

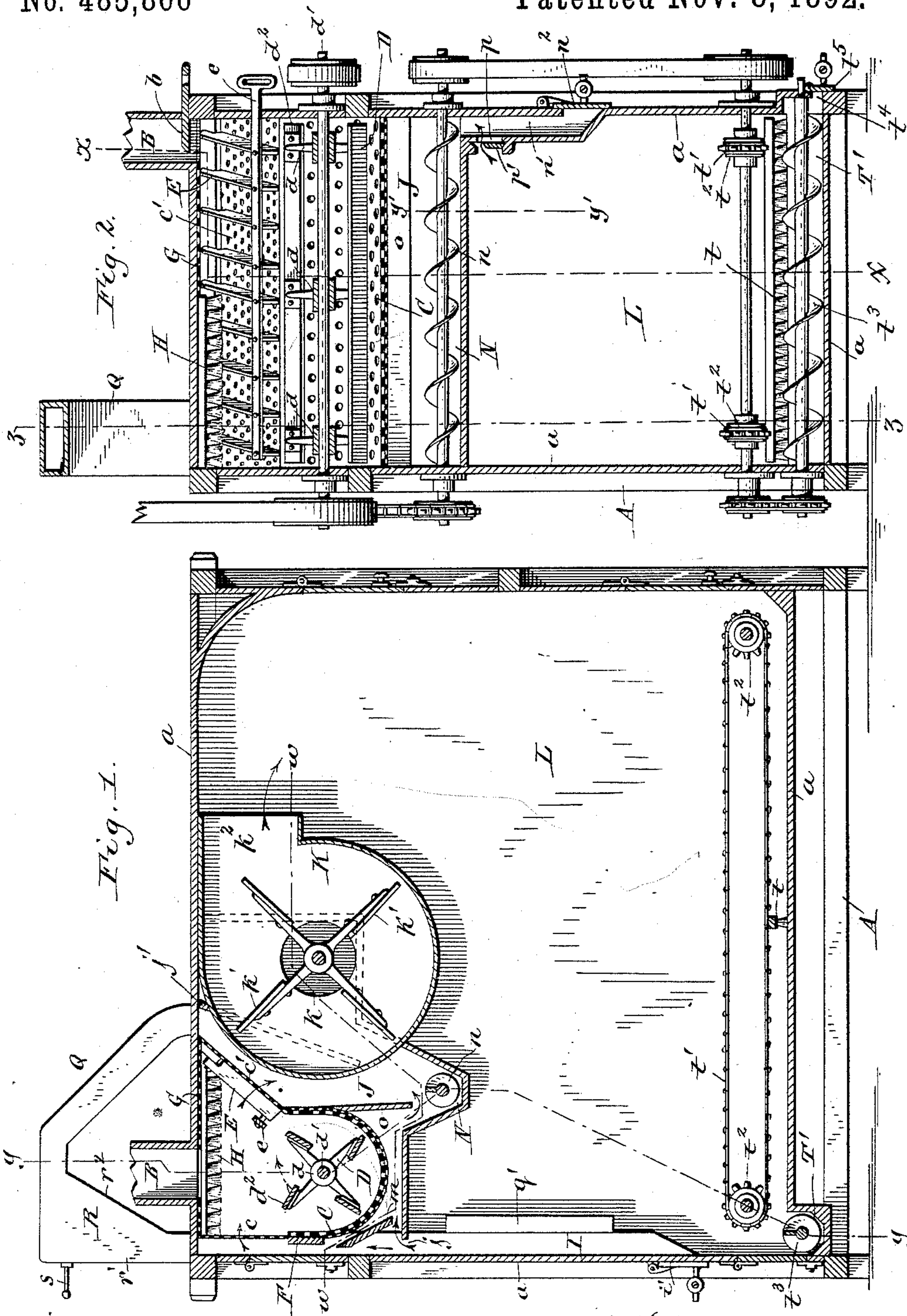
(No Model.)

