Aug. 17, 1926. 1,596,474

R. B. WINN

MOISTURE INDICATOR

Filed May 1, 1924

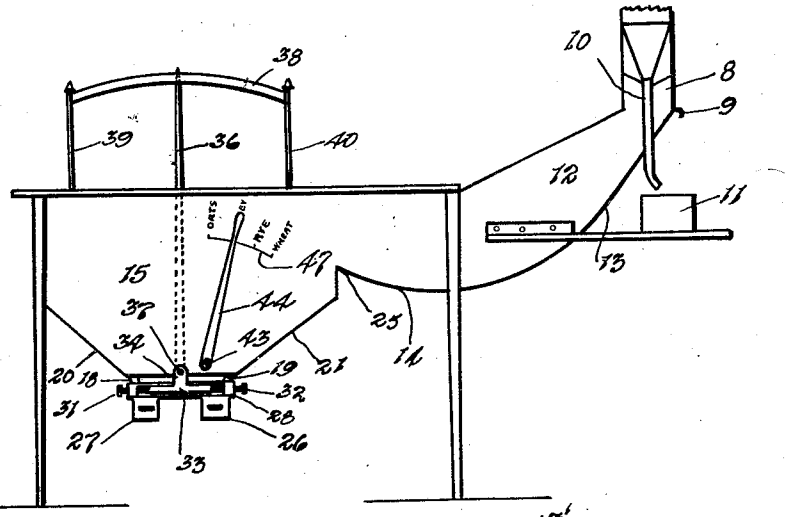


Fig 1

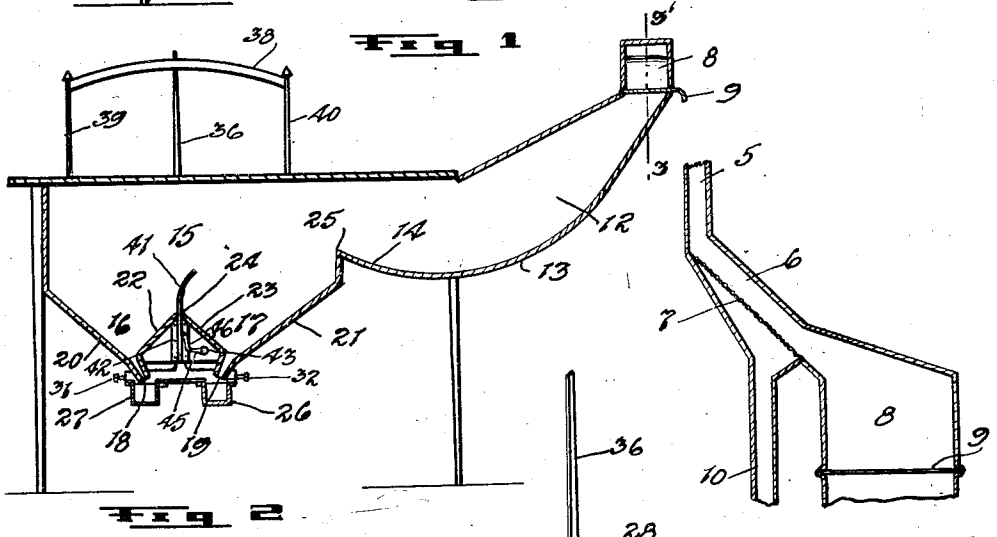


Fig 2

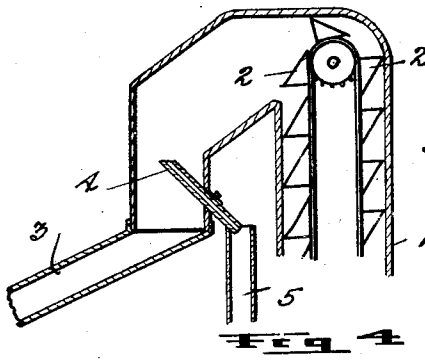


Fig 4

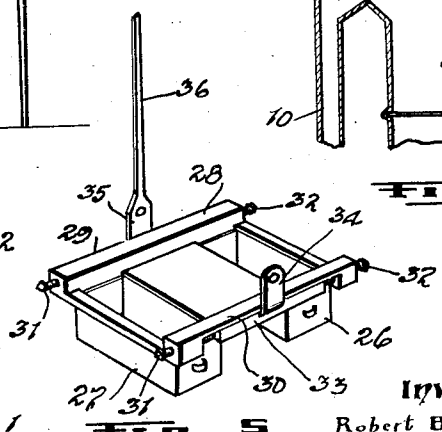


Fig 5

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Patented Aug. 17, 1926. 1,596,474

UNITED STATES PATENT OFFICE.

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MOISTURE INDICATOR.

Application filed May 1, 1924. Serial No. 710,386.

The invention relates to improvements in moisture indicators and particularly to a device for indicating the moisture condition of grain and an object of the invention is to provide a device which will effect the separation of the moist and dry grain in a sample quantity of grain by utilizing the action of gravity, the grain being projected into the air in a more or less horizontal direction and permitted to fall freely and being subsequently caught in balanced pans or such like, the relative weights of the filled pans indicating the amount of moisture in the sample.

