

Nov. 18, 1924.

H. KRUSSOW

1,515,776

GRAIN SEPARATOR AND CLEANER

Filed May 24, 1921

3 Sheets-Sheet 1

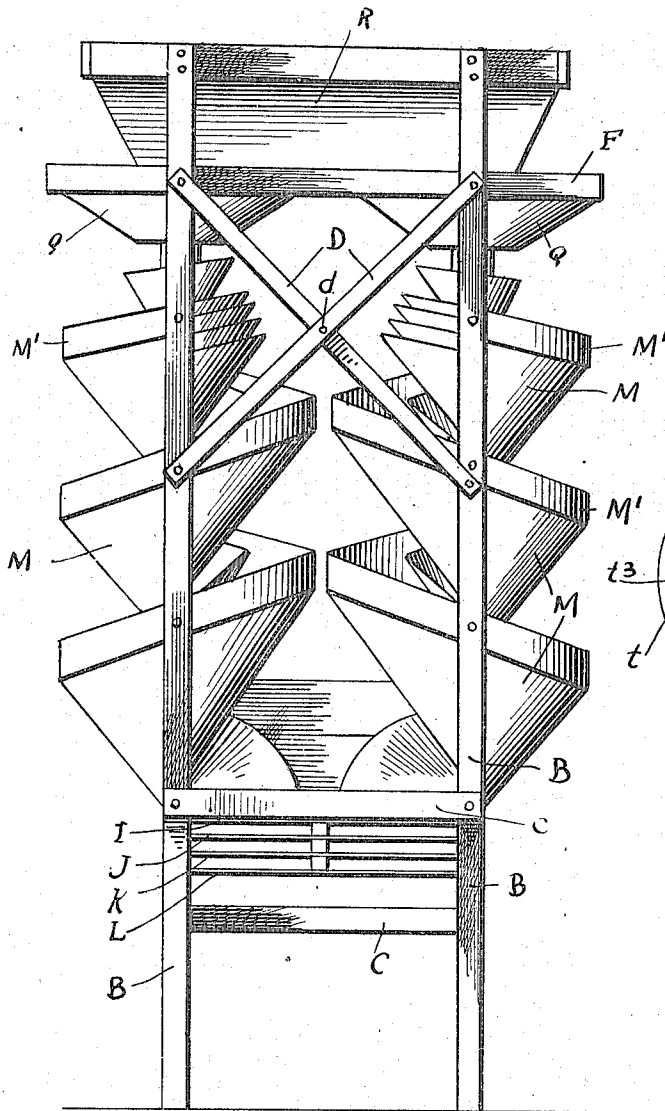


Fig. 1.

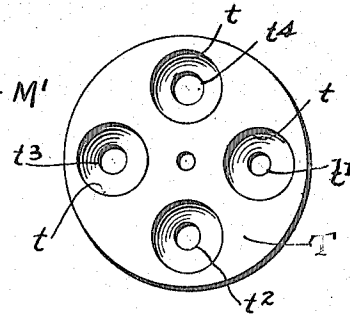
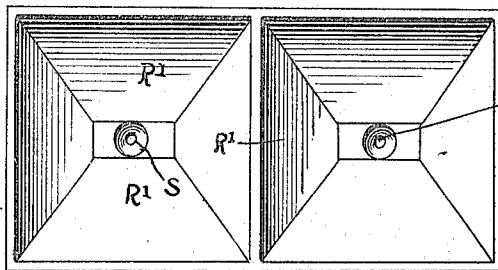


Fig. 8.

Fig. 4.



