D. HRYNIEWICH.

GRAIN SEPARATOR.

APPLICATION FILED MAY 11, 1921.

1,415,568.

Patented May 9, 1922.

5 SHEETS—SHEET 1.

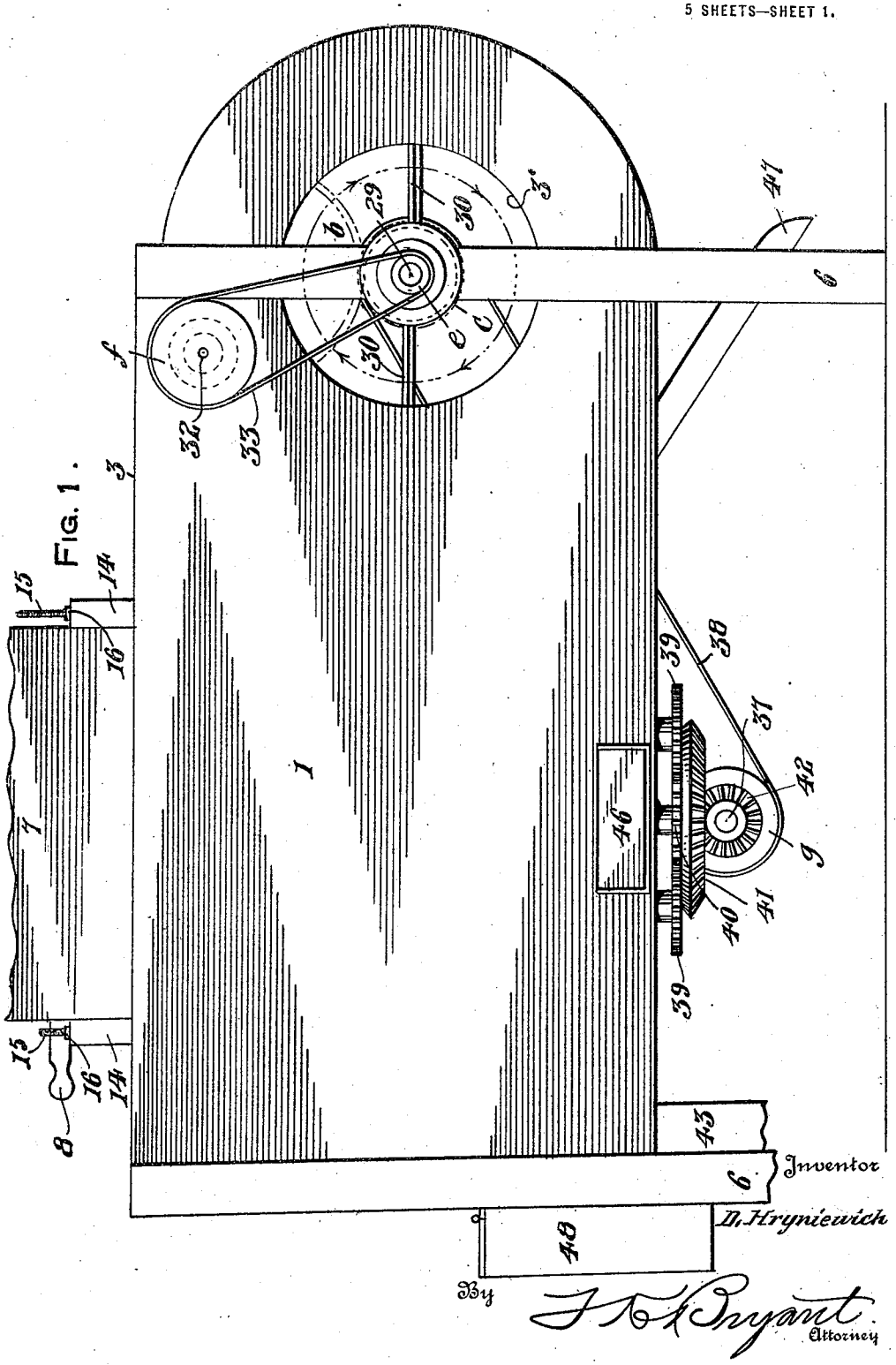


FIG. 1.