2 Sheets—Sheet 1.

A. HEINE.
GRAIN CLEANER.

No. 485,866

Patented Nov. 8, 1892.



Witnesses:
Theo. L. Popp.
Friedrich, Johann, Wilhelm.

August Heine. Inventor:
By Wilhelm Bonnet.
Attorneys.

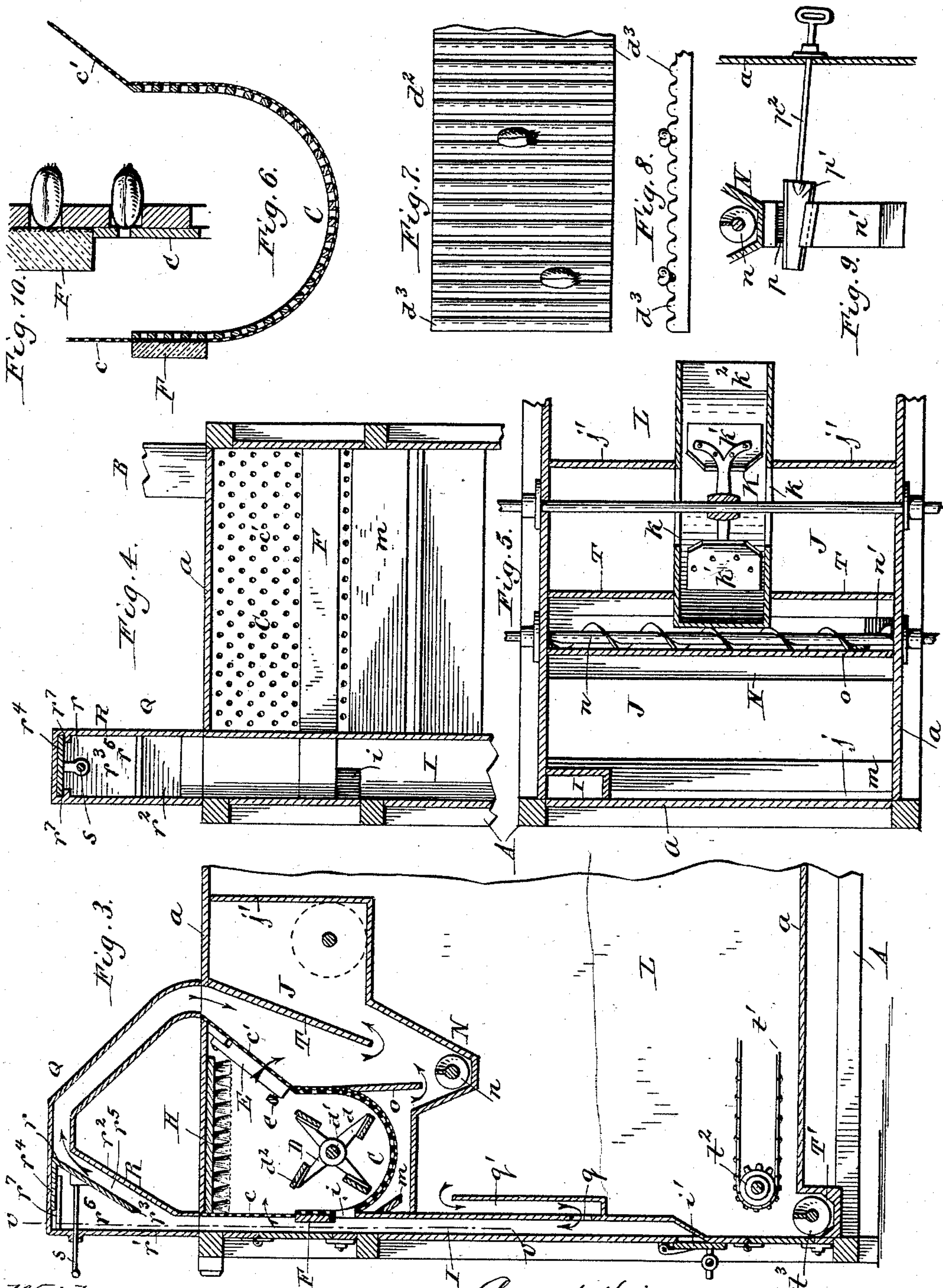
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By Wilhelm H. Bonner.
Attorneys

UNITED STATES PATENT OFFICE.

