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GRAIN SAMPLER

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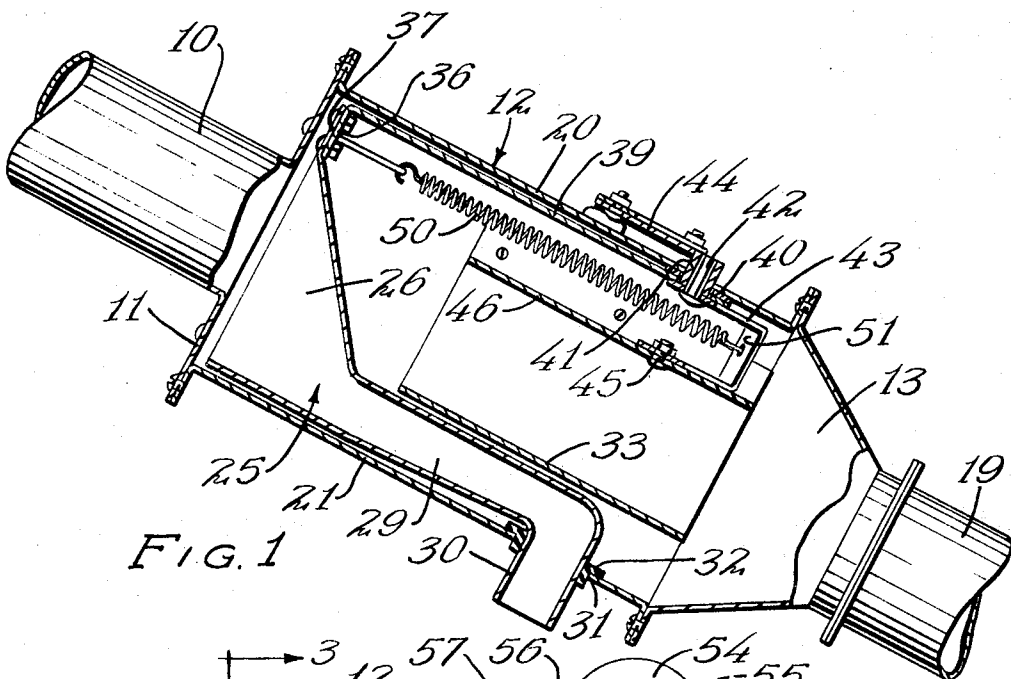