D. HRYNIEWICH.

GRAIN SEPARATOR.

APPLICATION FILED MAY 11, 1921.

1,415,568.

Patented May 9, 1922.

5 SHEETS—SHEET 2.

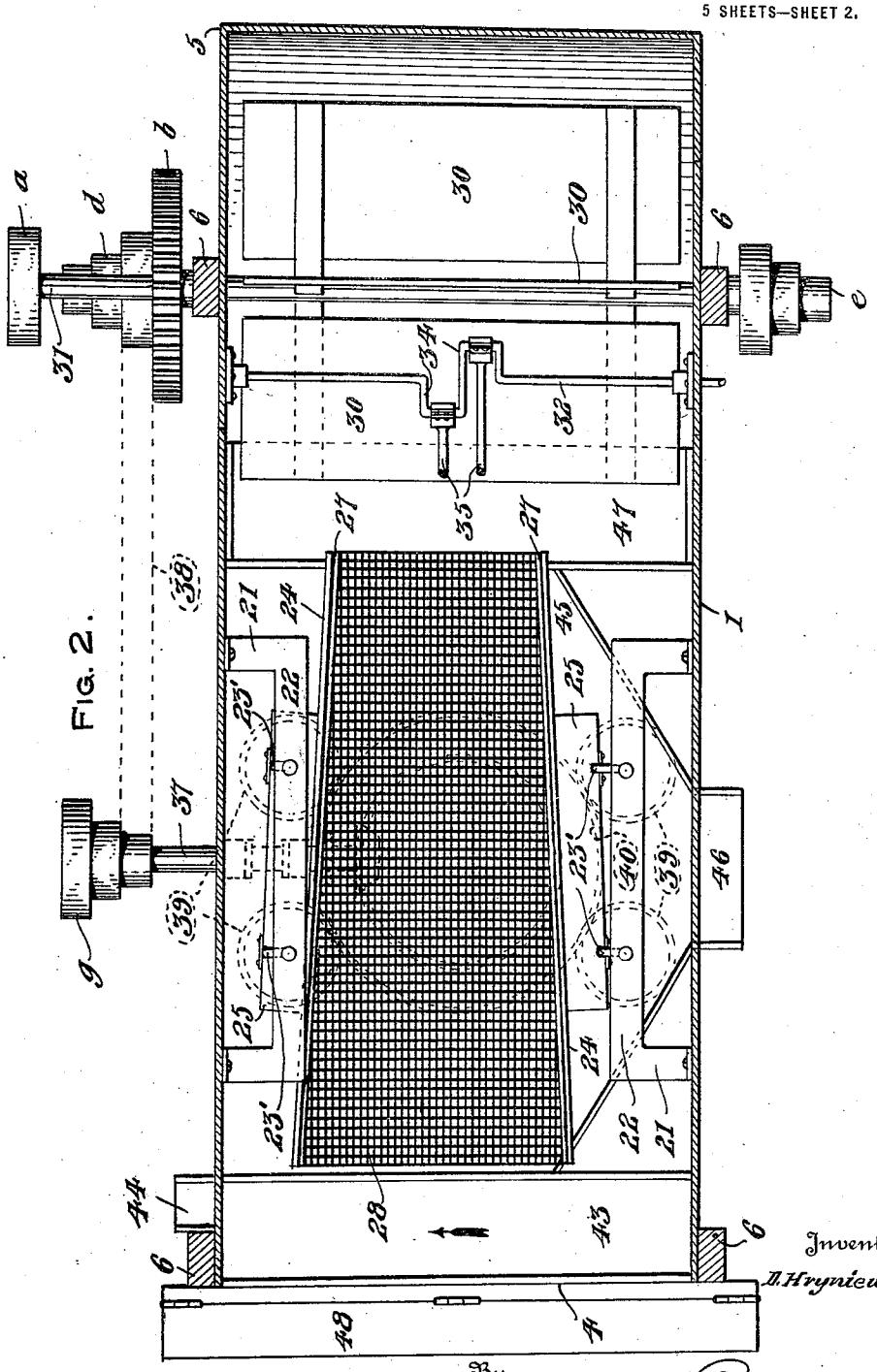


FIG. 2.

