

Oct. 1, 1946.

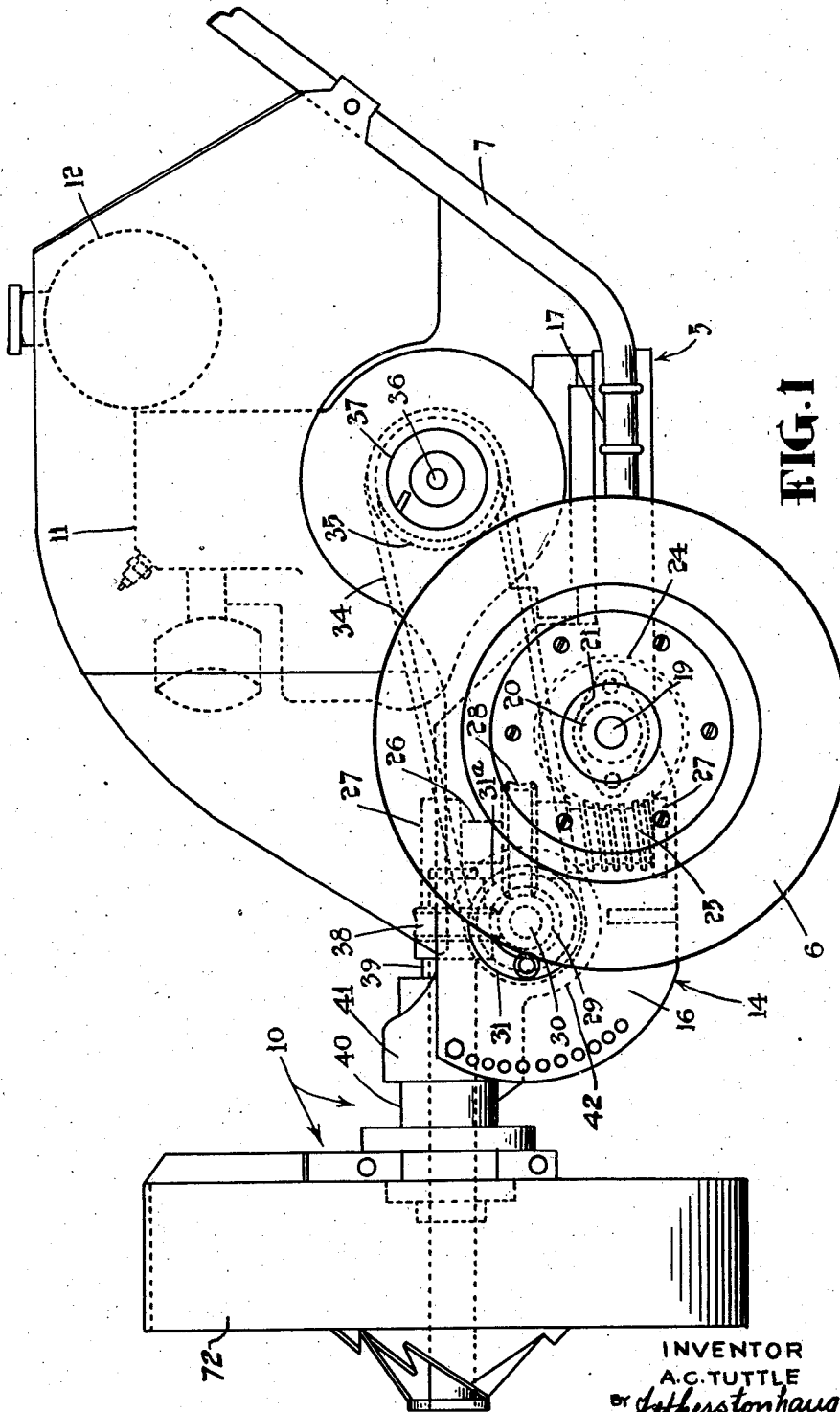
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2,408,459