FIG. 1

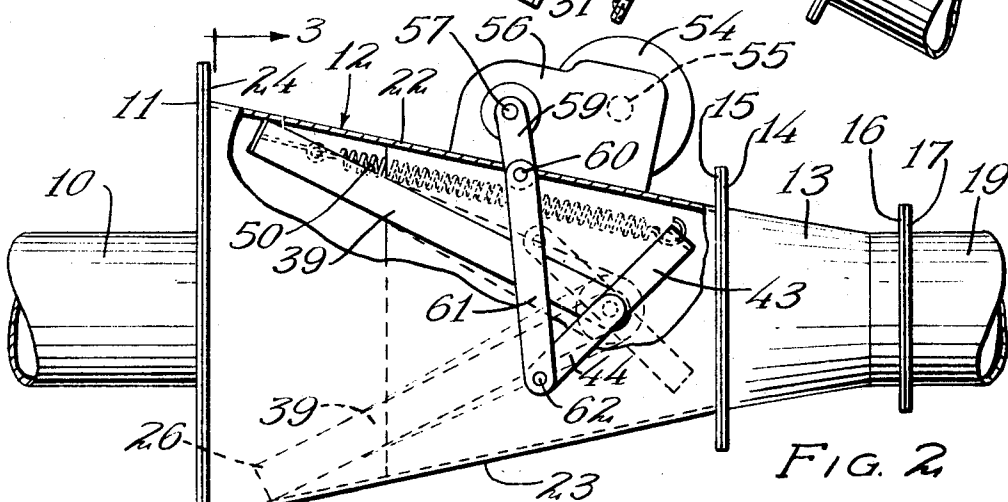


FIG. 2

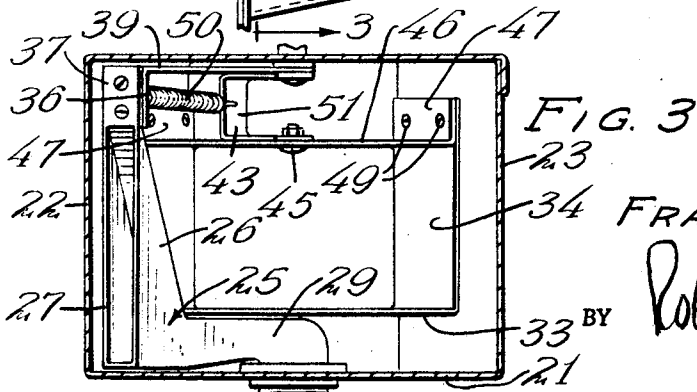


FIG. 3

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GRAIN SAMPLER

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ABSTRACT OF THE DISCLOSURE

An apparatus for obtaining samples of grain flowing through a conduit. The housing in which the sampler is located forms an enlargement of the conduit. A tapered "shoe" for removing the sample from the conduit is pivotally mounted within the housing and is reciprocated across the flow of grain material. A spring actuating mechanism is provided to move the shoe at a uniform rate in taking the sample.

This invention relates to an improvement in grain sampler and deals particularly with an apparatus for sampling grain and similar material flowing through a conduit which is simple to make, inexpensive to purchase, and extremely effective in its operation.

Various devices have been produced for sampling grain from a steady stream flowing through a conduit. Most such devices include some such means as a shoe having an open end, and a means of supporting the shoe for movement transversely of the grain conduit. While such devices are operable, they usually require considerable power to operate due to the slidable supports for the sampling shoe. In many instances, a pneumatic cylinder is used to reciprocate the shoe across the path of the grain. While a pneumatic cylinder is capable of moving the shoe at a constant speed where the friction resisting the movement of the sampling device is constant, the speed of travel may be variable where the frictional resistance to movement varies. Devices which must operate in the dusty atmosphere usually present in such systems, changes in frictional resistance are likely to take place.

It is an object of the present invention to provide a grain sampler comprising a tapered shoe communicating with a tubular outlet which includes a right angle bend, the shoe being pivotally supported about the axis of the right angularly turned end of the outlet. The pivot axis is usually centered with respect to the grain conduit so that the pivot axis intersects the axis of the grain conduit at right angles. Means are provided to swing the sampling device between two extreme positions on opposite sides of the flow of the grain. When in either extreme position, the sampler will not interfere with the flow of the grain. Thus, the sampler is in the path of movement of the grain only during the sampling operation.

A further feature of the present invention resides in the provision of a means for swinging the sampling shoe back and forth between its extreme positions which move the sampling shoe at a substantially constant rate of speed. The sampling shoe is moved from one extreme position to the other by means of a spring mounted on an arm pivoted co-axially with the sampler and which is connected by a spring to a second arm connected to the sampler for movement in unison therewith. The first lever

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arm is pivoted until the spring connecting the ends of the two levers passes a dead-center position at which time the spring swings the sampler to its other extreme position. Means is provided to oscillate the first lever arm between two extreme angular positions, the spring connecting the levels passing dead center during each oscillation and swinging the sampler through the flow of grain.

A further feature of the present invention resides in the provision of a device of the type described in which the tapered sampling shoe is supported by a hollow shank extending along one of a pair of parallel housing walls and having a right angularly turned end extending through this wall, and a lever which is secured to the shoe and extends along the other of said parallel walls and pivotally supported in coaxial relation with the end of the hollow shank. Guide plates are provided in spaced parallel relation to the parallel walls and inwardly of the hollow shaft and pivoted arm respectively.

These and other objects and novel features of the present invention will be more clearly and fully set forth in the following specification and claims:

In the drawings forming a part of the specification;

FIGURE 1 is a vertical sectional view through the transition housing and sampler's shoe showing the construction thereof.