Inventor
D. Hryniewich

By
Attorney

D. HRYNIEWICH.

GRAIN SEPARATOR.

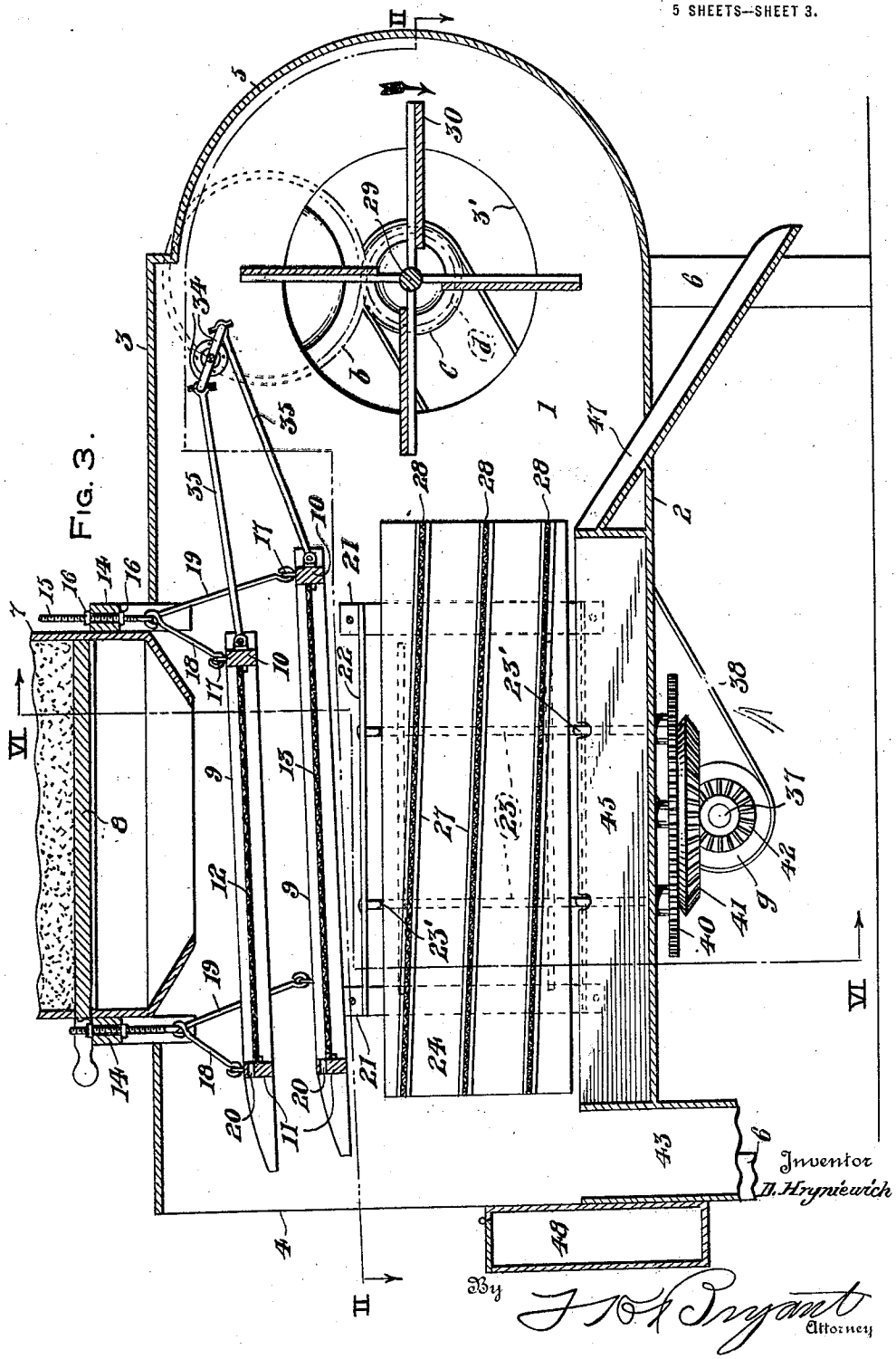
APPLICATION FILED MAY 11, 1921.

