

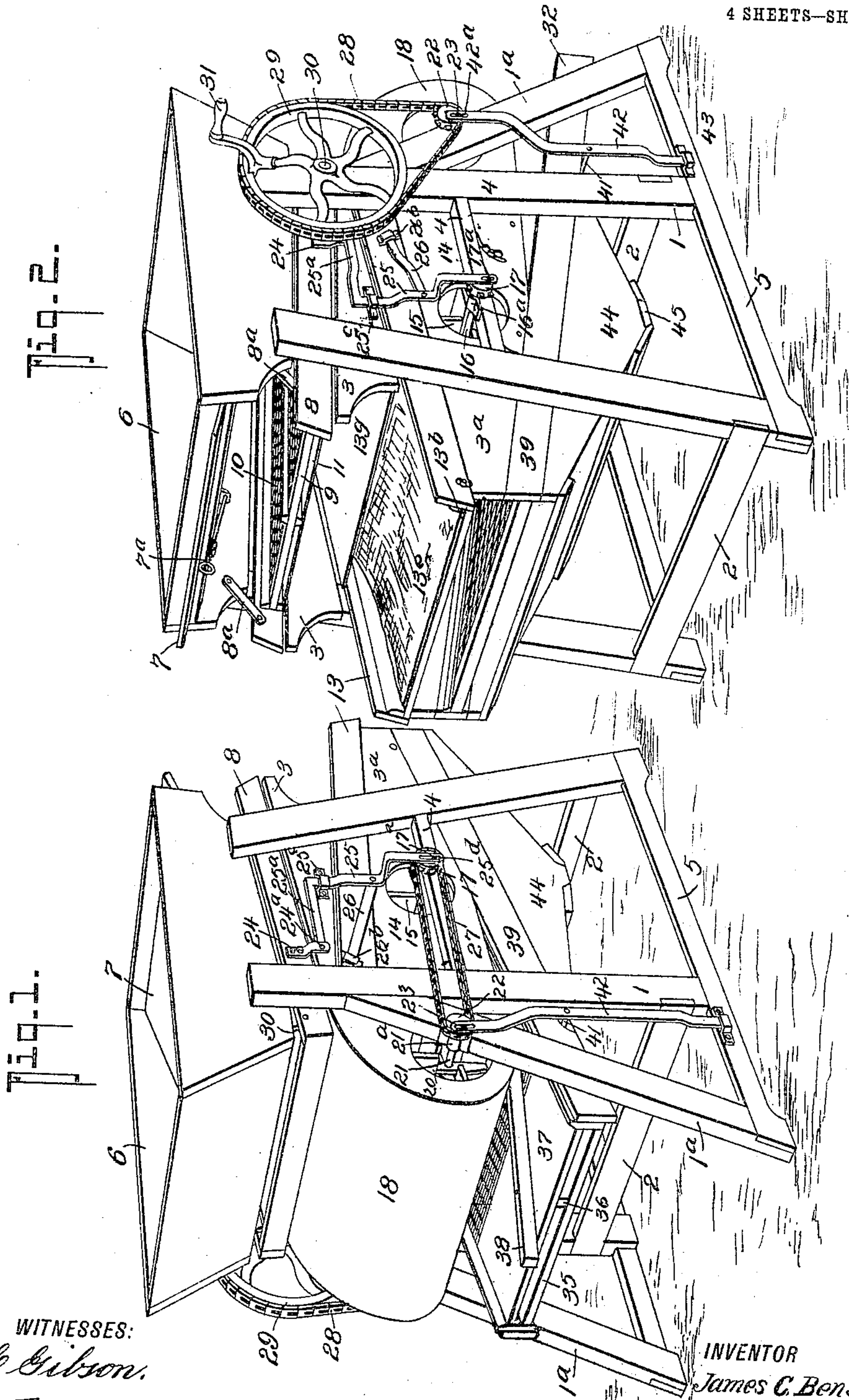
No. 801,207.

PATENTED OCT. 10, 1905.

J. C. BENSON.
SEED CLEANER AND GRAIN SEPARATOR.

APPLICATION FILED MAY 26, 1905.

