G. H. FRASER.

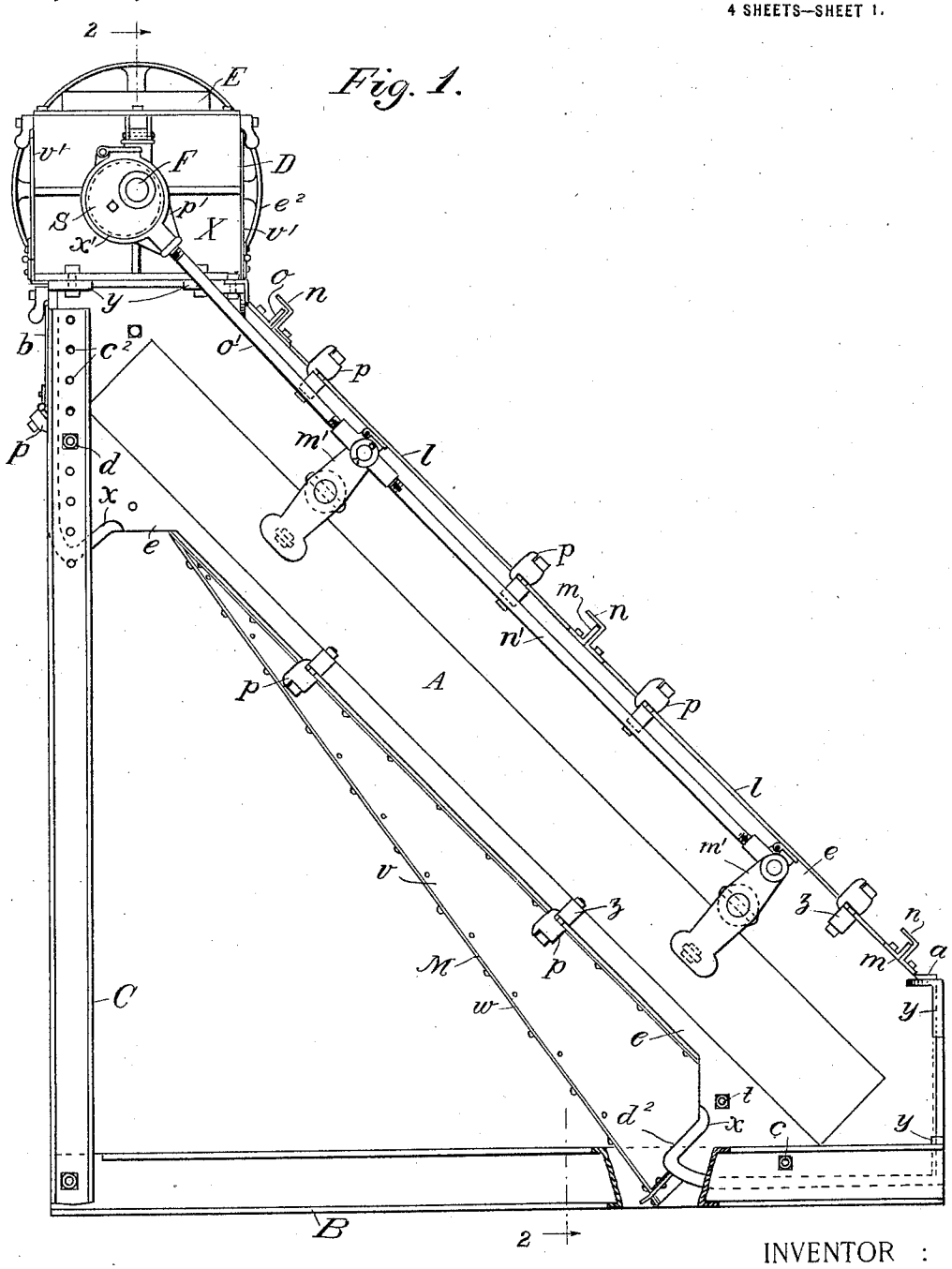
FEEDER OR REGULATOR FOR SCREENING APPARATUS.

APPLICATION FILED JUNE 11, 1915.