PORTABLE POWER DRIVEN CONVEYER

Filed Dec. 30, 1944

4 Sheets-Sheet 1



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4 Sheets-Sheet 2

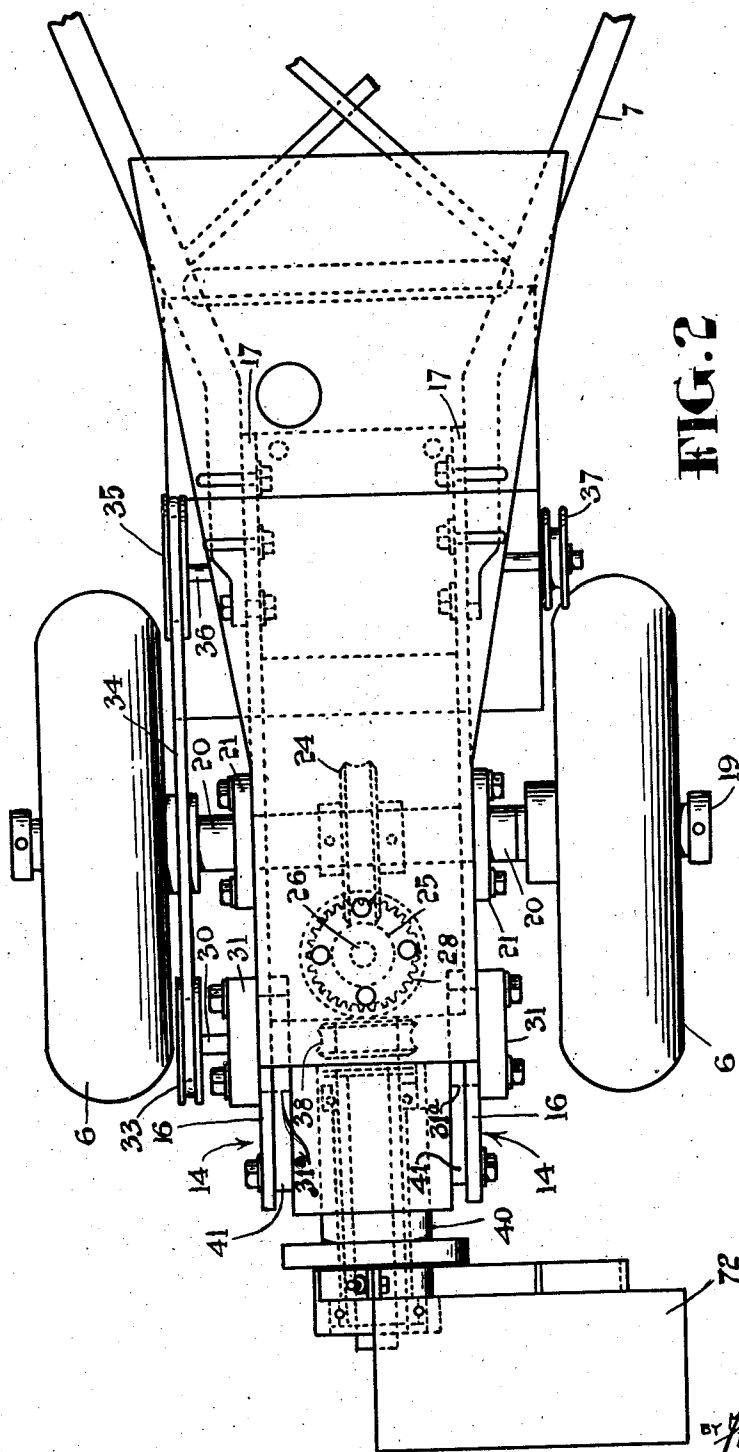