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3 Sheets-Sheet 2

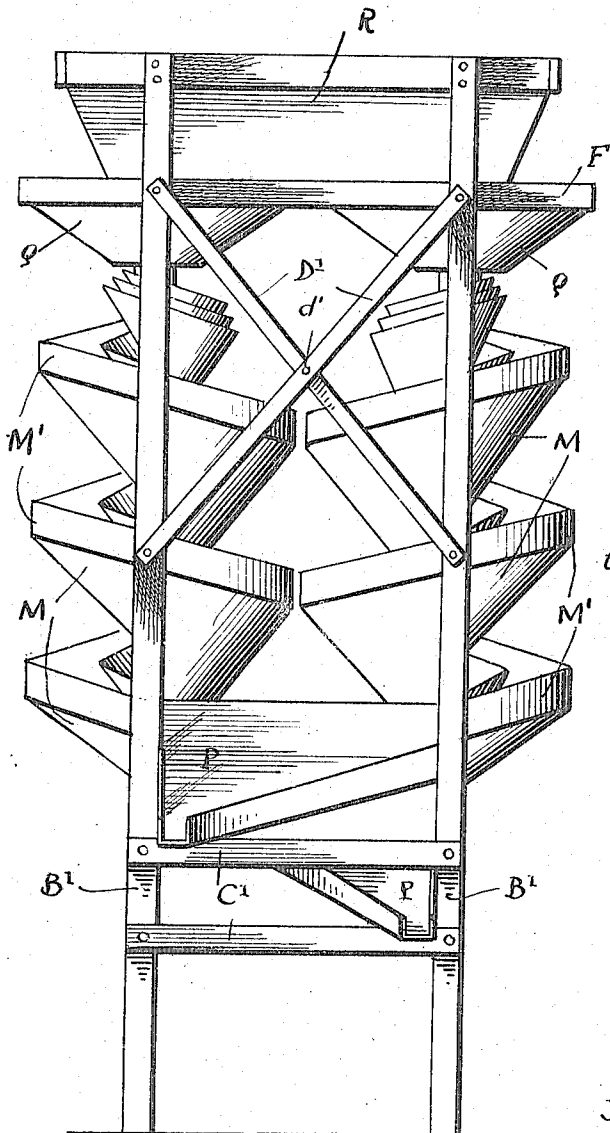


Fig. 2.

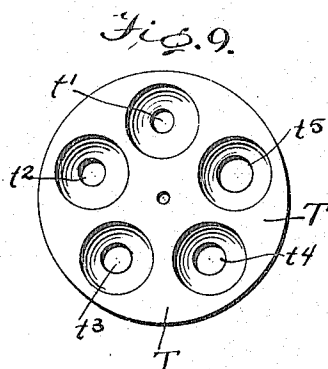
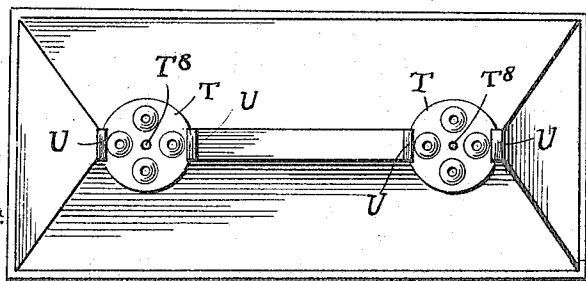


Fig. 9.

Fig. 7.