1,384,312. **Patented July 12, 1921.**

4 SHEETS—SHEET 1.

Fig. 1.



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FEEDER OR REGULATOR FOR SCREENING APPARATUS.

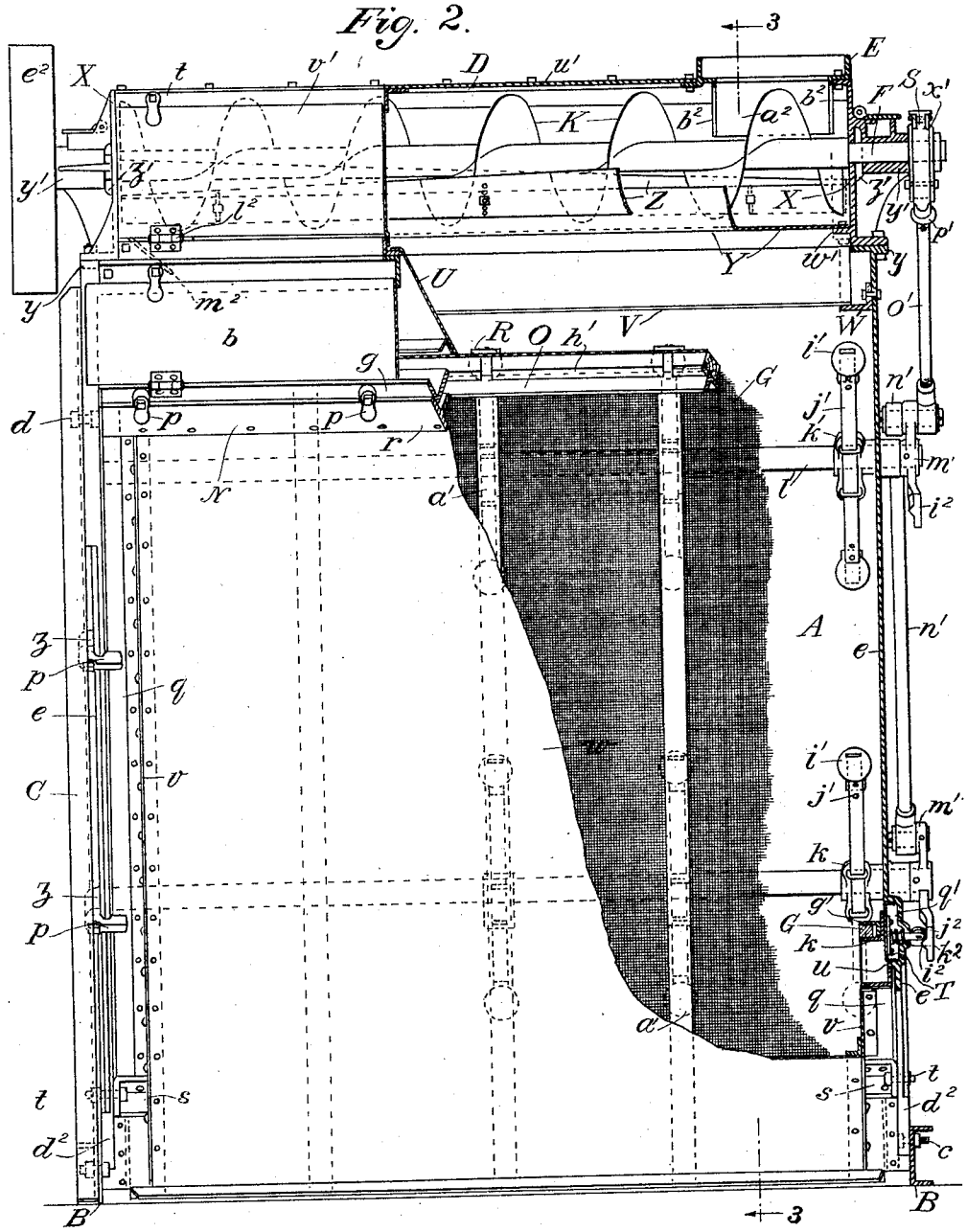
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4 SHEETS—SHEET 2.