1,415,568.

Patented May 9, 1922.

5 SHEETS—SHEET 3.

FIG. 3.



D. HRYNIEWICH.

GRAIN SEPARATOR.

APPLICATION FILED MAY 11, 1921.

1,415,568.

Patented May 9, 1922.

5 SHEETS—SHEET 4.

FIG. 5.

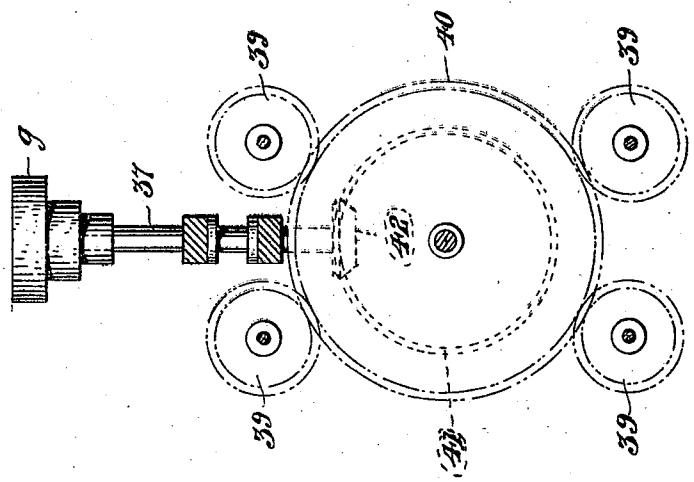
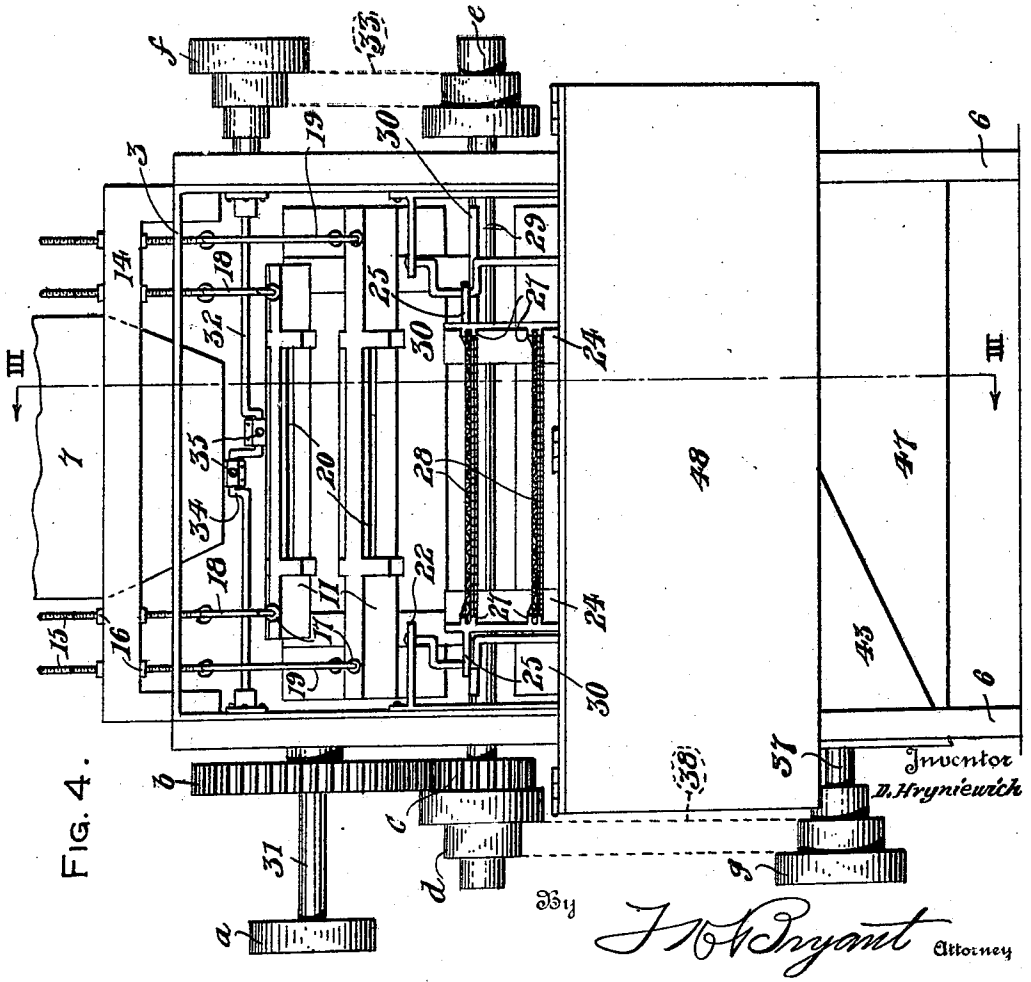