4 SHEETS—SHEET 1.



WITNESSES:
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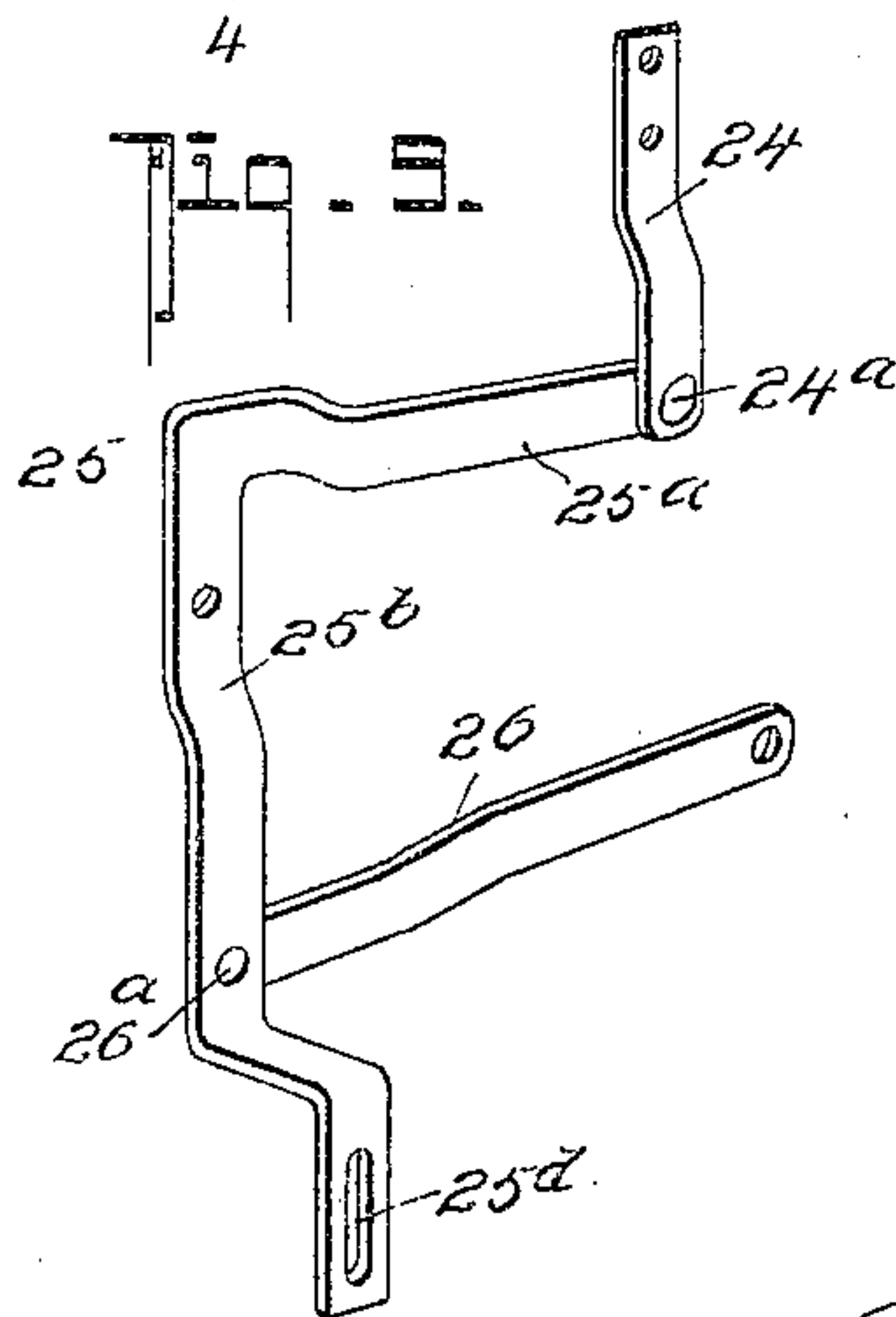