Fig. 2.



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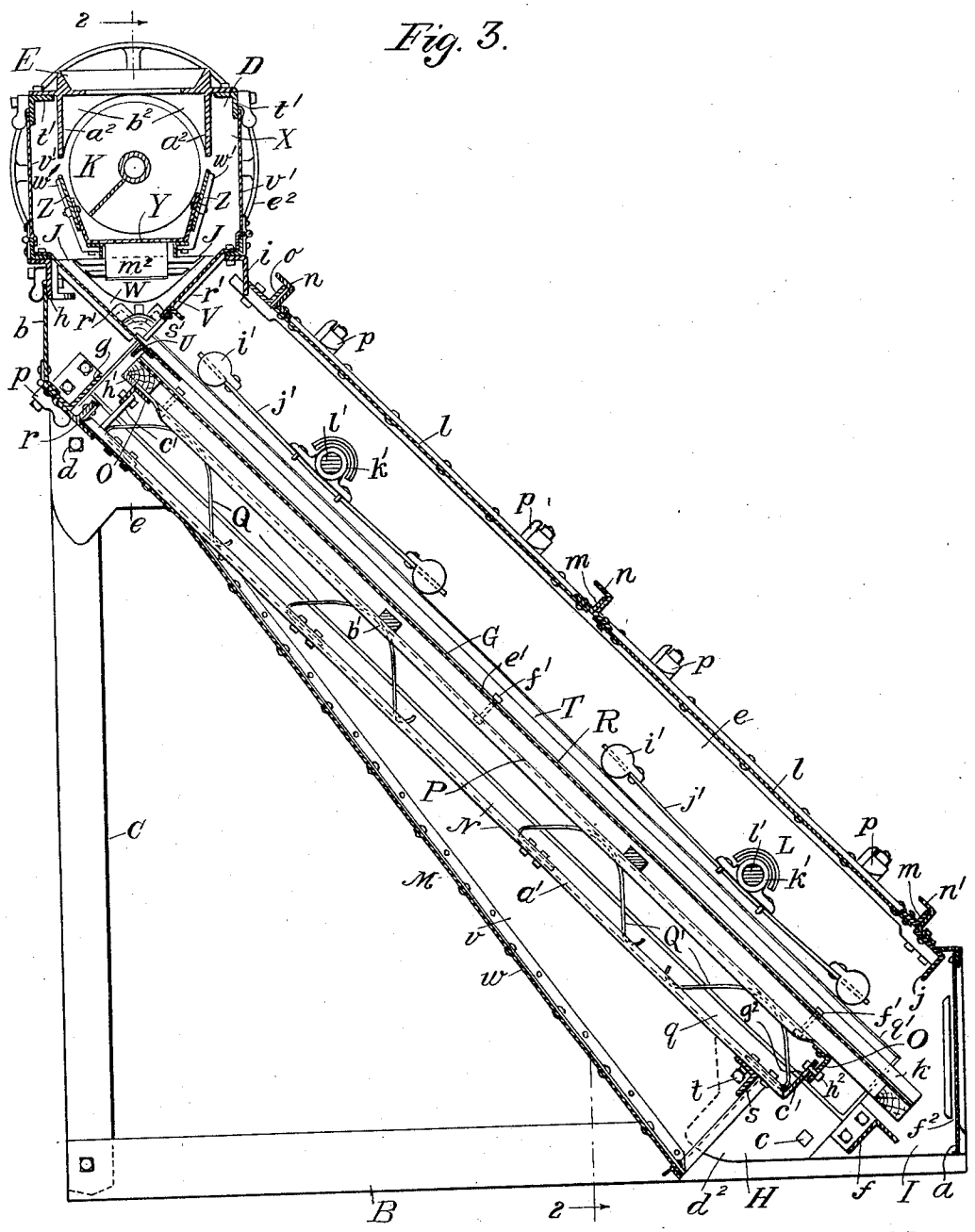
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4 SHEETS—SHEET 3.

Fig. 3.