A further object is to provide a device which can be manufactured at small cost and which will accurately indicate the amount of moisture in a grain sample and which can be readily set for use with the different grains which it is desired to test.

A further object is to provide means associated with the balanced pans, whereby an average sample of a quantity of grain, such as a load, can be obtained.

With the above more important objects in view the invention consists essentially in the arrangement and construction of parts hereinafter more particularly described, reference being had to the accompanying drawing in which:

Fig. 1 is a front view of the complete device.

Fig. 2 is a vertical sectional view longitudinally and centrally through the same.

Fig. 3 is an enlarged detailed vertical sectional view at 3—3′ Figure 2.

Fig. 4 is an enlarged detailed vertical sectional view through the upper end of a grain elevator and showing the sample tube associated therewith.

Fig. 5 is a perspective view of the balanced pans and associated parts.

In the drawing like characters of reference indicate corresponding parts in the several figures.

Considerable trouble is experienced and time lost at the present time in determining the moisture condition of grain delivered or received in an elevator and the method of obtaining a fair sample of grain, in order to test the moisture conditions, is very unsatisfactory as the same does not give a fair or representative sample of the complete quantity of grain. According to my invention I obtain a fair sample of a quantity of grain, say such as a load of grain, and having obtained this am able to accurately and quickly determine the moisture condition of such sample to the satisfaction of both the buyer and the seller and which creates a better feeling of confidence between the parties.

At points where grain is handled in quantities, such as at country or terminal elevators, the load of grain is dumped into a receiving hopper for weighing purposes and then is dumped from the hopper into an under pit from which it is elevated and discharged into anyone of a number of storage bins as selected by the attendant. As such is ordinary practice I have considered it sufficient, for the purposes of the present invention, to only show the parts of the elevator with which my invention is associated.

The elevator leg 1 contains the endless cup-conveyor 2 which discharges the grain into the distributing spout 3, such spout being utilized to direct the grain into any selected storage bin. A load of grain having been delivered, say by a farmer, to the elevator is dumped into and weighed in the receiving hopper, hereinbefore mentioned, and from the receiving hopper is discharged into the pit and from the pit is elevated by the elevator to the distributing spout 3.

The sample of grain which I obtain from the load is taken from the elevator by means of a sample tube 4 extending centrally into the head of the elevator in the manner shown in Figure 4 and arranged such that as the grain is passing to the distributing spout a small quantity thereof will at all times be caught in the sample tube and discharged by said tube into a receiving pipe 5. This pipe 5 passes down the elevator adjoining the elevator leg and it is provided adjacent its lower end with an inclined portion 6, the lower side of which is fitted with a screen 7, and the lower end of which opens to a sample collecting box 8, the bottom of which is closed by a sliding gate 9.

The screen 7 is of such a nature that it will permit the passage of dirt and small seeds therethrough with the result that clean grain only enters the box. The small seeds, dirt and such like are collected beneath the screen and fed through a discharge tube 10 to a suitably supported collecting box 11 which can be dumped from time to time.

An inclined chute 12 communicates with the box 8 and the lower side or bottom 13

of the chute is of the shape best shown in Figure 2 where it will be seen that the end next the box slants angularly downward rather abruptly and thereafter changes to a gradual curve with the end 14 of the chute remote from the box curving upwardly. The lower end of the chute opens to a box 15 having the bottom thereof formed to present similar hoppers 16 and 17 from which discharge spouts 18 and 19 lead. The hoppers 16 and 17 are actually formed by downwardly converging outer plates 20 and 21 and upwardly converging inner plates 22 and 23, the spouts 18 and 19 being introduced between the lower ends of the plates 20 and 22, and 21 and 23 respectively. The point of intersection of the plates 22 and 23 is located centrally of the box and passes parallel with the take-off edge 25 of the chute. The edge 24, however, is considerably below the edge 25.

Beneath the hoppers 16 and 17 I locate a pair of balanced pans 26 and 27, the pan 26 being adapted to receive the grain discharged through the spout 19 and the pan 27 that discharged through the spout 18. The pans are slidably supported by the ends of a substantially rectangular frame 28 and are mounted so that they can be pulled forwardly and removed in the same manner as the ordinary sliding drawer. The side members 29 and 30 of the frame have the ends each fitted with a set of adjusting screws 31 and 32. The screws of each set have their inner ends engaged with an adjusting bar 33 which underlies the side bars 29 and 30 in each instance. Both the bars 33 are provided centrally of their length with hangers 34 and 35 and the hanger 35 is extended to provide a pointer or finger 36.

The hangers 34 and 35 are connected pivotally to the box 15 in any suitable manner as indicated at 37 and the arrangement is such that the empty pans 26 and 27 counter balance one another upon the screws 31 and 32 being adjusted. When the empty pans are balanced, the pointer takes a vertical position and the upper end thereof is positioned centrally of a gauge bar 38 carried by suitable supports 39 and 40 extending upwardly from the top of the box 15.

Obviously the pans can be readily adjusted in either direction by tightening the screws 31 and loosening those 32 or vice versa.