FIG. 2

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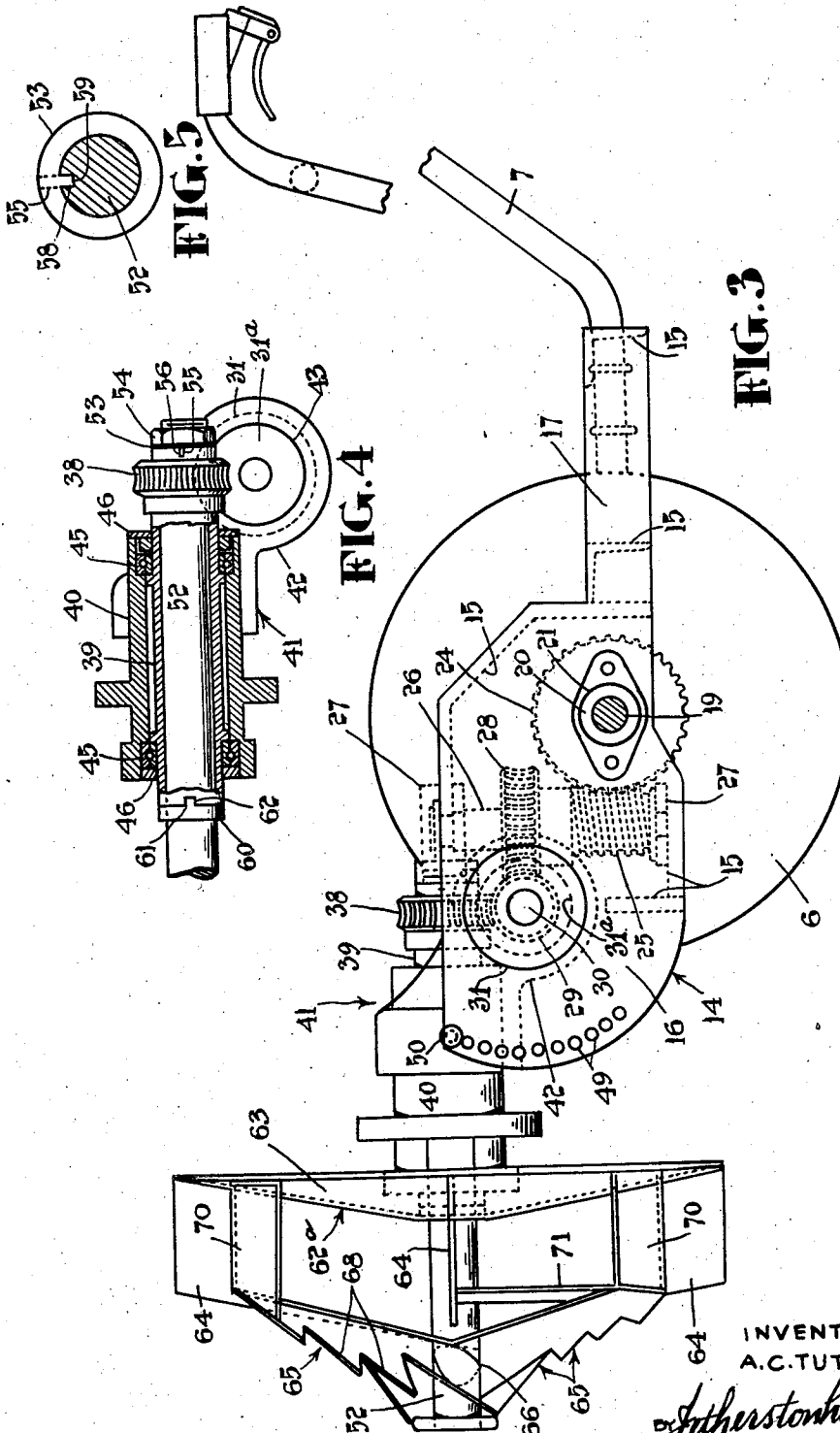
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4 Sheets-Sheet 4