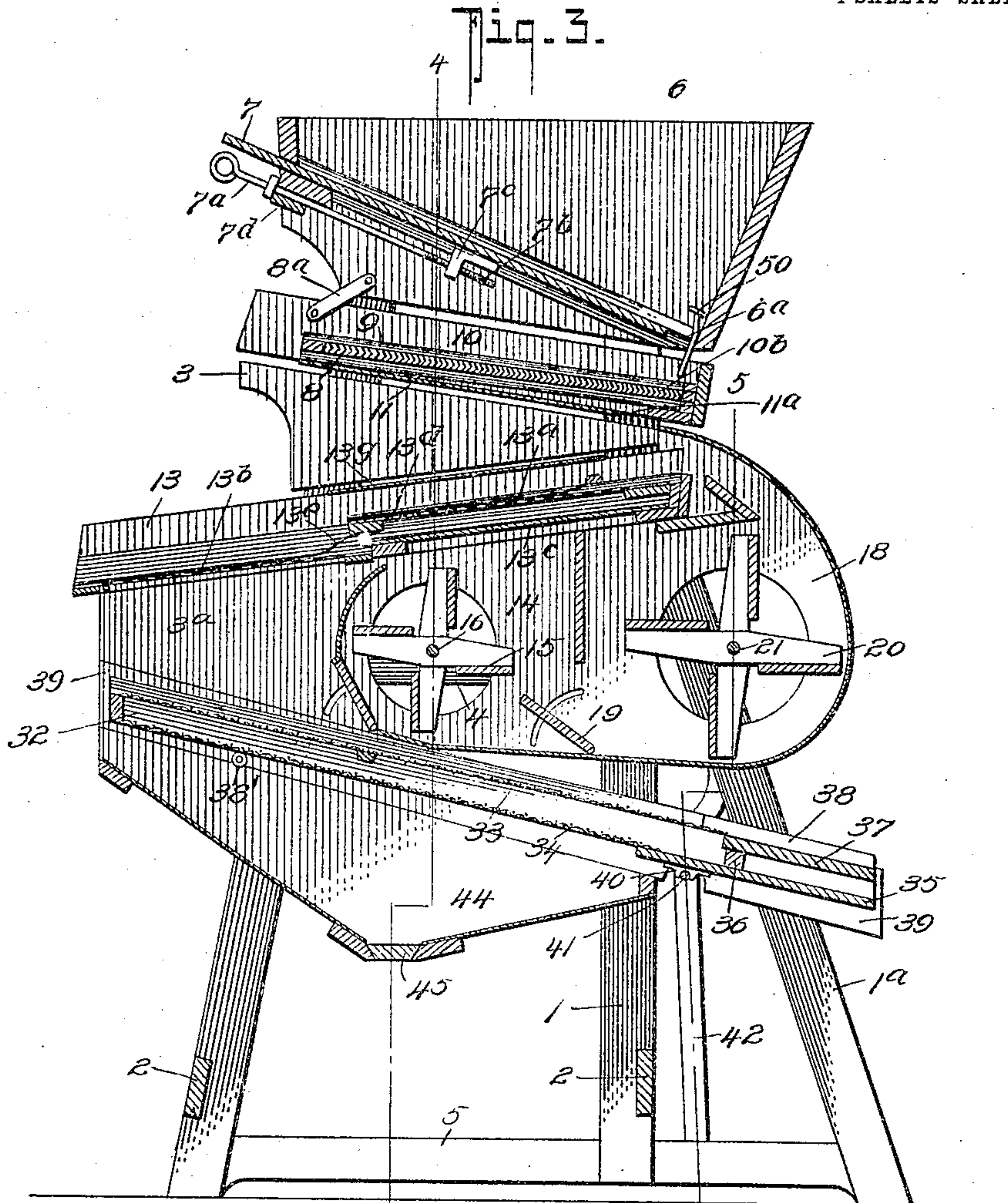
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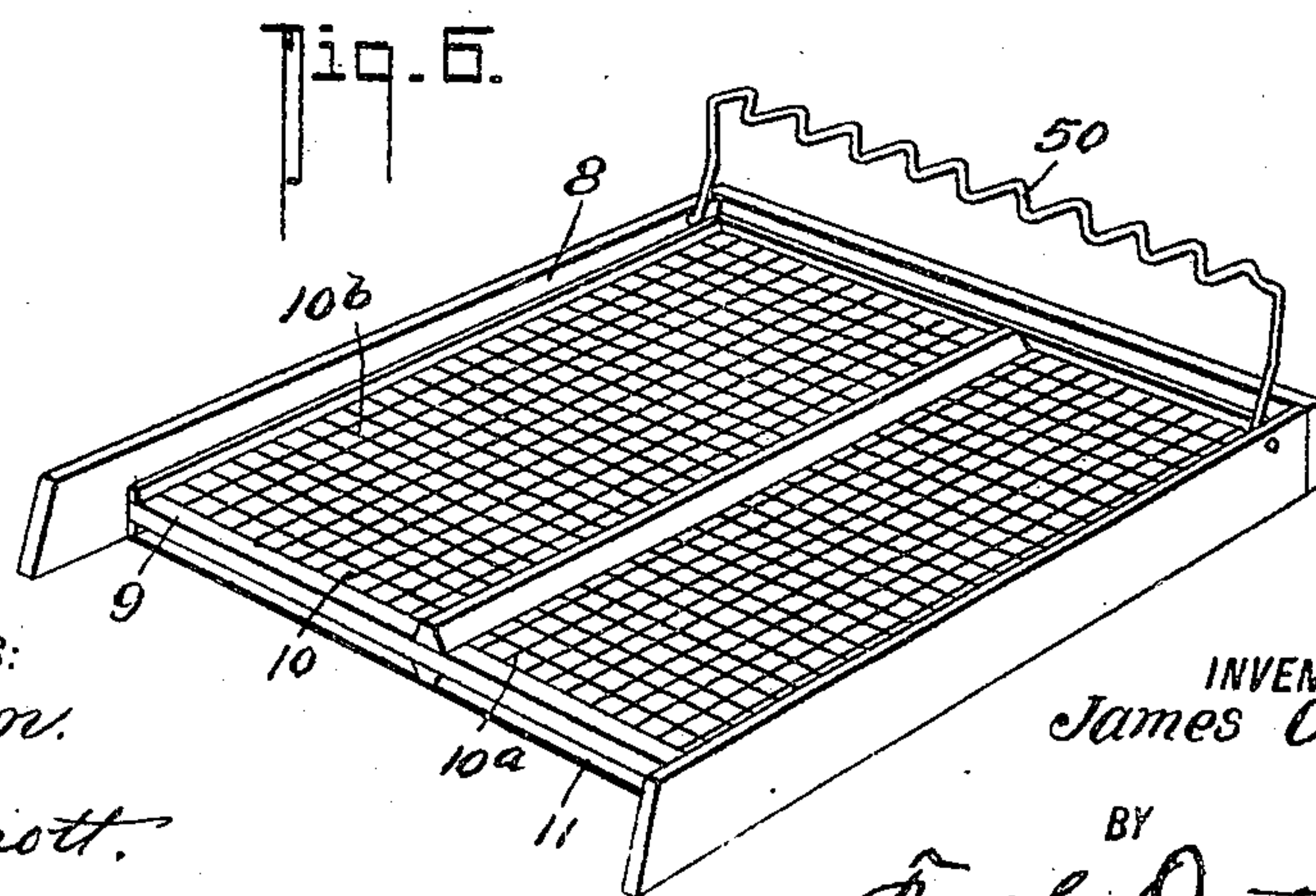