Within the box or casing 15 and centrally between the hoppers 16 and 17 I locate a divider 41 which extends lengthwise between the hoppers and has the upper end thereof curved as shown best in Figure 2 towards the chute 12. This divider has the ends thereof slidably mounted in end guides 42 and it is vertically adjustable. The adjustment is made in the following way:

A cross shaft 43 is provided, the shaft being fitted at one end of the box 15 with a controlling lever 44 and with a crank 45 which is pivotally connected by a link 46 to the divider. The lever operates over a scale 47 which is marked for various grains; oats, barley, rye and wheat being herein marked. Wheat is obviously the heaviest of the grains shown and oats the lightest. When the lever stands at the mark indicating wheat, the divider is in its highest position. When it is on the point indicated by oats, the divider is in its lowest position.

When the device is in use, the sample tube 4 continuously discharges a small quantity of grain to the pipe 5 and in this connection it is desirable that, say for a wagon load of grain elevated, the sample tube will gather and deliver, say four pounds of grain. This four pounds of grain is obviously a true sample of the load as it is taken from the whole load as the same is being discharged from the elevator to the discharge spout and is not a more or less restricted sample as is the case in present practice where a test tube is inserted in the load itself to obtain the sample. The pipe 5 carries the sample of grain to the inclined portion 6 where the foreign material is screened out and dropped to the box 11. The clean grain is caught in the box 8 which is designed to hold, say four pounds of grain. If this grain be barley, the lever 44 is set in the position indicated in the drawing, whereas if it be rye, oats or wheat, the lever is moved to the position indicating such grains. The sample having been collected in the box 8 and the lever having been set, the attendant then opens the gate 9 which liberates the sample of grain on to the bottom of the chute. As the grain slides down the chute it spreads out and owing to the varying moisture content of the various grain kernels, the grain kernels are projected in an upwardly inclining direction over the edge 25 of the chute at different velocities and accordingly the moist kernels will fall sooner than the dry. The moist grain is caught in the hopper 17 and delivered by the spout 19 to the pan 26, whilst the lighter grain is caught by the hopper 16 and delivered through the spout 18 to the pan 27. If after the test has been made and it is found that the pointer remains vertical, the sample of grain is gauged accordingly which might be, say, normal. The amount which the pointer swings to the left is a direct indication of the predominance of dry grain in the sample, whereas the amount which it moves to the right from central position, is a direct indication of the predominance of moist grain in the sample. By providing the bar 38 with a suitable scale, as practice may establish, one can directly state the grade of grain in so far as moisture condition is concerned.

This device is very simple in construction and operation, takes a fair sample of grain

from the whole load and visibly and accurately indicates the condition of moisture which, when the device is fully understood, will make it particularly desirable for use between the buyer and the seller as it will establish a better feeling of confidence between the parties.

Whilst I have described the device as used in a particular manner, it will be readily understood that it can be used for testing purposes in any location and under any circumstances.

What I claim as my invention is:—

1. In a moisture indicator for testing a sample of grain, a chute in which the sample is liberated, said chute being adapted to project the grain into the air and at a considerable velocity in a direction across the path of the action of gravity, hoppers adapted to catch the falling grain counter balanced receivers underlying the hoppers and adapted to receive the grain caught thereby, an indicator associated with the receivers and moving therewith and a stationary moisture indicating scale over which the indicator operates.

2. In a moisture indicator for testing a sample of grain, a chute in which the sample is liberated, said chute being adapted to project the grain into the air and at a considerable velocity in a direction across the path of the action of gravity, a set of hoppers centrally underlying the falling stream of grain, a pair of balanced pans into which the grain from the hoppers is discharged, an indicator moving with the pans and a stationary scale over which the indicator operates.

3. In a moisture indicator for testing a sample of grain, a chute in which the sample is liberated, said chute being adapted to project the grain into the air and at a considerable velocity in a direction across the path of the action of gravity, a set of hoppers centrally underlying the falling stream of grain, said hoppers having their adjacent edges converging upwardly, a vertically adjustable divider extending upwardly into the stream of grain in a location centrally between the hoppers, a pair of balanced pans underlying the hoppers and adapted to receive the grain caught by the hoppers, a pointer associated with the pans and a stationary moisture indicator scale over which the pointer operates.

4. In a moisture indicator for testing a sample of grain, a chute for receiving the sample of grain and adapted to project the grain in a stream of considerable velocity passing in a direction across the path of the action of gravity, a receiving box into which the stream of grain is projected, said box having the lower part thereof formed to provide a pair of adjacent hoppers adapted to receive the falling grain, a pair of balanced pans underlying the hoppers, chutes leading from the hoppers to the pans and means whereby the difference in weight of the grain containing pans is visibly indicated.

5. Means for separating grain kernels having varying moisture content comprising a chute receiving the grain kernels and projecting the grain kernels at different velocities across the path of the action of gravity, the varying velocities of the different kernels leaving the chute being directly dependent upon the moisture content of the kernels.

Signed at Fairlight this 28th day of March, 1924.

ROBERT B. WINN.