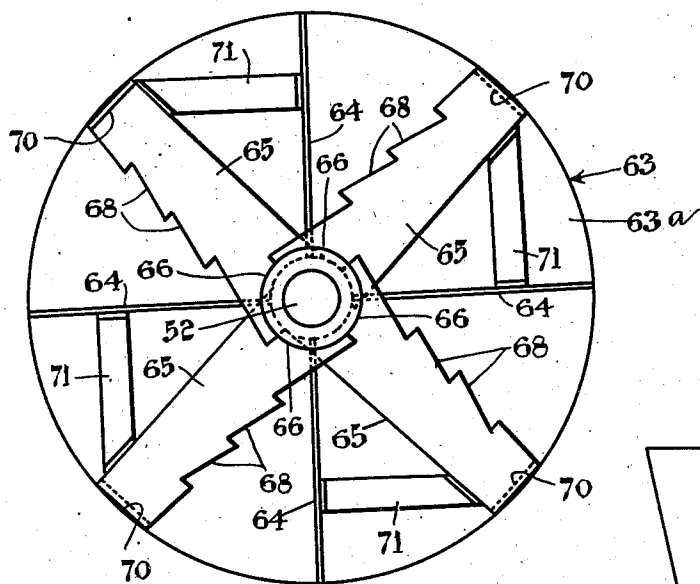


FIG. 6

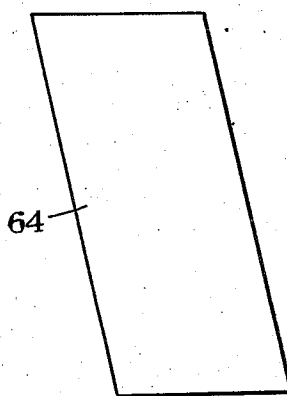


FIG. 7

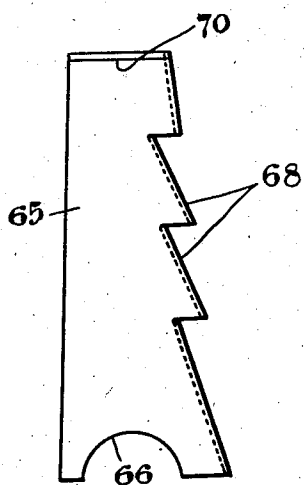


FIG. 8

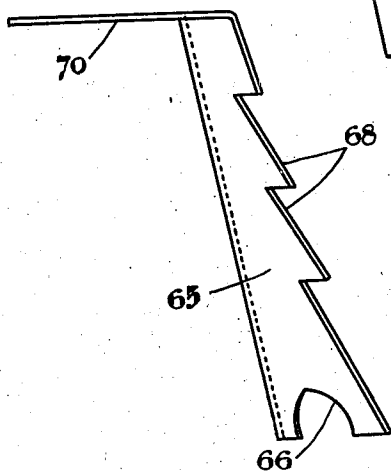


FIG. 9

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2,408,459

PORTABLE POWER-DRIVEN CONVEYER

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Application December 30, 1944, Serial No. 570,551

7 Claims. (Cl. 37-53)

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This invention relates to improvements in portable snow clearing machines of the type described in my co-pending application Serial No. 511,739, filed Nov. 25, 1943, and since issued as Patent No. 2,375,965.

The machine described in said application comprises a portable carriage mounting a snow clearing screw conveyer, a prime mover and drive mechanism through which the screw conveyer and, if desired, the ground wheels of the carriage are driven by the prime mover. The screw conveyer comprises a conical spindle gradually increasing in diameter toward its rear end and carrying a plurality of forwardly tapering vanes which are spiralled rearwardly around the spindle from the front end to an intermediate portion of the spindle and are then directed rearwardly in the axial direction of the spindle to provide integral paddle extensions encircled or partly encircled by a snow-deflecting hood or housing. When the machine is moved forwardly the vanes cut their way into the mass of snow which is forced rearwardly along the spiral portions of the vanes to the paddle extensions which serve to throw the snow at high velocity to an out-of-the-way location at one side of the path travelled by the machine.

The above mentioned screw conveyer is very efficient in operation but the fabrication and assembly of the component parts requires considerable time and labor and is fairly expensive. Another objection to the aforesaid screw conveyer is that it operates only in a horizontal position at a fixed distance above the ground level and therefore functions with maximum efficiency only when the level of the snow mass through which it is advanced is not appreciably below the smaller front end of the conical spindle on which the spiralled vanes are mounted.

With the foregoing in mind, one object of the present invention is to provide an improved snow clearing machine of the type mentioned in which the aforesaid screw conveyer is replaced by an equally efficient but simpler and less expensive screw conveyer in which the vanes and paddles are formed separately and are mounted on a portion of a supporting spindle which is of substantially uniform diameter.

Another object of the present invention is to provide an improved snow clearing machine of the type described in which the supporting spindle is adjustably mounted for swinging movement about a horizontal axis so that said spindle and the screw conveyer carried thereby may be shifted from a horizontal to various inclined positions

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without disrupting the drive connection between the spindle and the prime mover. This enables the operating position of the screw conveyer to be changed to suit the depth of snow through which the machine is moving and to thereby ensure efficient operation of the conveyer at all times.

Other objects, characteristic features and advantages of the invention will be more readily understood from the following detailed description of the accompanying drawings, in which—

Fig. 1 is a side elevation of a complete machine embodying my invention.

Fig. 2 is a top plan view of the assembly shown in Fig. 1.