AUGUST HEINE, OF SILVER CREEK, NEW YORK.

GRAIN-CLEANER.

SPECIFICATION forming part of Letters Patent No. 485,866, dated November 8, 1892.

Application filed June 10, 1892. Serial No. 436,250. (No model.)

To all whom it may concern:

Be it known that I, AUGUST HEINE, a citizen of the United States, residing at Silver Creek, in the county of Chautauqua and State of New York, have invented new and useful Improvements in Grain-Cleaners, of which the following is a specification.

This invention relates to a combined grain scourer and separator, and has for its objects to improve the scouring mechanism and the air-separator, so as to effect a more thorough scouring and separation of the grain from the dust.

In the accompanying drawings, consisting of two sheets, Figure 1 is a vertical longitudinal section of my improved grain-cleaning machine, taken through the fan in line xx , Fig. 2. Fig. 2 is a vertical transverse section through the scouring mechanism, taken in line yy , Fig. 1. Fig. 3 is a fragmentary longitudinal section through the grain-discharge leg, taken in line zz , Fig. 2. Fig. 4 is a fragmentary transverse section through the grain-discharge leg, the section being taken in line vv , Fig. 3. Fig. 5 is a horizontal section in line ww , Fig. 1. Fig. 6 is a fragmentary transverse section of the scouring-case on an enlarged scale. Fig. 7 is a fragmentary face view of one of the beaters of the scouring-reel. Fig. 8 is an end view of the same. Fig. 9 is a fragmentary sectional elevation of the screenings-discharge leg and connecting parts, showing the construction of its air-inlet valve, the section being taken in line $y'y'$, Fig. 2. Fig. 10 is an enlarged sectional view of the front portion of the scouring-case.

Like letters of reference refer to like parts in the several figures.

A represents the stationary frame in which the several parts of the machine are supported and which is provided with an inclosing case a .

B represents the feed-spout, arranged over the front portion of the machine on one side thereof and provided at its lower end with a slide b .

C represents the scouring-case, arranged transversely within the front portion of the inclosing case a underneath the discharge-opening of the feed-spout, and D represents the scouring-reel or beater-cylinder, arranged

within the lower semicylindrical portion of the scouring-case. The latter is trough-shaped and has its front wall c arranged vertically and extending upwardly to the top or deck of the inclosing case a . The rear wall c' of the scouring-case extends obliquely rearward to the deck of the inclosing case and is provided on its upper side with a set of inclined deflectors E , by which the grain is caused to move transversely through the machine or longitudinally through the scouring-case from the feed end to the discharge end thereof, and whereby this movement of the grain can be regulated. These deflectors are pivoted with their upper ends to the rear wall c' of the scouring-case and have their lower portions connected by a horizontal shifting-bar e , passing through the side wall of the inclosing case, whereby the deflectors can be adjusted. The scouring-reel consists of a number of spiders d , mounted on a shaft d' , and beaters d^2 , secured to the spiders. The scouring-reel rotates with its upper half toward the inclined rear wall of the scouring-case, as indicated by the dotted arrow in Fig. 1, thereby throwing the grain upwardly upon the inclined surface of the rear wall, from which it flows back into the lower trough-shaped portion of the scouring-case. As the grain flows back it is deflected toward the tail end of the scouring-case by the inclined deflectors E . It is desirable that the grain should strike with either end, and not with its side, against the scouring-case in order to remove the fuzz and germ from the ends of the kernels. For this purpose the advancing sides of the beaters are provided with corrugations or ribs d^3 , arranged at right angles to the shaft and forming grooves in which the grain arranges itself lengthwise, as represented in Fig. 7, thereby causing the grain to be directed with one end toward the scouring-case. The scouring-case is perforated, so that fine fragments of grain, seeds, and dust can pass from the interior of the scouring-case through these perforations into the space surrounding it and so that air-currents can pass from the surrounding space through the perforations into the scouring-case and back from the interior of the scouring-case into the surrounding space. Although large perforations have a greater scouring action upon