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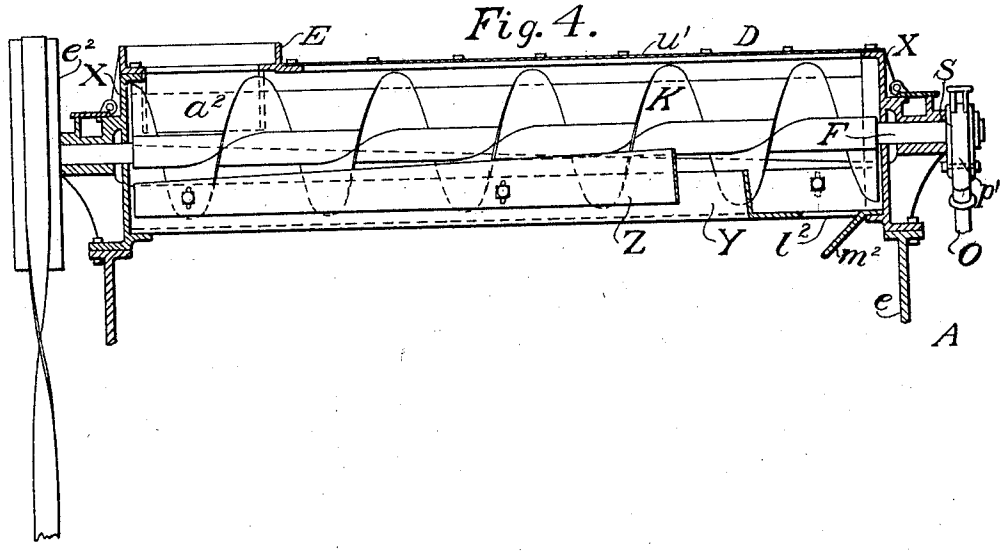
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4 SHEETS—SHEET 4.

Fig. 4.



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UNITED STATES PATENT OFFICE.

GEORGE HOLT FRASER, OF BROOKLYN, NEW YORK.

FEEDER OR REGULATOR FOR SCREENING APPARATUS.

1,384,312. Specification of Letters Patent. Patented July 12, 1921.

Original application filed June 15, 1906, Serial No. 321,856. Renewed December 27, 1915, Serial No. 68,919. Divided and this application filed June 11, 1915. Serial No. 33,464.

To all whom it may concern:

Be it known that I, GEORGE HOLT FRASER, a citizen of the United States, residing in the borough of Brooklyn, county of Kings, city and State of New York, have invented certain new and useful Improvements in Feeders or Regulators for Screening Apparatus, of which the following is a specification.

This application is a division of my application for improvements in screening apparatus filed June 15, 1906, Serial No. 321,856.

This invention relates to feeders or distributers for such devices as screening apparatus, and especially to apparatus of this character in which the material to be screened or sized is allowed to flow down an inclined screen through which the smaller particles fall to a fine outlet, and over which the larger particles flow to a coarse or tailing outlet.

Apparatus of this kind is used with one or more inclined screens, either stationary, vibrated, or jarred, inclosed in a casing, and used with a distributer for spreading the material to be screened over the upper part of the screen.

My invention aims to provide various improvements in apparatus of this general character, which will be hereafter more fully set forth with reference to the accompanying drawings, in which—

Figure 1 is an end elevation showing the preferred form of my invention;

Fig. 2 is a rear elevation thereof partly in vertical longitudinal section on the line 2—2 in Fig. 1, and looking in the direction of the arrow;

Fig. 3 is a vertical cross-section thereof cut on the line 3—3 in Fig. 2 and looking in the direction of the arrow, and partly broken away, and

Fig. 4 is a fragmentary vertical section looking in the direction of the arrow.

Referring to the drawings, A is the main body, B are its feet, C are its legs, D is the feeder body, E is the hopper, and F is the driving shaft. Within the body A is a screening member G, beneath which is the fines outlet, H, and in front of the lower end of which is the coarse outlet I. At the top of the screen is the inlet J, above which is a conveyer or other distributing feeder K. The material entering through the hopper E is distributed by the conveyer K throughout the length of the inlet J, from which it flows on to the screen G, down which it runs, the fines falling through and escaping through the fines outlet H and the coarse flowing down and passing out of the coarse outlet I.