Fig. 3 is a side elevation of the frame of the machine with the conveyer assembly mounted thereon.

Fig. 4 is a longitudinal sectional view of an adjustable yoke in which the spindle carrying the rotating parts of the conveyer assembly is mounted.

Fig. 5 is a detail view of a drive connection provided between certain elements shown in Fig. 4.

Fig. 6 is a front view of a conveyer element forming part of the conveyer assembly.

Fig. 7 is a side elevational view of one of the paddles forming part of the conveyer shown in Fig. 6.

Fig. 8 is a side view of one of the vanes forming part of the conveyer shown in Fig. 6.

Fig. 9 is a perspective view of the vanes shown in Fig. 8.

Referring more particularly to the drawings, 5 designates a portable carriage equipped with ground wheels 6 and handle member 7. This carriage supports a screw conveyer assembly 10, an internal combustion engine 11, a fuel tank 12 and the component parts of a drive mechanism (hereinafter described) through which the ground wheels and the power driven parts of the screw conveyer assembly are driven from the engine.

The frame structure or chassis of the carriage consists essentially of two vertically disposed side plates 14 secured together in spaced parallel relation by suitable transversely extending, connecting and bracing members 15 shown in Figure 3. These side plates 14 present relatively wide forward portions 16 and relatively narrow rearward portions 17.

The handle member 7 and engine 11 are secured to the rear portion of the carriage which is constituted by the narrow portion 17 of the frame plates 14.

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The ground wheels 6 are mounted on an axle 19 journaled in bearing bushings 20 fitted in suitable openings provided in the wide portions 16 of the frame plates 14. These bushings are provided with attaching flanges 21 secured to plates 14 by bolts 22 or other fastening means.

A worm wheel 24 is fixed to axle 19 and is driven by a worm 25 fixed to a vertical shaft 26 journaled in suitable bearings 27 carried by certain of the transverse members 15 connecting the frame plates 14. A worm wheel 28 fixed to shaft 26 is driven by a worm 29 fixed to a horizontal shaft 30 which is also journaled in suitable bearings 31 carried by the frame plates 14. A projecting end of shaft 30 carries a pulley or sprocket 33 which is driven by a belt or chain 34 from a pulley or sprocket 35 mounted on one end of the engine shaft 36. The opposite end of engine shaft 36 is equipped with a conventional starting pulley 37.

The worm 29 of shaft 30 also drives a worm wheel 39 fixed to one end of a hollow quill shaft 39 which extends through and is rotatably carried by a tubular bearing housing 40 forming part of a yoke 41 which is mounted to swing about a pivotal axis afforded by the shaft 30. In this connection it will be noted that yoke 41 includes laterally spaced supporting arms 42 inclining downwardly from the rear end of the tubular bearing housing 40 and provided with bearing openings 43 in which inward extensions 31a of bearing 31 are rotatably fitted. It will thus be seen that quill 39 and its bearing housing 40 are mounted to swing in a circular path about the pivotal axis afforded by shaft 30. Quill 39 is rotatably mounted in bearing housing 40 by means of anti-friction bearings 45 which serve, in conjunction with the retaining rings 46, to hold said quill against longitudinal movement relative to said bearing housing.

From the foregoing it will be seen that the quill 39 and its bearing housing 40 may be swung from the horizontal position shown in Fig. 1 to an inclined position extending downwardly and forwardly from the shaft 30. In order to permit the quill 39 and its bearing housing 40 to be secured in adjusted position the forward ends of the wider portions 16 of the frame plates 14 are provided with a series of openings 49 arranged in an arc concentric with the axis of shaft 30 and adapted to receive therethrough set screws 50 or other fastening members which are adapted for retaining engagement with the yoke 41.

The quill 39 supports and drives a spindle 52 forming part of the screw conveyer assembly 10. A rearwardly extending portion of spindle 52 is passed through the quill shaft 39 and is keyed to the rear end of the quill shaft by means of a driving washer 53 and a clamping nut 54. Washer 53 is provided with a forwardly extending driving projection 55 which is held in a notch 56 of the quill 39 by clamping nut 54. Washer 53 is also provided with a key projection 58 which is fitted in a key slot 59 provided in spindle 52. Spindle 52 is also keyed to the forward end of the quill shaft 39 by means comprising a shoulder 60 formed on the spindle and provided with a driving projection 61 fitted in a notch 62 provided in the forward end of the quill shaft 39.