the grain than fine perforations, it is necessary to employ fine perforations in the scouring-case to prevent the grain from passing through. In order to obtain the desirable results of both small and large perforations, the scouring-case is constructed of an outer layer having fine perforations and an inner layer having comparatively - large perforations. The outer layer forms almost the entire inclosure of the scouring-case; but the inner layer is arranged only in the trough-shaped portion of the scouring-case.

F represents a board provided on its inner side with a coating of emery or similar abrading material and arranged lengthwise along the outer side of the inner layer at the upper front side of the trough-shaped portion of the scouring-case. This board closes the openings in the inner layer from the outside and a portion of the abrading-surface is exposed in each opening. The openings in the inner layer of the scouring-case are only large enough to permit the kernels of grain to enter the same endwise, so that only the ends of the kernels come in contact with the abrading-surface of the emery-board.

G represents a perforated scouring-plate, forming the top portion of the scouring-case at the receiving end thereof and secured to the under side of the inclosing case. Part of the grain which is thrown upwardly by the head portion of the scouring-reel strikes against the under side of the scouring-plate, which latter thereby assists in cleaning the grain.

H represents a brush, which forms the top portion of the scouring-case at the tail end thereof and which is secured to the under side of the deck of the inclosing case. The grain which is thrown upwardly by the tail portion of the scouring-reel strikes the brush H, whereby the dust adhering to the grain is removed. The scouring-case is provided at its tail end and in its front wall with an elevated discharge-opening i , Figs. 3 and 4, through which the scoured grain escapes and from which it drops into a grain-leg I. The latter is arranged vertically in front of the scouring-case at the tail end thereof and extends above and below the same and has its lower end closed by a gravity-valve i' .

J represents a draft-chamber inclosing the inner and lower sides of the scouring-case and through which the air-current passes on its way to the fan. The bottom of the draft-chamber is separated from the front wall of the inclosing case by a space j , which allows the air-current to enter upwardly around the front end of the bottom and pass between the latter and the lower portion of the scouring-case into the lower portion of the draft-chamber. The rear end of the bottom is connected with the deck by a vertical wall j' , Fig. 3.

K represents the fan-case, which is arranged in the middle portion of the machine in rear of the scouring mechanism and which has its eyes k communicating with the rear portion

of the draft-chamber, so as to draw an air-current through the chamber and into the fan-case.

k' represents the fan-blades, which rotate within the fan-case, and k^2 is the blast-spout, through which the dust-laden air is discharged rearwardly from the fan-case into a depositing-chamber L, formed in the rear and lower portion of the inclosing case. The screenings which pass through the perforations of the scouring-case drop upon the bottom of the draft-chamber, but are prevented from dropping through the space j in front of the bottom by a rearwardly-inclined deflecting-board m , which is separated at its upper end from the front wall of the inclosing case and at its lower end from the bottom of the draft-chamber, as shown in Fig. 1. The screenings which drop upon the bottom of the draft-chamber underneath the scouring-case are carried rearwardly by the current of air passing underneath the deflecting-board and deposited in a conveyer-trough N, formed in the bottom of the draft-chamber between the scouring-case and the fan-case.