As thus far described the parts may be of any usual or suitable construction.

According to the preferred form of my invention, I provide an improved construction for the main body A, the feeder D, an improved vibrating mechanism L, and I provide various details of improvement in construction, arrangement and operation, all of which will be more fully hereinafter set forth.

The body A consists of a tubular casing of substantially rectangular cross-section, closed at front by a front door *a*, which slides or is adjustable vertically in grooves formed in the body, and at rear by a hinged rear door *b*, which body has an open top beneath the feeder, and an open bottom at its front end for the outlets, and is pivotally mounted on its feet B at front by pins *c* or otherwise, and adjustably connected to the legs C by pins *d* or otherwise, so that the angle of the body can be set at the degree of inclination desired. The body A is preferably composed of two identical ends *e* of cast or other metal, united at their lower front part by a cross-piece or angle bar *f*, at the lower part of their rear ends by a bar *g*, at top by a cross-piece or angle bar *h* at rear and *i* at front, and at their lower front end by a cross-piece or angle bar *j*, which connections preserve the two sides in suitable relation. The top and bottom sides of the main casing are preferably both closed by removable walls or covers, the top by sheet metal covers *l* which have edges reinforced by angle irons *m* at bottom, and by Z-bars *n* at top, which are fitted together at their edges to hold the covers in place and prevent leakage of dust. Another Z-bar *n'* is carried by the casing below the covers, and above the covers a corresponding angle bar *o* is carried by the casing, to which bars the adjacent edges of the covers are fitted. By this construction any cover may be easily removed to get access to the screen member from in front. At each end each cover is also clamped by a swinging clamp *p* pivoted to the end wall *e*.

The bottom of the main body is a movable or removable door M, according to my invention, and preferably consists of a metallic frame N composed of upwardly extending angle bars q connected at top by a T-bar r and at bottom by an angle bar s, and carrying a sheet metal covering v and w closing the rear or bottom wall of the body. The door M preferably fits within the end walls and is pivoted thereto near its lower end by the pins t, so that its upper end can be swung downwardly to give access to the interior from the rear. It makes suitably tight connection with the end walls by contact of its frame with the shoulder u therein, and with the bar g by contact of the bar r therewith, and it is held in the closed position in any suitable manner, as by the gravity clamps p with which the top and bottom edges of the ends e are provided. The outer face of each end e is cast with a flange x fitting against the inner face of the feet B at the lower end, and the inner face of the leg C at the upper end, and with lugs y for connecting the feeder to these ends, and with ears z for carrying the clamps.

The screen member G is preferably mounted on the movable back M so that it can be removed or lowered with this back for giving access to the screens. It may be mounted directly on the frame N, but I prefer to support it movably thereover by a yielding frame P carried from the frame N by springs Q, and I prefer to provide a plurality of screen members G separably connected to the frame P, as by sliding them therein from the rear end, so that any one may be removed for repair either by sliding it out rearwardly without lowering the back door, or by lowering this door and then sliding it out, or by removing its clamps R and lifting it out. As shown, a number of channel bars a' are carried by the frame N, and the springs Q are mounted on these and on the end angles q, and the frame P consists of a number of inverted channel bars b' embracing the upper ends of the springs and having their ends connected by angle bars O embracing posts c' at the top and bottom of the bars a', for slidingly supporting the screen frame. The clamps R between the screen members G are shown as each consisting of a straight bar e' of strap iron connected to the frame P by a bolt f', and over each bar k the clamp consists of an inverted angle iron g'. The bolts f' may go through the leaf springs Q, to retain these in place. The upper end of each screen member G has a downwardly projecting portion h' which hangs on the screen frame P.