FIG. 4.



D. HRYNIEWICH.

GRAIN SEPARATOR.

APPLICATION FILED MAY 11, 1921.

1,415,568.

Patented May 9, 1922.

5 SHEETS—SHEET 5.

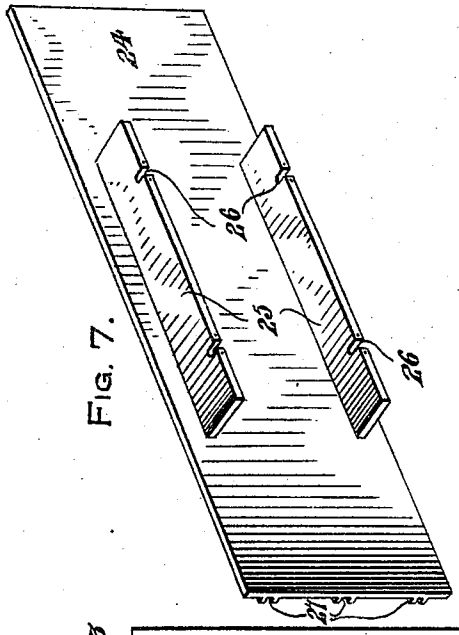


FIG. 7.

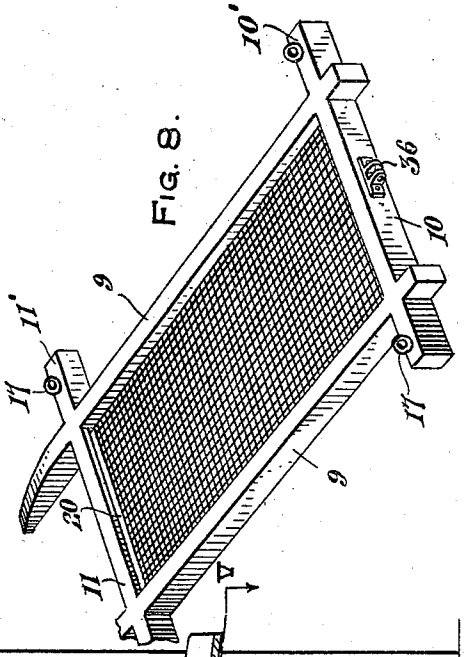


FIG. 8.