n represents a screw-conveyer, which is arranged in the conveyer-trough and carries the material toward one end thereof and discharges it into the upper end of a screenings-leg n' . The latter is arranged in the inclosing case and its lower end is closed by a gravity-valve n^2 . In order to prevent the heavier particles of the screenings—such as broken grain and seeds—from being drawn into the fan, an upright deflecting-board o is arranged lengthwise over the conveyer and extends from the scouring-case downwardly into the conveyer-trough below the bottom of the draft-chamber, thereby causing the current of air to be deflected out of a direct line, which causes the heavier particles of the screenings to become separated from the light dust and to drop into the conveyer-trough N. The conveyer n is rotated at a comparatively-high speed in order to agitate the material in the conveyer-trough, whereby the dust is liberated and upon rising is brought within reach of the air-current, which carries it to the fan. In order to still further free the screenings which are deposited in the conveyer-trough from dust, a current of air is delivered from the depositing-chamber into the leg n' through an opening p , whereby the material in dropping through the leg n' is intercepted by an upward current of air, which removes any dust particles which may be commingled with the screenings. The air-current passing through the opening p in the screenings-leg is regulated by a slide p' , provided with a handle p^2 , extending through the front wall of the inclosing case. A portion of the light dust which is removed from the grain while being scoured floats in the space above the scouring-reel. This light dust is removed by a current of air entering the scouring-case through its front wall and passing out through its rear wall and into the draft-chamber.

Q represents a return-bend air-trunk, which connects the upper end of the grain-leg with the top of the draft-chamber for the purpose of creating an upward air-current through the grain-leg, which intercepts the grain falling through the leg and removes the hulls known as "white caps" and other light particles which may be mixed with the grain. The lower portion of the grain-leg is provided in its rear wall with an opening q , through which the air is admitted from the dust-depositing chamber L into the lower portion of the grain-leg. This opening communicates with the lower end of an upright air-passage q' , which latter opens with its upper end into the upper portion of the dust-depositing chamber, where the air is comparatively free from dust. The return-bend air-trunk is provided above the grain-leg with an enlarged valve-chamber R, in which is arranged a valve r . The valve-chamber is provided with a vertical front wall r' , arranged in line with the front wall of the grain-leg, and a rear wall r^2 , which inclines forwardly. The valve r is composed of an inclined rear wall r^3 , arranged parallel with the rear wall r^2 of the valve-chamber, and a horizontal top board r^4 . An inclined passage r^5 is formed in rear of the board r^4 and an elevated separating-chamber r^6 in front of the board r^4 . The top board of the valve is guided in ways r^7 , formed in the valve-chamber, and the valve is provided with a shifting-rod s , extending through the front wall of the valve-chamber, whereby the valve can be adjusted to increase or decrease the size of the inclined passage for regulating the upward draft through the grain-leg. The hulls and light particles which are separated from the grain in the grain-leg by the air-current are carried upwardly through the inclined passage of the valve-chamber and through the descending rear portion of the return-bend air-trunk into the draft-chamber. Any heavy particles—such as whole grain or large fragments of broken grain—which may be lifted by the air-current are separated at the upper end of the grain-leg by entering the elevated separating-chamber above the grain-leg by their momentum, while light particles pass with the air-current rearwardly to the fan. The heavy particles drop back through the grain-leg after losing their momentum.

T is a deflecting-board, extending from the top of the inclosing case in rear of the air-trunk outlet downwardly into the conveyer-trough N, which causes the heavier particles carried on the air-current to be separated from the air and deposited in the conveyer-trough. The fine dust which is suspended in the air-current delivered by the fan into the chamber L is deposited on the bottom of the latter and is swept by a traveling brush t into a transverse conveyer-trough T', arranged at the front end of the depositing-chamber. This brush is secured to chain belts t' , passing around sprocket-wheels t^2 . The conveyer t^3 , arranged in the conveyer-trough T',

discharges the dust through an opening t^4 in one end of the conveyer-trough, which opening t^4 is closed by a gravity-valve t^5 . The gravity-valves which close the discharge-openings of the grain and screenings legs l and l' and dust-conveyer trough T' allow the material to escape from the machine without permitting the ingress or egress of air. The air, which has become freed from the dust in the dust-depositing chamber, is drawn by the fan from the dust-depositing chamber through the grain and screenings legs, through the scouring-case and the draft-chamber and is again delivered, loaded with dust, into the depositing-chamber, and thus kept in continuous circulation within the machine, so that practically no air is discharged from the machine and none is drawn into the same.