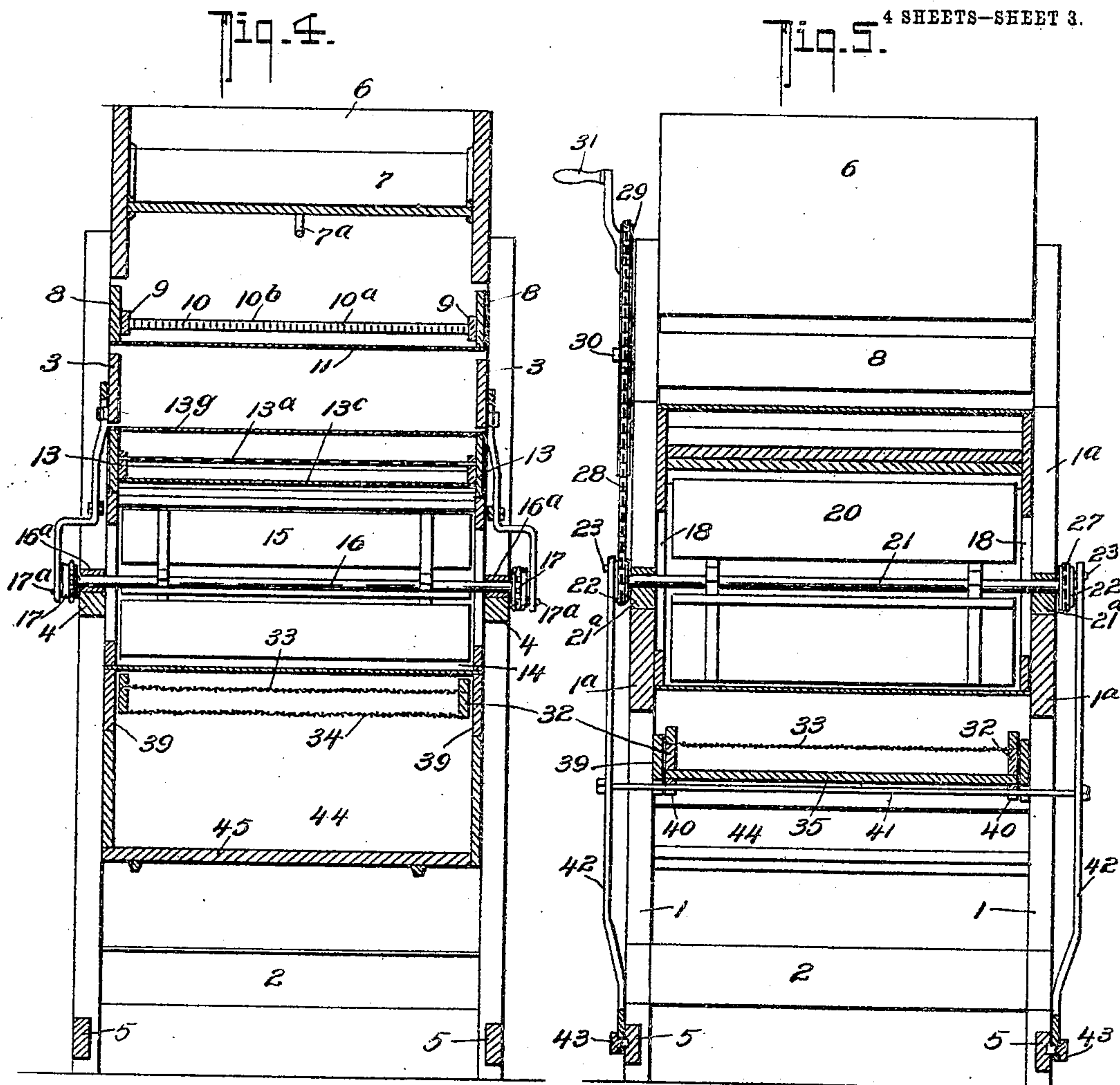
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