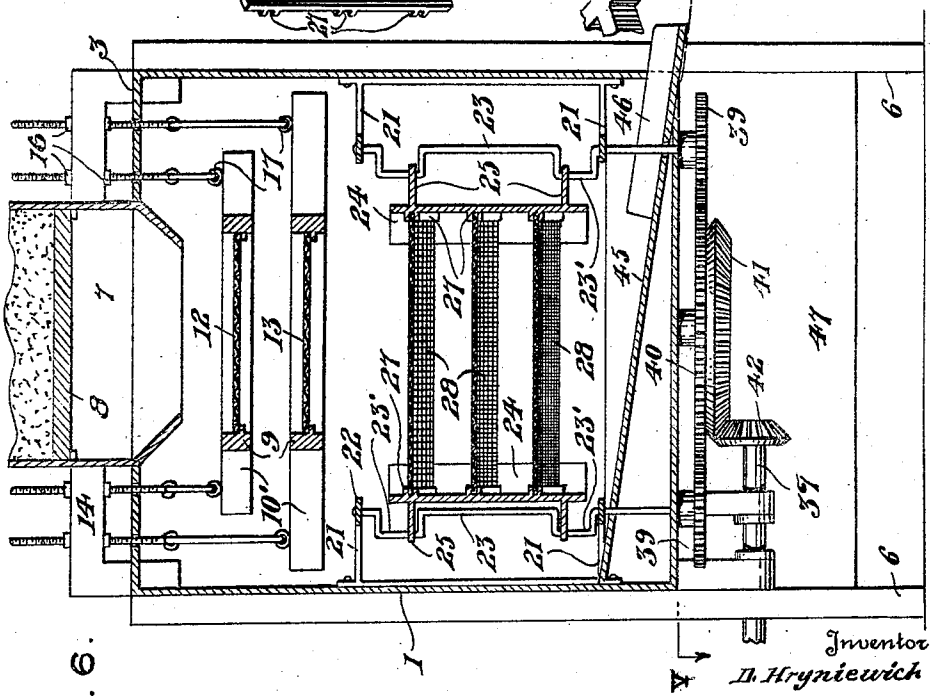


FIG. 6.

Inventor
D. Hryniewich

By F. A. Bryant

Attorney

UNITED STATES PATENT OFFICE.

DMITRO HRYNIEWICH, OF LIVERMORE, PENNSYLVANIA.

GRAIN SEPARATOR.

1,415,568. Specification of Letters Patent. Patented May 9, 1922.

Application filed May 11, 1921. Serial No. 468,550.

To all whom it may concern:

Be it known that I, DMITRO HRYNIEWICH, a citizen of the United States of America, residing at Livermore, in the county of Westmoreland and State of Pennsylvania, have invented certain new and useful Improvements in Grain Separators, of which the following is a specification.

This invention relates to certain new and useful improvements in grain separators and has particular reference to that type of machine embodying a plurality of vibrating screens having a fan associated therewith for blowing chaff from the grain and also for blowing the finer grains from the sifting screens into a lateral receptacle, the grains passing through grading screens for discharge into different receptacles.

A further object of the invention resides in the provision of a grain separator wherein a plurality of vibrating screens is employed, the screens separating and grading the grains, vibratory reciprocating movements being communicated to certain ones of the screens while the other screens are given a circular shaking motion.

With the above general objects in view and others that will become apparent as the nature of the invention is better understood, the same consists in the novel form, combination and arrangement of parts hereinafter more fully described in connection with the accompanying drawings, and in which like designating characters refer to corresponding parts throughout the several views.

In the drawings,

Figure 1 is a side elevational view of a grain separator constructed in accordance with the present invention,

Figure 2 is a longitudinal horizontal sectional view taken on line II—II of Figure 3, showing the fan wheel and one of the vibrating screens,

Figure 3 is a vertical longitudinal sectional view taken on line III—III of Figure 4 showing the several vibrating screens within the casing, the gate controlled feed hopper and the fan blower,

Figure 4 is an end elevational view of the machine showing the driving connections for the shifting parts,

Figure 5 is a horizontal sectional view taken on line V—V of Figure 6 showing the driving mechanism for the circular motion vibrating screens,

Figure 6 is a vertical cross sectional view taken on line VI—VI of Figure 3 showing the driving mechanism with the crank shafts for the circular motion vibrating screens and the adjusting screws for varying the height of the reciprocating vibratory screens,

Figure 7 is a perspective view of one of the side supports for the circular motion vibrating screens, and

Figure 8 is a perspective view partly broken away of one of the reciprocating vibratory screens.