The screen may be moved, jolted or vibrated in any usual or suitable way, but I prefer to use the vibrators L which consist of a plurality of knockers i' loosely or elastically connected by spring arms j' and holders k', with shafts l' which extend through bearings in the end walls e, and are oscillated by arms m' which are connected together by an adjustable link n', and are connected by a link o' to the strap p' of an eccentric S driven from the shaft F. This eccentric has a throw sufficient to cause the knockers to move slightly farther than necessary for them to hit the clamps E over the screens, so that the knockers hit these clamps a suitable blow, and the elastic bars j' yield sufficiently to make up for any additional oscillation of the knocker shafts. The spring mounted screen frame may yield slightly under this blow, so that the screen will be jarred by the blow as well as slightly moved thereby. This jarring will be sufficient to prevent clogging of the screen, and to facilitate downward flow of material thereover.

Leakage between the end walls e and the side bars k of the screen frame may be prevented in any usual or suitable manner, but I prefer to cast the inner face of the end walls with a pocket q', and to mount on this face and in this pocket a yielding dust bar or plate T, which may be clamped against the end wall with an intervening packing strip, or may be sprung or pressed outwardly from this wall in such manner as to bear against the side of the screen frame and prevent leakage at this point, but which is preferably a spring pressed bar slidingly mounted in the pocket as shown.

The inlet J is directly above the screens, and preferably consists of two removable deflectors, the one U being inclined downwardly and forwardly and resting on and lapping the top of the screen for a suitable distance, and the other V being inclined downwardly and rearwardly and terminating a suitable distance above the deflector U to give the necessary clearance for the inlet J, these deflectors being so disposed that feed from either the rear or the front side of the feeder will be directed downwardly and forwardly on to the top of the screen. The deflectors are removable through the feeder casing, and are carried by a cast iron carrier W bolted to the inner face of each end wall e. This carrier has flanges r' projecting inwardly from the end walls to prevent leakage past the ends of the deflectors, which flanges are notched near the bottom to permit the deflector U to pass downwardly, and are provided with a curved wall s' for directing material on to the deflector U. The back of each carrier is recessed to clear the dust plate T, and the lower corner is notched to clear the screen.

As shown the feeder or distributer is bodily reversible to bring its hopper at either end. Its casing is removably and reversibly mounted and comprises two cast

metal end walls X connected by angle irons t', closed at top by a removable and reversible sheet iron top wall u' from one extremity to the hopper E, which latter is removably and reversibly mounted and closes the remainder of the top, closed at front and rear by doors v', and removably bolted to the top of the body A. The distributing conveyer K is reversible both in position and drive and extends from end to end of the feeder casing, and beneath the conveyer the feeder has a removable and reversible trough Y flanked on each side of the conveyer by a removable and reversible adjustable feed plate Z, which is mounted to be tilted to the necessary angle to cause the material distributed by the conveyer to flow out of the trough in substantially uniform quantity throughout its length. My invention provides a removable and reversibly inclinable feed edge, preferably an adjustable plate at each side of the conveyer, and a clearance or discharge outlet at each side, so that the conveyer may discharge to the front or to the rear as desired, according to the direction that it is driven, thus avoiding the necessity for reversing the feed hopper or for using a left hand conveyer. The trough Y is a plate having upwardly bent edges, and is supported from lugs within the casing D by two transverse angle bars, or is otherwise suitably constructed, and has inclined sides to which the feed plates are applied. The end plates X are formed with correspondingly inclined internal flanges w' for supporting the trough, and feed plates, on the lower ends of which flanges are lugs for the angle bars supporting the trough.

The eccentric S has a shoulder against which the eccentric strap p' bears, and on its outer end the eccentric is covered with a dust plate x' which protects it from dirt. The strap is provided with an oil well, and each of the bearings are likewise provided for lubrication. The bearings y' for the driving shaft F are spaced apart at z' from the wall to permit any dust which may escape from the feed casing along the shaft to fall downwardly instead of entering the bearings.

The feed hopper E is formed with a depending flange a^2 at each side to prevent material from jumping across from the hopper directly over the feed board, and with a vertical neck b^2 to direct the feed downwardly on to the conveyer.

The legs C are formed with a plurality of holes c^2 through any of which the bolts d may be passed to support the body A from the legs at the desired angle.

