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent is:

1. In apparatus of the character specified, a gathering mechanism comprising a bed-plate, a flight conveyer having the leads superposed and having the flights extended beyond the forward margin of the bed-plate.

2. In apparatus of the character specified, the combination with a supporting carriage arranged to travel to and fro, of a gathering mechanism supported by said carriage and extending transversely of the line of movement of the carriage and comprising a bed plate and a series of flights arranged for travel over said bed plate and adapted to force material upward on the bed plate, said flights being extended beyond the forward margin of the bed plate.

3. In apparatus of the character specified, the combination with a traveling carriage, of a bed plate extending transversely of the line of travel of said carriage, and a gathering mechanism coöperating with the bed plate and including a series of flights which travel over the bed plate longitudinally thereof, said flights having their forward ends projecting beyond the front margin of the bed plate and being extended in the direction of their movement.

4. In apparatus of the character specified, the combination with a traveling carriage of a bed plate supported by said carriage and extending transversely of the direction of movement of the carriage, a plurality of curved flights arranged for travel over said bed plate longitudinally thereof, said flights having their forward ends bent in the direction of their movement in gathering material, and means for imparting gathering movement to said flights.

5. In apparatus of the character specified, the combination with a traveling carriage and a bed plate carried thereby and extending transversely of the line of travel of said carriage, of gathering mechanism coöperating with said bed plate and including a series of flights arranged for travel over said bed plate longitudinally thereof, and means for imparting movement to said flights, the flights having their forward ends extended beyond the forward edge of the bed plate and being curved in the direction of their movement over the bed plate.

6. In apparatus of the character specified, the combination with a traveling carriage and a bed plate extending transversely of the line of travel of the carriage, of gathering mechanism coöperating with said bed plate and comprising a series of flights arranged for travel longitudinally of the bed plate and having downwardly projecting portions beyond the front margin of the bed plate to maintain a clear space immediately in front of the bed plate.

7. In apparatus of the character specified, a material disturbing device comprising a forwardly inclined structure overhanging the material to be disturbed and means for imparting a lateral periodic movement to said structure.

8. In apparatus of the character specified, the combination with a traveling carriage and gathering mechanism carried thereby, said gathering mechanism being disposed transversely of the direction of travel of the carriage, and material-disturbing devices above said gathering mechanism for causing material to gravitate toward said gathering mechanism, said material-disturbing devices being extended over substantially the entire operative length of the gathering mechanism.

9. In apparatus of the character specified, the combination with a traveling carriage and gathering mechanism carried thereby, said gathering mechanism comprising a bed plate and an endless flight conveyer coöperating therewith, said gathering mechanism

being disposed transversely of the line of travel of the carriage, of means above the gathering mechanism for causing material to gravitate toward said bed plate throughout substantially its entire length.

10. In apparatus of the character specified, the combination with a traveling carriage and a gathering mechanism operating transversely of the line of travel of said carriage, of material-disturbing devices extending forward of said gathering mechanism to cause material to gravitate toward said gathering mechanism, said material-disturbing means comprising a frame and means for imparting a lateral periodic movement to said frame.

11. In apparatus of the character specified, the combination with a traveling carriage and gathering mechanism carried thereby and extending transversely of the line of travel of the carriage, of a toothed frame mounted above said gathering mechanism and extending at its base over substantially the entire operative length of said gathering mechanism, and means for agitating the said frame to cause material to gravitate toward said gathering mechanism.

12. In apparatus of the character specified, the combination with a traveling carriage, of gathering mechanism mounted on said carriage and disposed transversely of the line of travel thereof, and material-disturbing devices to cause material to gravitate toward said gathering mechanism, said material-disturbing devices comprising a forwardly inclined structure, means for adjusting the inclination of said structure, and means for imparting a lateral periodic movement to said structure.

13. In apparatus of the character specified, the combination with a traveling carriage, gathering mechanism mounted on said carriage and disposed transversely of its line of travel, and material-disturbing devices for causing material to gravitate toward said gathering mechanism, said material-disturbing devices comprising a toothed frame pivoted at its base on a horizontal axis above said gathering mechanism and means for varying the inclination of said frame.

14. In apparatus of the character specified, the combination with a traveling carriage and gathering mechanism carried thereby and disposed transversely of the line of travel of said carriage, of material-disturbing devices comprising a toothed frame pivoted at its base on a horizontal axis parallel to said gathering mechanism and susceptible of reciprocatory movement longitudinally of its pivotal axis, and means for imparting reciprocatory movement to said frame.

In testimony whereof, I have signed my name in the presence of two witnesses.

EDWIN H. MESSITER.

Witnesses:
H. RICHARD WÖBSE,
BAXTER MORTON.