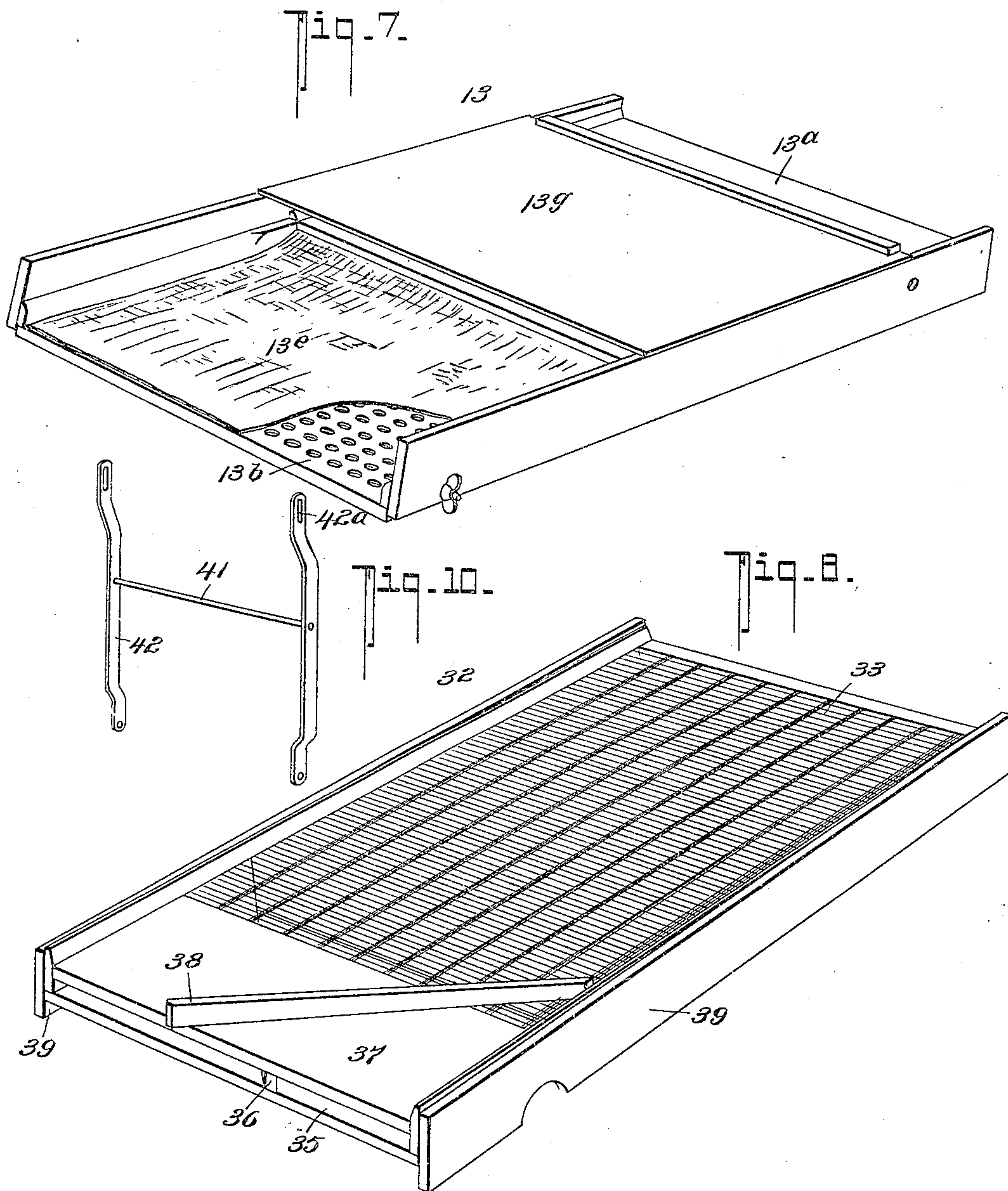
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SEED-CLEANER AND GRAIN-SEPARATOR.