Each end piece e is formed with a projecting ear d^2 which laps the side wall v of the bottom door M, and has a curved edge struck from the center of the pivotal pin t, and the lower edge of the side wall v extends out under the projection d^2 to prevent leakage beneath the latter at the sides.

The angularity of the screen G is fixed relatively to the body, and its steepness is adjusted by adjusting the entire body until the desired angle for the screen is obtained, but I prefer to construct the bottom M of a greater steepness than that of the screen in order to insure free flow of the screened material, which owing to its fines is not likely to flow as freely as the coarser material.

The posts c' will project in the direction in which it is desired that the yielding frame P shall reciprocate, and are formed with slots g^2 through which are passed bolts h^2 in the ends of the frame P, which bolts act as stops to arrest the upward movement of this frame, while permitting it to freely descend when the springs are compressed. Thus the frame P slides up and down on the posts in its movement under the action of the mechanism L, and is abruptly stopped at a predetermined point in its upward movement. The effect of this is to permit the material on it to rise and to jar out of the meshes of the screen any pieces that may have wedged therein.

When an end motion or knock for the screen is desired, this may be attained in any suitable manner, but I prefer to put a cam i^2 on the lower side of the oscillating arms, and have it run against a roller j^2 fastened to the adjacent end dust bar T, and passing through slots in the ends e, and to provide springs k^2 for pressing the screen toward this roller. The roller rides up the bevel of the cam and compresses the spring, and when the roller passes to the opposite side of the cam, the spring presses the screen back until its roller strikes the cam, thus giving it the desired movement and jar transversely of the flowing material. The cam i^2 can be on the eccentric S and work a lever.

To provide for this end motion, the internal pockets in the ends e are preferably deep enough to give the necessary clearance for end motion, and the side dust plates are angle or channel bars sliding in these pockets and having flanges of sufficient width to allow for the desired motion without escaping from the pockets.

The vibration of the screen insures flow of material down it when it is relatively flat, but as the bottom is without vibration, the fine material is liable to stick thereon unless the angle is relatively steep, and to avoid this my invention provides a greater angularity for the bottom wall than for the screen.

In operation, the driving pulley e^2 being on either end of the shaft F, and the eccentric and arms m' being on the other end, the feed hopper will be placed at either end

of the feeder according to convenience, and the conveyer K will be driven in such direction as to propel the material fed through the trough Y toward the other end of the machine. The feed board Z at the side of the conveyer where the flights are rising will be tilted until the material flows over its edge in a substantially uniform volume from end to end. This will be determined by opening the front or rear door of the feed casing and adjusting the feed board by hand until a satisfactory distribution of material is obtained. If the feed is flowing over the rear board it will fall on the deflector U, slide down this on to the screen G, and flow over and through the latter, the coarse going to the outlet I and the fines to the outlet H. If the feed is over the front board Z it will fall on to the deflector V and slide rearwardly down this until it falls on to the deflector U, from which it will slide on to the screen. The screen vibrates the deflector U.

At the end of the trough remote from the hopper the trough is usually formed with an opening l^2 to permit escape of material which has not been thrown over the feed plate. I provide an inclined deflector m^2 here, which preferably consists of the bent down portion of the metal cut from the trough, which is bent at an angle to direct the material falling through this opening obliquely, either back toward the middle of the screen, or laterally toward the front or rear deflector plates, thus preventing such material from flowing down close to the edge of the screen.

If vibration of the screen is desired, the vibrating mechanism L will be connected to the screen and adjusted to knock with the desired force. In such case the strikers i' will pound the screen clamps with equally rapid blows, and the screen will vibrate sufficiently to keep itself clean and to cause the material to flow rapidly. The springs Q will yield slightly under this vibration, and the knocker straps j' will flex slightly, thus providing for a slight lost motion effect.

To inspect the surface of the screen, one or both doors l may be removed. To withdraw or repair any screen frame, the clamps R over it may be loosened, and it may be drawn out bodily through the back door b by slightly lifting the deflector U, or the entire bottom M with the screens and screen frames may be oscillated downward by releasing the clamps p, and any of the screens may be repaired in place, or may be slid outward, or lifted out and recovered. On reassembling the screens, the hinged bottom M can be closed up and clamped, and the machine is again ready for operation.