Briefly described, the invention embodies a grain separator wherein a plurality of vibratory screens is arranged within a casing, the screens being arranged in superposed relations and of relatively increasing finer mesh toward the lower screen, the upper screens being given alternating reciprocatory vibrating motions while the lower screens are carried by mounting plates attached to vertically disposed crank shafts for imparting a circular vibratory motion thereto. A fan blower is arranged in one end of the casing, and is employed for directing the blast of air over the screens to remove therefrom the chaff, the grains being graded by the screens for delivery into separate compartments provided with outlet chutes. By the provision of pulley and belt connections, the several screens and fan are driven from a single source of power while the grain delivered to the screens is controlled by a manually operable gate.

Referring more in detail to the accompanying drawings and particularly to Figure 3, there is illustrated a grain separator embodying a casing comprising side walls 1, a bottom wall 2 and a top wall 3, one end of the casing being open as indicated at 4 while the other end thereof is closed by an outwardly arched wall 5, the casing being supported on corner legs 6.

An opening is provided in the upper wall 3 of the casing to accommodate the lower end of a grain hopper 7 controlled at its lower open end by a sliding gate 8.

A pair of separating screens is disposed within the casing adjacent the upper end

thereof and directly beneath the hopper 7 for vibratory reciprocating movements, these screens being more clearly shown in Figures 3 and 8, each including a rectangular frame embodying side bars 9 and transverse end bars 10 and 11, the transverse bars 10 and 11 carrying end extensions 10′ and 11′ for purposes presently to appear. The frames are provided with wire screens 12 and 13, the mesh of the screen 13 being relatively finer than the mesh of the screen 12, while the screen 13 and its supporting frame is of greater length than the superposed screen to insure the deposit of all grains sifted through the screen 12. The mounting of the reciprocating screens embodies transversely extending U-shaped brackets 14 clearly shown in Figures 3, 4, and 6 having the ends thereof supported in the upper wall 3 of the casing. Adjusting screws 15 extend perpendicularly through the brackets 14 and are vertically adjustable therein by the nuts 16 threaded on the screws 15. As shown in Figure 6, the lateral extensions 10′ and 11′ of the frame supporting the lower screen 13 extend laterally of the extensions of the frame supporting the upper screen 12, each extension carrying an eye bolt 17 to be engaged by links 18 and 19, the other ends of the links being attached to the lower ends of the adjusting screws 15. The forward transverse bars 11 of each screen supporting frame are provided with elongated slots 20 to permit the end escape of the small grains for delivery into a suitable receptacle to be later described.

A circularly moving shaking or vibrating screen construction is disposed beneath the reciprocating screens 12 and 13 and is shown more clearly in Figures 3, 6, and 7, the side walls 1 of the casing having bracket arms 21 secured thereto and projecting inwardly in opposed relations with longitudinal strips 22 extending between the inner ends of the bracket arms. Vertically disposed crank shafts 23 are journaled in the bracket strips 22 with the crank portions 23′ constituting supports for the shaking screen frame. This frame embodies side plates 24, shown in detail in Figure 7, carrying outwardly directed flanges 25 having the edges thereof notched as at 26 for receiving the crank portions 23′ of the crank shafts 23 with the open ends of the notches suitably closed by a strap or other device. The inner faces of the plates 24 are provided with longitudinally extending inclined guide cleats 27 between which the screens 28 are slidably mounted, the screens being of relatively increasing finer meshes extending from the upper screen to the lower screen.

A shaft 29 extends transversely of the casing adjacent the arched end 5 and has secured thereto a fan wheel 30 travelling in the direction of the arrow as indicated in Figure 3 for purposes of separating the chaff from the grain and for separating the grains when sifting through the lower screens 28.

The power mechanism for operating the screens 12, 13 and 28, and the fan wheel 30 embodies a power shaft 31 carrying a motor driven pulley —*a*— and a gear wheel —*b*—, the shaft 31 being journaled in one of the side walls of the casing as shown in Figures 2 and 4. The shaft 29 journaled transversely of the casing has secured to one projecting end thereof, as shown in Figure 4, a pinion —*c*— in engagement with the gear —*b*— and is further provided with a stepped pulley —*d*— arranged adjacent the pinion —*c*—, the opposite end of the shaft 29 projecting from the other side of the casing carrying a stepped pulley —*e*—. As shown in Figures 2, 3, and 4, the crank shaft 32 extending transversely of the casing is provided upon one projecting end thereof with a stepped pulley —*f*— having a belt connection 33 with the stepped pulley —*e*—, the crank portions 34 of the shaft 32 having link connections 35 with the brackets 36 upon the transverse bars 10 of the vibrating screen frames, the crank portions 34 of the shaft 32 extending in opposite directions to create an alternating reciprocating movement of the screens 12 and 13, as clearly shown in Figure 3.