A portion of spindle 52 which extends forwardly beyond the front end of quill shaft 39 has mounted thereon a conical disc 63, a plurality of radially extending paddles 64 located forwardly of the disc 63 and a plurality of vanes 65 located forwardly of the paddles 64. The disc 63 is ar-

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ranged on spindle 52 with its conical side 63a facing forwardly. The paddles 64 are arranged with their rear edges welded or otherwise secured to the conical side 63a of disc 63 and with their inner end edges welded or otherwise secured to spindle 52. Each paddle 64 is shaped so that, in its applied position, its forward and rearward radial edges lie substantially parallel with the conical surface portion of the disc 63 to which it is attached.

Each of the vanes 65 is made of gradually decreasing width toward its outer end and is provided at its inner end with a semi-elliptical spindle-receiving recess 66 in which the spindle 52 is fitted in securing these parts together. The vanes 64 are mounted on the spindle 52 so that they conjointly provide a screw conveyer by means of which the snow into which the vanes are advanced is conveyed rearwardly to the paddles 64 which serve to throw the snow at high velocity to one side of the path travelled by the machine. In this connection it will be noted that the width of each vane 65 extends diagonally across the central axis of the spindle 52 and that each vane 65 is inclined so that its upper end lies rearwardly of its lower end. The leading radial edge of each vane 65 is preferably serrated to provide cutting teeth 68 which enables the vane to readily cut its way into a packed mass of snow or other material. The upper end of each vane 65 is provided with an integral rearwardly directed extension 70 which has its rear end welded or otherwise secured to the conical surface of disc 63. These extensions 70 serve a dual purpose. They brace and support the upper ends of the vanes 65 and they also serve as peripheral cutters. Suitable bracing members 71 are also connected between the outer end of each vane 65 and one of the paddles 64.

From the foregoing it will be apparent, that in the operation of the machine described herein, the ground wheels 6 and the spindle driving quill 39 of the conveyer assembly are driven from the engine 11 through the agency of the flexible driving element 34 and shafts 30 and 26. It will also be apparent that, as the machine is moved forwardly, the cutting vanes 65 of the conveyer assembly will cut into a mass of snow or other material and move said material rearwardly to the paddles 64 which serve to throw the material to one side of the path travelled by the machine. The paddles 64 rotate within a semi-circular deflecting or housing wall 72 which is mounted on the yoke 41 and may be adjusted about said yoke to determine the direction in which the snow is propelled by the paddles. If the snow through which the conveyer assembly is advanced is deep this assembly will normally be arranged with spindle 52 in the horizontal position shown in Fig. 2. If the snow is not deep enough to permit the conveyer assembly to operate with satisfactory efficiency in the horizontal position such assembly may be swung downwardly about the pivotal axis afforded by shaft 30 and then fastened by the set screws 50 in a suitable downwardly and forwardly inclined position.

When desired the rotating parts of the conveyer assembly may be detached as a unit from the yoke 41 by removing the clamping nut 54 of spindle 52 and withdrawing the latter from the driving quill 39. This method of mounting the rotating parts of the conveyer assembly also has the advantage that, on removal of this assembly, the driving spindle of other tools may be inserted in the quill 39 and secured thereto in the

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same manner as previously described in connection with spindle 52.

Having thus described what I now conceive to be the preferred embodiment of my invention it will be understood that various modifications may be resorted to within the scope and spirit of the invention as defined by the appended claims.

I claim:

1. A machine of the character described comprising a portable frame, a transversely extending shaft rotatably journaled in said frame, means for driving said shaft, an adjustable bearing housing extending in a direction at right angles to said shaft and mounted for swinging movement about a center coinciding with the central longitudinal axis of said shaft, a spindle extending through said housing and rotatably carried thereby, means for driving said spindle from said shaft in all adjusted positions to which the housing is swung about said shaft, a conical disc carried by a portion of the spindle projecting from the end of the housing remote from said shaft, a plurality of radial paddles secured to said spindle and said disc and a plurality of vanes arranged around said spindle to conjointly provide a screw conveyer for conveying material along said spindle in the direction of said paddles, said vanes being secured to said spindle and to said disc and means for retaining said housing in any of the various positions to which it is swingable about said shaft.