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3 Sheets-Sheet 3

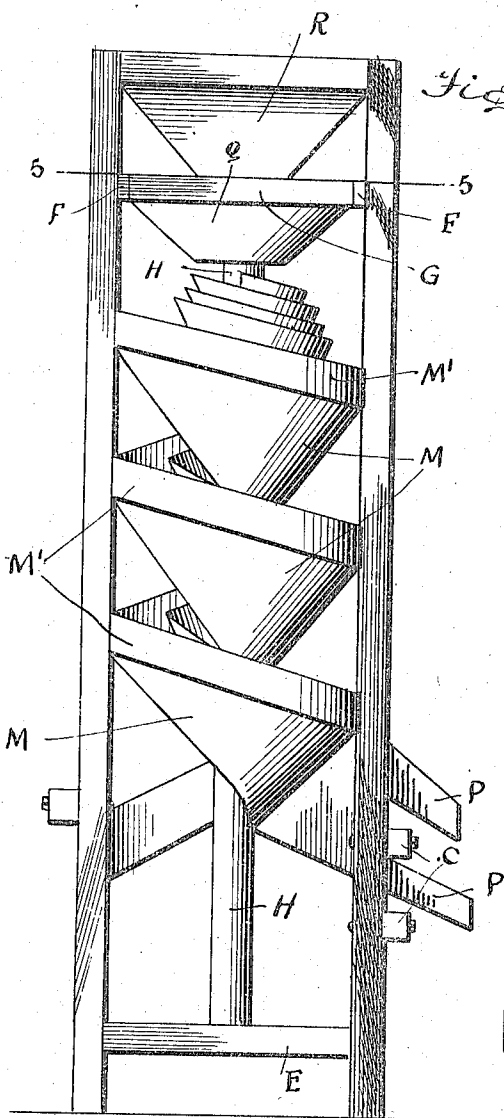


Fig. 3.

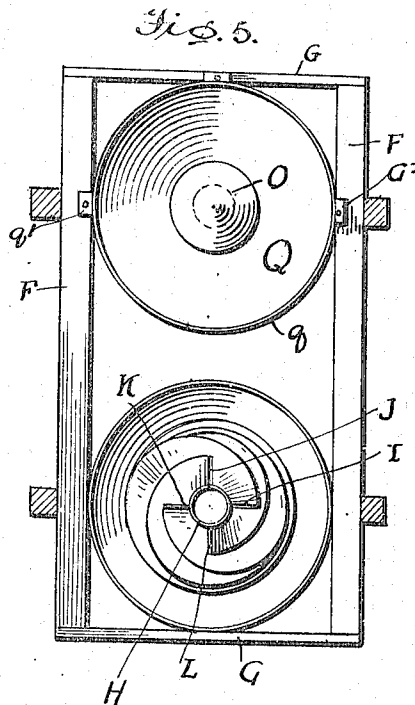


Fig. 5.

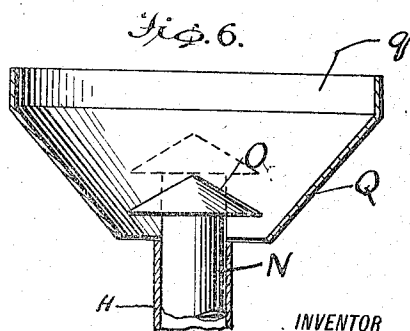


Fig. 6.

WITNESSES

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## UNITED STATES PATENT OFFICE.

HENRY KRUSSOW, OF ELLSWORTH, MINNESOTA.

GRAIN SEPARATOR AND CLEANER.

Application filed May 24, 1921. Serial No. 472,314.

*To all whom it may concern:*

Be it known that I, HENRY KRUSSOW, a citizen of the United States, and a resident of township of Ellsworth, in the county of Meeker and State of Minnesota, have invented certain new and useful Improvements in Grain Separators and Cleaners, of which the following is a specification.

This invention relates to improvements in grain separators and has reference more particularly to gravity separators of the spiral type, and has for its main object to provide a separator for removing cockle, wild mustard and all other spherical shaped seeds from wheat, rye, oats and speltz.

With this and other objects in view my invention consists in certain novel features of construction and arrangement of parts as will be hereinafter fully described and pointed out in the claim, reference being had to the accompanying drawings forming part hereof, and in which:

Figure 1 is a front elevation of the device,

Figure 2 is a rear elevation,

Figure 3 is a side elevation,

Figure 4 is a top plan view of the hopper,

Figure 5 is a horizontal section taken on the line 5—5 of Figure 3,

Figure 6 is an enlarged detail section showing garner pan and pyramid cap,

Figure 7 is a horizontal section showing in plan the outer face of the hopper bottom,

Figure 8 is a rear view of one of the disc valves for regulating feed,

Figure 9 is a slightly modified form of same.