FIGURE 2 is a top-plan view of the apparatus shown in FIGURE 1, a portion of the housing being broken away to show the interior construction.

FIGURE 3 is a cross-sectional view through the structure, the position of the section being indicated by the line 3-3 of FIGURE 2.

The grain conduit is shown as including an inlet portion 10 having a rectangular flange 11 on one end thereof, the flange 11 forming an end of the transition housing which is indicated in general by the numeral 12. A tapered adapter 13 is provided with a flanged end 14 designed for attachment with a mating flange 15 on the outlet end of the housing 12. The adapter 13 is also provided with a peripheral flange 16 which is secured to a cooperable flange 17 on the outlet portion 19 of the grain conduit.

The transition housing 12 is generally rectangular in cross-section and includes a pair of parallel top and bottom panels 20 and 21 which are of trapezoidal outline, and a pair of side panels 22 and 23 which are of generally rectangular outline and connect the tapering sides of the top and bottom panels 20 and 21. A mounting flange 24 is provided on the large dimension end of the housing designed for attachment to the flange 11 connected to the inlet conduit 10. The flange 15 extends peripherally about the opposite or outlet end of the housing 12.

A sampling shoe 25 is pivotally supported within the housing 12. The shoe 25 includes a narrow tapered inlet portion 26 having a relatively narrow rectangular forward end 27 best illustrated in FIGURE 3 of the drawings. The tapered diverter or sampling shoe end 26 communicates with a hollow shank 29 having a right angularly extending end 30 extending through an aperture 31 in the wall panel 21. A sealing washer of leather or similar material is indicated at 32 sealing the area between the walls of the opening 31 and the shank end 30. As is indicated in FIGURE 2 of the drawings, the end of the shoe 26 swings to opposite sides of the inlet conduit 10 so as to normally

be out of the path of the grain flowing through the conduit. A partition wall 33 is supported in parallel spaced relation to the housing wall 21, the plate 33 serving to guide the major portion of the grain directly through the transition housing. The plate 33 is provided with tapered sides 34 which fit within, and are secured to, the tapering sides 22 and 23 of the housing 12.

An elongated arm 39 includes a right angularly turned end 36 which is secured to the end extremity 37 of the shoe 26. The arm 39 is pivotally secured to the housing panel 20 at 40, the arm 39 being apertured to encircle a collar 41 encircling a bolt 42 extending through the panel 20. A U-shaped lever 43 is connected by the multi-sided bolt 42 to a lever arm 44 outwardly of the housing panel 20, the bolt 42 holding the arm 44 from rotation relative to the U-shaped lever 43. The bolt 42 is coaxial with the end 30 of the hollow shank 29. A pivot bolt 45 which is also coaxial with the bolt 42 and shank end 30 connects the U-shaped lever arm to a second guide or partition wall 46 designed to maintain the major portion of the grain flow in the center of the housing. The partition wall 46 is also provided with flanges 47 secured to the tapering walls 22 and 23 of the housing by bolts such as 49 or other suitable means.

A spring 50 connects the transverse end 51 of the U-shaped lever 43 to the angularly turned end 36 of the arm 39. The U-shaped lever 43 is designed to pivot between two extreme positions which is somewhat less than 90 degrees apart. During the pivotal movement of the lever 43 from one extreme position shown in full lines in FIGURE 2 to the other extreme position indicated in dotted outline in FIGURE 2, the spring 50 crosses the pivot axis of the pivot bolts 42 and 45 just before the lever 43 reaches either extreme position. As soon as the lever 43 passes deadcenter position relative to the arm 39, the spring 50 functions to quickly swing the sampling shoe 26 from one extreme position shown in solid lines in FIGURE 2 of the drawings to the other extreme position indicated in dotted outline in this figure. In both of the extreme positions illustrated, the sampling shoe is out of the stream of grain flowing through the transition housing 12. A motor 54 is secured to the side wall 22 of the transition housing 12, and the shaft 55 of the motor acts through gears in a gear reduction unit 56 to drive a shaft 57 at a desired rate of speed. As the sampling shoe takes two samples of the grain for each revolution of the shaft 57, the gear reduction unit 56 is proportioned to take the samples at the desired time interval. As the force of the spring 50 actuating the sampling shoe remains constant, the same force is applied to the spring to move the sampling shoe to its other extreme position, and as a result the sampling shoe moves across the path of grain at a constant speed.