2. A machine as set forth in claim 1, in which the means for driving said spindle from said shaft comprises a hollow quill shaft rotatably mounted in said housing and receiving the spindle therethrough and a worm wheel carried by said spindle and meshing with a worm carried by said shaft.

3. A machine of the character described comprising a portable frame, a transversely extending shaft rotatably journaled in said frame, means for driving said shaft, a worm fixed to said shaft, a bearing housing extending at right angles to said shaft and mounted to swing in a circular path about a center coinciding with the central longitudinal axis of said shaft, a hollow quill shaft extending through said bearing housing and rotatably mounted therein, one end of said quill shaft projecting beyond the end of the housing nearest said shaft and carrying a worm wheel meshing with said worm, means for securing said bearing housing in different positions of adjustment to which it is swingable about the aforesaid central axis of the shaft, a spindle extending through said quill shaft and fixed to rotate therewith, a conical disc mounted on a portion of the spindle projecting forwardly from the end of the bearing housing remote from said shaft, said disc being arranged with its convex conical surface facing forwardly, a plurality of radial paddles arranged around said spindle forwardly of said disc, each paddle having its inner edge secured to said spindle and its rearwardly located radial edge secured to the convex conical surface of said disc and a plurality of vanes arranged around said spindle forwardly of said paddles, each vane having its inner end secured to said spindle so that the width of the vane extends diagonally across the central axis of the spindle, said vanes being inclined in the longitudinal direction of the spindle so that their outer ends lie rearwardly of their inner ends and connecting members extending between the outer ends of said vanes and said disc.

4. A machine of the character described comprising a portable frame, a transversely extend-

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ing shaft rotatably journaled in said frame, means for driving said shaft, a worm fixed to said shaft, a bearing housing extending at right angles to said shaft and mounted to swing in a circular path about a center coinciding with the central longitudinal axis of said shaft, a hollow quill shaft extending through said bearing housing and rotatably mounted therein, one end of said quill shaft projecting beyond the end of the housing nearest said shaft and carrying a worm wheel meshing with said worm, means for securing said bearing housing in different positions of adjustment to which it is swingable about the aforesaid central axis of the shaft, a spindle extending through said quill shaft and fixed to rotate therewith, a conical disc mounted on a portion of the spindle projecting forwardly from the end of the bearing housing remote from said shaft, said disc being arranged with its convex conical surface facing forwardly, a plurality of radial paddles arranged around said spindle forwardly of said disc, each paddle having its inner edge secured to said spindle and its rearwardly located radial edge secured to the convex conical surface of said disc and a plurality of vanes arranged around said spindle forwardly of said paddles, each vane having its inner end secured to said spindle so that the width of the vane extends diagonally across the central axis of the spindle, said vanes being inclined in the longitudinal direction of the spindle so that their outer ends lie rearwardly of their inner ends, connecting members extending between the outer ends of said vanes and said disc and a plurality of bracing members each connecting the outer end of one of said paddles to the outer end of an adjacent vane.

5. A machine of the character described comprising a portable frame, a transversely extending shaft rotatably journaled in said frame, a spindle arranged at right angles to said shaft so that a portion of the spindle projects forwardly from said frame, means for rotatably mounting said spindle, means for driving said spindle from said shaft, a conical disc arranged on the spindle forwardly of said frame with the convex conical surface of the disc facing forwardly, a plurality of radial paddles arranged around said spindle forwardly of said disc, each paddle having its inner end secured to the spindle and its trailing radial edge secured to the convex conical surface of the disc, a plurality of vanes arranged around said spindle forwardly of said paddles to conjointly provide a screw conveyer, each vane having its inner end secured to the spindle so that the width of the vane extends diagonally across the central axis of the spindle, said vanes being inclined in the longitudinal direction of the spindle so that the outer ends of the vanes lie rearwardly of the inner ends and are positioned opposite portions of the disc which lie midway between said paddles, and vane connecting and bracing members extending between the outer ends of the vanes and opposing portions of the disc.

6. A machine as set forth in claim 5 in which the forwardly disposed radially extending edge of each vane is serrated to provide cutting teeth.

7. A machine as set forth in claim 5 in which the paddles are formed so that the leading and trailing edges of each paddle are substantially parallel with that portion of the convex conical surface of the disc to which the paddle is secured.

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