No. 801,207.

Specification of Letters Patent.

Patented Oct. 10, 1905.

Application filed May 26, 1905. Serial No. 262,457.

To all whom it may concern:

Be it known that I, JAMES C. BENSON, residing at Troy, in the county of Miami and State of Ohio, have invented certain new and useful
5 Improvements in Seed-Cleaners and Grain-Separators, of which the following is a specification.

My invention primarily seeks to provide a
10 a very simple and economical construction in which the adjustability or the operative arrangement of the several parts can be readily and conveniently accomplished and said parts adapted to effectively operate for their intended
15 purposes; and in its generic nature my invention comprehends a novel and peculiar co-operative arrangement of a receiving-hopper, a separating-shoe, an upper and a lower chaff-shoe disposed intermediate the separating-
20 shoe and the hopper, a dust and dirt box below the separating-shoe, and blast devices between the chaff-shoes and the separating-shoe to blow out the chaff and other light material.

In its more complete nature my invention
25 includes a special construction of grain-separating shoe and chaff-shoes, a special construction and arrangement of air-blast devices for coöperating with the chaff-shoes to blow out the chaff, dust, and light material,
30 a special means for regulating said air-blasts, an improved means for agitating the material in the hopper to cause it to properly feed from the hopper to the upper chaff-shoe, a special means for imparting the proper mo-
35 tion to the blast devices and the respective shoes, and a special means for mounting the respective shoes on the supporting-frame.

With other objects in view than have heretofore been enumerated the invention also
40 includes certain novel construction, combination, and arrangement of parts, all of which will be first described in detail and then specifically pointed out in the appended claims, reference being had to the accompanying
45 drawings, in which—

Figure 1 is a perspective view of my invention viewed from the front or grain-discharging end. Fig. 2 is a view looking toward the rear or chaff-discharging end of the machine.
50 Fig. 3 is a vertical longitudinal section of my machine. Fig. 4 is a transverse section on the line 4 4 of Fig. 3. Fig. 5 is a similar view on the line 5 5 of Fig. 3. Fig. 6 is a detail perspective view of the upper chaff-shoe. Fig. 7 is a similar view of the lower
55 chaff-shoe. Fig. 8 is a perspective view of

the separating-shoe. Fig. 9 is a detail perspective view of one of the sets of operating-hanger members for the chaff-shoes. Fig. 10 is a detail view of the members 41 and 42. 60

Referring now to the accompanying drawings, in which like numerals of reference indicate like parts in all of the figures, 1 1^a designate the upright and inclined standards or legs, 2 the end cross-bars or braces, 3 3^a the
65 upper and lower side members, respectively, 4 the horizontal side cross-braces secured to the uprights 1 1, and 5 the bottom side braces for the supports 1 1^a, the whole forming the frame or supporting parts of my machine. 70

6 designates a hopper mounted on the upper ends of the standards 1 1 and extending the full width of the machine. The hopper 6 has its discharge-opening 6^a disposed over the lower end of the upper chaff-shoe 8, and the
75 said discharge-opening 6^a is regulated in size or closed off entirely by the slide or gate 7, movable in the opening 6^a, a rod 7^a, having a screw connection 7^b with a bearing 7^c on the
80 gate 7 and passing through a bearing 7^d on the hopper bottom, serving to hold the gate to its adjusted positions.

The upper chaff-shoe 8, which is disposed lengthwise of the machine and between the standards 1, is suspended at its upper end by
85 a pair of hangers 8^a 8^b, pivotally secured thereto and to the hopper sides in an inclined position, and the said upper chaff-shoe 8 is held for longitudinal and vertical reciprocation in a manner presently explained. The upper
90 chaff-shoe 8 includes a special construction of screen devices which comprises a frame 9, upon which the screen 10 is secured, and the said screen 10 comprises a series of longitudinal strips 10^a and transverse strips 10^b, the
95 transverse strips 10^b being slanted toward the upper and rear end of the chaff-shoe 8 to feed the material deposited on the screen from the hopper up the shoe toward its rear end. Disposed under the screen 10 and secured to the
100 shoe 8 is a metal plate 11, which extends from the rear end toward the front of the shoe and which is designed to catch the grain that falls through the screen 10 and allow it to gravitate downwardly toward the front of the shoe
105 8, where it discharges through an aperture 11^a onto the upper or front end of the lower chaff-shoe 13.

50 designates a crimped wire member bent into a U shape and secured to the lower end
110 of the shoe 8. The wire member 50 projects up through the hopper-outlet into the hopper

and serves to agitate the material within the hopper to cause it to properly feed through the hopper-outlet aperture and prevent the outlet-aperture becoming clogged.

5 The lower chaff-shoe 13 receives the grain from the upper chaff-shoe 8 at its front or elevated end, as before stated, onto a screen 13^a, which extends about half the length of the shoe. A second screen 13^b, forming a part
10 of the lower chaff-shoe 13, extends the remaining half of the said shoe and is disposed in a plane below the screen 13^a.