Where great steepness is desired for the screen, the body can be adjusted upwardly and the bolt d fastened in one of the upper holes. If less steepness is desired, the body can be connected to one of the lower holes c^2 of the leg C. The front end of the body will rock on the pin c throughout these adjustments without clearing the side walls of the feet B, which walls serve to prevent escape of dust at the sides of the separator in all its normal positions.

The front door a may be adjusted vertically to permit discharge wholly or partially through the front of the separator, for which purpose it is loosely mounted to slide in the groove f^2, which is duplicated at each end of the part e.

For transportation, the parts can be shipped erected as shown, or if desired the body A may be folded down between the feet B, and the legs C can be disconnected from the feet and folded up on top of the feet, whereupon the whole can be crated with great compactness; or where even a closer packing is desired, the feed casing D with its inclosed parts can be separated from the body and shipped separately. If desired the casing A can be taken apart and shipped in pieces, all the parts being separably connected together to facilitate this.

It will be noted that the angles t' of the lower corners of the feed casing are so disposed that they form shelves on which the material can build up to seal the joint at the lower edge of the front and rear doors v', and thus prevent leakage beneath these, and that the bar g is so arranged that dust can accumulate above it and seal the joint at the bottom of the door b, and also that the angle o is adapted to collect a body of material to seal the joint between itself and the angle i at the front of the body A.

It will be seen that my invention provides a feeding apparatus which is simple, strong and compact, and which combines easy accessibility with a wide range of adjustment; also that it provides a device which can be driven in either direction and for reversing any of the parts, and one in which the mere shifting of the feed hopper from one end to the other suffices to adapt the machine for receiving at either extremity.

It will be understood that my invention is not limited to the particular details of construction, combination of parts, or method of operation, herein set forth and shown as constituting its preferred form or adaptation, since my improvements can be availed of in whole or in part according to such modifications as circumstances or the judgment of those skilled in the art may dictate, without departing from the spirit of my invention.

What I claim is:—

1. In combination, housing means affording an elongated distributing chamber, a reversibly revoluble longitudinally feeding

laterally discharging distributing screw conveyer mounted in said chamber, stationary means affording a trough for said conveyer affording a discharge outlet at and extending longitudinally of each side of said conveyer, adjustable means adjustably mounted as to and extending longitudinally of said stationary means for varying said outlets respectively and affording at each side of said conveyer an adjustable discharge edge extending longitudinally of said conveyer and spaced apart from the longitudinal walls of said chamber to afford a passage at each side of said trough for material distributed by said conveyer, and adjusting means for adjusting said adjustable means respectively.

2. In combination, housing means affording an elongated distributing chamber, a reversibly revoluble longitudinally feeding laterally discharging distributing screw conveyer mounted in said chamber, stationary means comprising a member below and affording a trough for said conveyer affording a discharge outlet extending longitudinally of each side of said conveyer, movable means movably mounted relatively to and at each side of said stationary means and extending longitudinally of and at each side of said conveyer for varying said outlets and spaced apart from the longitudinal walls of said chamber to afford a passage at each side of said trough for material distributed by said conveyer, and means for moving said movable means to vary said outlets.

3. In combination, housing means affording an elongated distributing chamber, a reversibly revoluble longitudinally feeding laterally discharging distributing screw conveyer mounted in said chamber, stationary means comprising a member below and affording a trough for said conveyer affording a discharge opening at and extending longitudinally of and at each side of said conveyer, inclinable adjustable means adjustably mounted as to said trough at and extending longitudinally of each side of said conveyer respectively and reversibly inclinable to reversely vary said outlets respectively and spaced apart from the internal walls of said housing to afford a passage at each side of said trough for material distributed by said conveyer, and adjusting means for adjusting said inclinable means relatively to said trough.

In witness whereof, I have hereunto signed my name in the presence of two subscribing witnesses.

GEORGE HOLT FRASER.

Witnesses:

SIGVARD G. HELLEM,

GUSTAV SCHONHEIT.