In the drawings I have illustrated a practical embodiment by which my invention may be carried into effect, and which I will now proceed to describe in detail.

The device includes a frame construction comprising square planed wooden posts of suitable dimensions set vertically a suitable distance apart. The frame further includes two front posts B which are connected near their lower ends by the brace C.

The upper portions of the front posts B are connected by the cross braces D secured at their ends to the posts and to each other at their intersection by a suitable bolt or rivet d.

The rear of the frame is constructed the same as the front part and consists of the two spaced apart posts B' secured together near their lower ends by the braces C' and at their upper portions by the cross braces

D' all of which are fastened to the rear of frame in relatively the same position as the front.

The sides of the frame are secured together by bars of wood E which are mortised into the front and rear legs or posts, being preferably held rigid in that relation by bolts passing through the legs or posts and bars and held by nuts or other suitable fastenings.

A horizontal open frame is secured within the front and rear posts near their upper ends and comprises front and rear beams or timbers F which extend laterally beyond the said posts to which they are suitably secured, and the end beams or timbers G suitably secured to the said front and rear beams, these end beams bracing the upper horizontal frame.

The device further consists of two galvanized iron pipes of suitable length and diameter set at each side of the previously described framework, these pipes being designated by the reference characters H and set at their lower ends on the side bars near the lower end of the frame.

To this pipe or shaft are soldered four spirals I, J, K and L which are identical and made of suitable gage galvanized iron. The upper end of each of these spirals is fastened by soldering to the shafts H commencing about one inch from the top of said shaft with the small end of the spiral. The fastening of these spirals one inch from the top of the shaft is made in pairs directly opposite each other, that is the top point of contact of I and K and are directly opposite each other and the upper ends of contact of the several spirals are one inch from the top of post or shaft H wrapped around said posts.

The spirals terminate directly over each other the desired distance from the bottom of the posts or shafts H depending of course on the dimensions selected for the length and size of same.

An outer spiral M is made which is materially larger than the nested spirals just described, being made from a suitable blank. The inside of this latter or outer spiral, as it will be termed, is soldered to the posts or shafts H at a point about eleven inches from the top thereof on the opposite side of the point of contact of the second of the inner spirals on one post H, but lower down on the opposite post H. This outer spiral will

thus be soldered in position on the post last mentioned at a distance of about one inch below the outermost of the inner set or nested spirals, clear down the line and terminating at the rear in the spouts P, P.

To the outer edge of the outer spiral M is soldered a vertical flange M' throughout its entire extent, the flange M' standing vertically throughout its length, to keep the material therein from being thrown out of the separator by centrifugal force.

Within the top of the posts or shafts H a short section of pipe or tubing N is placed, fitting snugly therein but which may be moved up or down about one inch or more.

On the top of this slidable pipe section is placed a pyramid shaped cap O which is soldered thereto. This cap O is made from a suitable blank cut and fashioned into shape and then soldered to adjustable pipe section N as above set forth, and hence may be adjusted up and down with said section as indicated by dotted lines in Fig. 6.

Q is a garner shape galvanized iron cone of suitable diameter at the top and having a circular flange  $q$  about one inch wide which is soldered around the top edge thereof, and this cone has a suitably sized opening at the bottom. The top of this cone is secured at its upper end to the top frame by small brackets  $q'$  made of galvanized iron, the brackets being riveted to the cone Q.

The hopper R is divided into two compartments by placing the inclined wall sections R' as shown thus virtually making two separate hoppers each of which tapers downwardly toward the center and has a circular opening S through the bottom of the hopper.

The lower face or outside of the bottom of the hopper is of course flat, and has pivotally secured thereto beneath the outlets S, above referred to, a circular disk T having four (or other desired number) openings  $t$ . Beneath these openings and around the outside of their circumference will be soldered to the disk or circular plate T the four cone-shaped exits or throats  $t^1$ ,  $t^2$ ,  $t^3$  and  $t^4$ , the diameters of which correspond with the diameters of the openings  $t$ .