13^c designates a sheet-metal bottom plate below the screen 13^a and in a plane with the
15 screen 13^b to feed the grain which passes through the screen 13^a onto the screen 13^b, an oil-cloth curtain 13^d being secured over the screen 13^a, while a second oil-cloth curtain 13^e is secured over the screen 13^b to prevent chaff,
20 &c., from passing through the screens 13^a and 13^b.

13^f designates a metallic plate over the screen 13^a and at the top of the shoe to prevent the chaff as it is blown out by the air-
25 blast from accumulating on the curtain 13^d.

Below the shoe 13, arranged centrally of the machine, is an air-blast mechanism comprising a drum or casing 14, closed at the top by the shoe 13 and having an adjustable gate
30 14^a at its rear to regulate the discharge of the plates. Within the drum or casing 14 is a rotary fan 15, including a shaft 16, passing out to the sides of the machine and mounted in bearings 16^a 16^b on the cross members 4 4,
35 sprocket-wheels 17 17, having crank-pins 17^a 17^b, being secured to the ends of the shaft 15 for a purpose presently understood.

18 designates a second drum or casing at the front of the machine, which communicates
40 with the drum or casing 14 by an adjustable gate 19, and this is designed to discharge the air between the upper and lower chaff-shoes at the front ends thereof. Arranged within the drum or casing 18 is a second rotary fan
45 20, also including a shaft 21, mounted in bearings 21^a 21^b on the supports 1^a 1^b and carrying at its end sprockets 22 22, having crank-pins 23 23, for a purpose presently explained.

24 24 designate pendent bars rigidly secured to the upper chaff-shoe 8, one on each side thereof near the front of the shoe, and the said bars 24 are each pivotally secured at
50 24^a to short arms 25^a of angle-irons 25, whose long arms 25^b are fulcrumed by pivot-bearing clips 25^c to the cross-bar 3 on each side of the machine. The lower end of each long arm 25^b of the angle-irons 25 is slotted, as at 25^d, to receive the crank-pins 17^a 17^b of the sprockets 17. Below the fulcrum-point of each long
55 arm 25^b an arm 26 is pivotally secured to the said arms 25^b, as at 26^a, which arms 26 26 are also pivotally secured to the lower chaff-shoe 13 near its front end by clips 26^b, as shown.

A sprocket-chain 27 passes over the sprock-
65 ets 17 and 22 at one side of the machine, while

a sprocket-chain 28 passes over the other sprocket 22 on the opposite side of the machine and over a sprocket drive-wheel 29, mounted on a stud-shaft 30, which is secured to the support 1 of the machine, and the said
70 drive-wheel 29 has a crank 31, by means of which motion is imparted to the drive-wheel, which motion is in turn transmitted to the fan-shafts and to the chaff-shoes.

Below the lower chaff-shoe the separating-
75 shoe 32 is mounted, and the said shoe 32 has its highest point at the rear of the machine and receives the seed discharged from the lower screen of the lower chaff-shoe onto the rear or upper end of the separator-shoe. The
80 separating-shoe 32 includes a pair of screens of different mesh running nearly the entire length of the shoe and arranged one above the other to separate the grain into two parts, the larger-size grain not passing through the
85 upper screen 33 and the smaller-size grain not passing through the lower screen 34, both screens, however, being so arranged as to permit any dust which may have been deposited with the grain onto the separator-screen to
90 pass through the separator-screens into the dust-collecting chamber below the separator-shoe. At its front end the separator-shoe is provided with a closed bottom 35, which is
95 provided with a diagonal bar 36 to pass the grain from the lower screen out from the separator-shoe at one side thereof, a supplemental bottom 37 being arranged above the diagonal bar 36 and the bottom 35 and in a
100 plane with the upper screen 33, and a second diagonal bar 38 being arranged above the bottom 36 and in a direction opposite to the bar 35 to discharge the grain from the upper screen at the opposite side of the separator,
105 as clearly shown in Figs. 1 and 8.

38' 38' designate a pair of friction-rollers secured to cleats 39 on the frame of the machine below the separator-shoe and upon which the upper or rear end of the separator-shoe is adapted to rest. Near its front end the
110 separator-shoe is provided on its under side with a pair of U-shaped bearing members 40, adapted when the separator-shoe is slipped into position to fit over a horizontally-held transverse rod 41, which is secured to a pair
115 of vertical levers 42 42, which are pivotally secured by cleats 43 43 to the lower brace-bars of the machine, one on each side of the machine, and the said vertical levers 42 42 have their upper ends provided with slots 42^a
120 to receive the crank-pins 23 of the sprockets 22 before referred to, whereby when the shaft 20 is rotated the vertical levers 42 will be rocked, and they in turn will rock or reciprocate the separator-screen in a longitudinal
125 direction.

Below the separator-screen is a dust-collecting receptacle 44, which is adapted to collect any dust or dirt that might have passed onto the separator-shoe with the grain, a suit-
130

able gate 45 being provided to let out the material from the receptacle 44.