A stub shaft 37 journaled in one side wall of the casing carries the stepped pulley —*g*— upon the outwardly projecting end thereof that has a belt connection 38 with the stepped pulley —*d*—. The lower ends of the crank shafts 23 as shown in Figures 5 and 6 carry gears 39 meshing with a central gear 40 which in turn carries a bevel gear 41 for engagement with the bevel pinion 42 upon the inner end of the stub shaft 37, the rotation of the shaft 37 communicating motion to the crank shafts 23 in an obvious manner.

The grain in the hopper 7 is delivered to the upper screen 12 under control of the sliding gate 8, the screens 12 and 13 being alternately vibrated in opposite directions by their link connections 35 with the crank shaft 32. The air draft created by the fan will separate the chaff from the grain and discharge the same through the open end 4 of the casing as illustrated in Figure 3. The grain will sift through the screens 12 and 13 and the air draft will cause the finest grains to be discharged from the ends of the screens 12 and 13 into the hopper 43 as shown in Figures 2 and 3, the hopper being provided with a lateral outlet chute 44. The grain sifting through the screens 12 and 13 will be received on the upper screen 28 of the lower screen construction, the screens 28 carried by tht side plates 24 being given a circular shaking motion by the vertically disposed crank shafts 23. The fine grains sifting through the screens 28 will be delivered into the lower

hopper provided with the inclined bottom wall 45 and laterally discharged through the side chute 46. The grains remaining on the lower screen 28 will fall by gravity, due to the shaking motion of the screens and by the reverse inclination thereof as shown in Figures 3 and 6, into the discharge chute 47 shown in Figure 3. It will therefore be seen that the reciprocating screens and the rotatably movable screens as well as the fan 30 are driven from a central power shaft, it also being noted that the relative positions of the screens 12 and 13 are readily changed by adjusting the screws 15.

The air draft created by the fan 30 will completely separate the chaff from the grain and discharge the chaff through the open end 4 of the casing, the finest grains being separated from the chaff by falling into the end receptacle 43 as above described. By providing reciprocating and rotary motion screens, the screens are given a complete shaking motion providing for a better cleaning and grading of the grains, the quantity of grain material fed to the machine being controlled by the sliding gate 8. A receptacle 48 disposed at the rear end of the machine may be employed for storing the screens or tools and like devices for use in the operation of the machine. To provide for a continuous draft through the casing, one side wall thereof is provided with an opening 3′ adjacent the fan 30 to afford an air inlet for the fan.

While there is herein shown and described the preferred embodiment of the invention, it is nevertheless to be understood that minor changes may be made therein without departing from the spirit and scope of the invention as claimed.

What is claimed as new is:

1. In a grain separator of the type described, a casing, a feed hopper for the upper end thereof, a set of screens within the casing arranged beneath the hopper, means for moving the set of screens in a circular path, said means including perpendicular side plates for removably supporting the screens, vertically disposed crank shafts carrying the side plates, and means for rotating said crank shaft.

2. In a grain separator of the type described, a casing, a feed hopper at the upper end thereof, a set of sifting screens arranged in the casing, and embodying longitudinally extending side plates, spaced pairs of guide cleats carried by the opposed faces of the side plates, sifting screens slidably positioned in the cleats between the side plates, vertically disposed crank shafts positioned outwardly of the side plates, outwardly directed horizontal flanges carried by the side plates, and having notched edges receiving the crank portions of the shafts, and means for rotating the crank shafts to impart a circular motion to the sifting screens.

In testimony whereof I affix my signature in presence of two witnesses.

DMITRO HRYNIEWICH.

Witnesses:

C. W. Wells,

Lewis Neuel.