I do not wish to claim in this application anything which is claimed in my pending application, Serial No. 419,166, dated January 25, 1892.

I claim as my invention—

1. The combination, with the perforated scouring-case, of an imperforate abrading-plate arranged against the outer side of a portion of the scouring-case and closing the perforations therein and a scouring-reel arranged within the scouring-case, substantially as set forth.

2. The combination, with a perforated scouring-case, of an imperforate plate secured to the scouring-case and provided on its inner side with a coating of emery, which closes the outer ends of the perforations, and a scouring-reel arranged in the scouring-case, substantially as set forth.

3. The combination, with a scouring-case, of a scouring-reel rotating in the scouring-case and a brush secured in the scouring-case and against which the grain is thrown by the reel, substantially as set forth.

4. The combination, with a trough-shaped scouring-case, of a scouring-reel arranged therein and a stationary brush arranged in the scouring-case above the scouring-reel, substantially as set forth.

5. The combination, with a trough-shaped scouring-case, of a scouring-reel arranged therein, a perforated top plate forming the upper inclosure of the scouring-case at the head end thereof, and a brush forming the upper inclosure of the scouring-case at the tail end thereof, substantially as set forth.

6. The combination, with the inclosing case of the machine, the perforated scouring-case, and the scouring-reel arranged therein, of a draft-chamber inclosing the scouring-case and provided with a conveyer-trough, a fan having its eye connected with the draft-chamber, and a deflecting-board whereby the heavy particles are directed into the conveyer-trough, substantially as set forth.

7. The combination, with the inclosing case of the machine, the scouring-case, and the scouring-reel arranged therein, of a draft-chamber having its bottom extending under-

neath the scouring-case and separated at its front end from the wall of the inclosing case by an air-passage and an inclined cant-board arranged over said passage and separated at its upper end from the front wall of the inclosing case and at its lower end from the bottom of the draft-chamber, substantially as set forth.

8. The combination, with the scouring mechanism, of a draft-chamber inclosing the scouring mechanism and provided with a conveyer-trough, a fan whereby an air-current is drawn through the draft-chamber, a dust-depositing chamber connected with the discharge-spout of the fan, and a discharge-leg connected with the conveyer-trough and provided with an air-inlet communicating with said dust-depositing chamber, substantially as set forth.

9. The combination, with the inclosing case of the machine and the scouring mechanism, of a draft-chamber inclosing the scouring mechanism, a fan having its eye connected with the draft-chamber, a dust-depositing chamber connected with the discharge-spout of the fan, an upright leg which receives the grain from the scouring mechanism and communicates near its lower end with the depositing-chamber to receive the air therefrom, and an air-trunk connecting the upper end of the leg with the draft-chamber, substantially as set forth.

10. The combination, with the upright separating-leg and the fan which causes an air-current to flow through the same, of a closed separating-chamber arranged above the up-

per end of the separating-leg and a lateral passage which leads from the upper end of the separating-leg to the fan, whereby the heavy particles are projected upwardly into the separating-chamber, while the air-current in which the lighter particles remain suspended passes off through the lateral passage, substantially as set forth.

11. The combination, with an upright separating-leg and the fan which causes an air-current to flow through the same, of an inclosure having its lower end connected with the upper end of said leg and its upper end connected with the fan and a valve arranged in said inclosure and having on one side a depression which forms part of a closed separating-chamber, while the other side of the valve forms the adjustable wall of the passage which leads to the fan, substantially as set forth.

12. The combination, with the scouring mechanism and the draft-chamber inclosing the same, of a leg arranged on the front side of the scouring mechanism and receiving the grain therefrom and a return-bend air-trunk connecting the upper end of the leg with the draft-chamber and provided with a separating-chamber above the leg and a valve arranged therein, substantially as set forth.

Witness my hand this 7th day of June, 1892.

AUGUST HEINE.

Witnesses:

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