This disk is pivotally secured to the bottom of the twin hoppers by a rivet  $t^5$  passing through the bottom of the hopper about two and one-half inches from the center of the openings in the bottom of the hopper and also about two and one-half inches from the center of the holes made in the disk or circular plate T, the plate being further movably held in place against the bottom of the hopper by two diametrically opposite flanges U soldered to the outside of the bottom of the hopper, thereby holding the disk snugly in position up against the bottom of the hopper. The disk may be turned at will by the operator so as to permit the

openings of the cones, one at a time, to receive the proper flow of the grain from the hopper and their openings at the bottom sides thereof which are respectively 12/16, 13/16, 14/16 and 15/16 inches in diameter and these cones are about two inches high with their upper diameter about two and one-half inches.

It will thus be seen that by this arrangement regulation of the flow of the grain may be readily secured.

It will be noted that the outside bottom circumference of the pyramid cap of each part of the circumference thereof, is about one inch higher than the bottom circumference of the garner Q when placed in position for operation.

The operation of the device is as follows:

The material to be separated is delivered into the hoppers and falling into the garner is discharged upon the pyramid cap and then evenly distributed to the spirals. The smaller particles which are oblong or non-spherical shape, enter the channels formed by the spirals and pass rapidly downward and are discharged from the chutes or exits at the lower ends of the same. In the downward travel of the material the larger particles will be carried by centrifugal force over the edge of the inner spiral channels into the next spiral channel the diameter of which is greater for that purpose, and so on. Those particles which are rounded and are too large for the outermost of the nested series, are caught and carried by the outside spiral trough which has the vertical flange and discharged by way of the spout or gutter at the lower end, the said flange preventing the particles from being thrown over the sides by centrifugal force.

It should be particularly noted that the grain delivered to the spirals must pass through the lower end of the conical member Q. The member Q as is apparent is adapted to further insure that the grain will be deposited in the upper ends of the spirals.

The apparatus is especially adapted for the sorting or separation of grain which is of oblong or ellipsoidal shape, from rounded objects, such as peas, or beans, since in the discharge of the mixed grain and foreign substances the internal spiral channels will catch and hold the oblong or ellipsoidal grains, while by centrifugal force the rounded grains, such as peas and the like, will roll over the internal spiral channels and enter the outer spiral trough.

The apparatus may be used successfully for the purpose of removing cockle, wild peas, wild mustard and all other spherical shaped seeds from wheat, rye, oats and speltz by pouring the grain infested with the spherical foul seed aforesaid, into the hopper proper, adjusting the perforated

disks having the conical exits, on the bottom thereof, thereby permitting the grain or grains to pass through the mill by the force of gravity until the clean grain without motive power finds its way into the clean grain spouts at the front of the device and the spherical noxious foul seed of every kind will also thereby be separated and find their way into the foul seed spout at the rear of the device.

The device as a whole may be set up on the floor, of a granary, or it may be attached to and suspended from the ceiling of a granary, mill or elevator immediately under an opening in the floor thereof and there securely fastened in place in a level position and be utilized to clean grain day and night without any mechanical power applied thereto.

The capacity of the device may be increased indefinitely by increasing the number of the spirals and by placing within each spiral section one or two extra spirals

of the same material, shape and dimensions, and other working parts indefinitely, without changing the principle of the device.

The parts of the right section of the device are placed in position on right shaft H by wrapping the spirals around the same to the left, and on the left side by wrapping the spirals around the left shaft H to the right.

Having thus fully described my invention and set forth the preferred embodiment by which it may be carried into effect, what I claim is:

In a separator of the character described, a plurality of spirals vertically arranged and terminating at their upper ends in equal spaced relation from a common point, a seed hopper disposed above said spirals and having an outlet in the bottom thereof, a vertically adjustable cap interposed between said hopper and the spirals, and a hopper about said cap.

HENRY KRUSOW.