A crank arm 59 is provided upon the shaft 57, and the end of the crank arm 59 is pivotally connected at 60 to a link 61 pivotally connected at its other end 62 to the lever arm 44. The link 61 oscillates the lever arm 44 between its two extreme positions and accordingly causes a complete cycle of the sampling shoe for each revolution of the shaft 57.

In accordance with the patent statutes, I have described the principles of construction and operation of my improvement in Grain Sampler, and while I have endeavored to set forth the best embodiment thereof, I desire to have it understood that changes may be made within the scope of the following claims without departing from the spirit of my invention.

I claim:

1. A grain sampler for use in a grain conduit and the like including:

a transition housing having an inlet at one end and an outlet at the other end,
said housing including a pair of generally parallel sides spaced on opposite sides of said inlet and extending laterally beyond said inlet, and panels connecting the edges of said generally parallel sides,

a hollow diverter shank extending adjacent to, and substantially parallel to one of said parallel sides and having a substantially right, angularly turned end extending through, and pivotally supported by said one parallel side, with the pivot axis substantially intersecting the axes of said inlet and outlet, said hollow shank extending toward the inlet end of said housing and having on its end a tapered hollow diverter having a narrow generally rectangular inlet opening movable across said housing from one side to the other of said inlet to receive material therefrom upon pivotal movement of said shank,

an arm pivotally supported on an axis coaxial with said shank end on the other of said parallel housing sides, said arm being secured to said diverter and extending along said other parallel housing side out of the normal path of material through said housing, and

means for oscillating said arm to swing said diverter from one side of said inlet to the other,

said arm oscillating means including a lever pivoted coaxially with said arm,

spring means connecting a point on said arm adjacent the end thereof connected to said diverter, and

means for oscillating said lever to move said spring on opposite sides of said pivot point.

2. The structure of claim 1 and including a rotatable crank arm connected to said lever for pivoting said lever, and means for rotating said crank arm.

3. The structure of claim 1 and including a pair of guide plates secured within said housing in spaced relation to the parallel sides of said housing,

said hollow shank extending between one of said guide plates and an adjoining one of said parallel sides, and

said arm is supported between the other of said plates and the other of said parallel sides.

4. A grain sampler for use in a grain conduit and the like including:

a transition housing having an inlet at one end and an outlet at the other end,

said housing including a pair of generally parallel sides, and panels connecting the edges of said parallel sides holding said parallel sides spaced apart a distance substantially greater than the width of said inlet,

a diverter shoe having a narrow generally rectangular open end and a tapered body communicating with a hollow diverter shank having a right angularly extending end,

means pivotally supporting said right angularly extending shank and extending through one of said parallel sides with the pivot axis substantially intersecting the aligned axes of said inlet and outlet,

said diverter shoe being supported with said open end swingable across said housing forwardly of said inlet from a position on one side of said inlet to a position on the other side thereof,

said hollow diverter shank being on one the side of the normal path of material passing through said housing,

an arm secured to the end of said open end most remote from said hollow shaft and being pivotally supported by said other parallel side in coaxial relation with said shank end and located on the other side of the normal path of material passing through said housing from said hollow shank,

a pair of guide plates extending between said connecting panels in parallel spaced relation to said parallel sides and spaced to confine the flow of grain therebetween,

said hollow diverter shank being outwardly of one of said guide plates and said arm being outwardly of the other said guide plate.

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5. The structure of claim 4 and including a lever pivoted coaxially with said arm spring means connecting a point on said lever spaced from the pivot point to a point on said arm adjacent the end thereof connected to said diverter, and

means for oscillating said lever to move said spring on opposite sides of said pivot point.

6. The structure of claim 5 and including a rotatable crank arm connected to said lever for pivoting said lever, and means for rotating said arm.

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