In operation the grain is placed in the hopper in the usual manner and motion is imparted to the drive sprocket-wheel, which causes the upper and lower chaff-shoes and the separating-shoe to be reciprocated longitudinally as well as causing the upper chaff-shoe to be reciprocated vertically, the agitator within the hopper preventing the outlet thereof becoming choked up. The material as it passes out of the hopper falls on the lower end of the upper chaff-shoe, and, owing to the motion of the said shoe, the material climbs up the screen toward the rear of the shoe, the grain passing through the screen-bottom onto the metal bottom of the upper chaff-shoe, from whence it moves down and is deposited on the front or upper end of the lower chaff-shoe. Any dust, dirt, or other light material passing from the upper chaff-shoe toward the lower chaff-shoe with the grain is blown out by the air-blast from the fan 20, which blast also serves to blow out of the rear of the machine the loose chaff and stuff which falls off the upper rear end of the upper chaff-shoe onto the oil-cloth apron of the lower chaff-shoe, the chaff being discharged at the rear of the machine. The grain after it passes onto the lower chaff-shoe is screened through the screens of the lower chaff-shoe and deposited onto the separator-shoe at its rear high end, and any dust or small chaff which passes out of the second chaff-shoe with the grain is blown out at the rear end of the machine by the central air-blast fan 15. The grain then passing down the separator-shoe is separated into its two grades, the larger grain remaining on the top screen and passing off at one side of the discharge end of the chaff-shoe, while the smaller grain passes through the upper screen of the separating-shoe onto the lower one and is deposited at the opposite side of the discharge end of the separator-shoe.

By constructing the upper chaff-shoe as shown and described and providing the same with any suitable screen necessary for chaffing any kind of grain and seed and by mounting the said shoe to have an up-and-down pitching motion nearly all of the foul stuff is carried off by the said screens at its upper end, while the lower chaff-shoe is so constructed with suitable screens for taking out any small sticks, joints, and weed-seeds that pass through the screen of the upper chaff-shoe, the separating-shoe being arranged to receive the grains and seeds passing through the lower chaff-shoe screens and serves to separate all kinds of grains and seeds that pass through the machine.

From the foregoing description it will be seen that I have provided a separating and cleaning machine of a very simple and effective construction which will readily serve its

intended purposes and in which means are provided for readily regulating the air-blasts and directing them to the proper points and in which means are provided for collecting and effectively separating the grain from the chaff and foreign matter, as well as separating the cleaned grain into grades.

From the foregoing description, taken in connection with the accompanying drawings, it is thought the complete operation, construction, and many advantages of my invention will be readily understood by those skilled in the art to which it appertains.

Having thus described my invention, what I claim, and desire to secure by Letters Patent, is—

1. In a machine of the class described, the combination with a hopper, and a grain-separating shoe supported on a main frame for reciprocal motion thereon; of an upper chaff-shoe and a lower chaff-shoe inclined in opposite directions to each other, the lower chaff-shoe being inclined in an opposite direction to the grain-separating shoe, said chaff-shoes being disposed between the hopper and the separating-shoe, said upper chaff-shoe having a screen, a metal bottom plate below said screen and having a discharge-outlet, said lower chaff-shoe comprising a pair of screens arranged in different planes and each extending about half the length of the shoe, oil-cloth curtains over said lower chaff-shoe, screens, and a sheet-metal top over the upper screen of the lower chaff-shoe, and means for longitudinally reciprocating both of said chaff-shoes and said separating-shoe.

2. In a machine of the class described, the combination with a hopper, and a grain-separating shoe supported on a main frame for reciprocal motion thereon; of an upper chaff-shoe and a lower chaff-shoe inclined in opposite directions to each other, the lower chaff-shoe being inclined in an opposite direction to the grain-separating shoe, said chaff-shoes being disposed between the hopper and the separating-shoe, said upper chaff-shoe having a screen, a metal bottom plate below said screen and having a discharge-outlet, said lower chaff-shoe comprising a pair of screens arranged in different planes and each extending about half the length of the shoe, oil-cloth curtains over said lower chaff-shoe screens, and a sheet-metal top over the upper screen of the lower chaff-shoe, and means for longitudinally reciprocating both of said chaff-shoes and said separating-shoe, and for vertically reciprocating one of said chaff-shoes.

3. In a machine of the class described, the combination with a hopper, and a grain-separating shoe supported on a main frame for reciprocal motion thereon; of an upper chaff-shoe and a lower chaff-shoe inclined in opposite directions to each other, the lower chaff-shoe being inclined in an opposite direction to the grain-separating shoe, said chaff-shoes

being disposed between the hopper and the separating-shoe, said upper chaff-shoe having a screen, a metal bottom plate below said screen and having a discharge-outlet, said lower chaff-shoe comprising a pair of screens arranged in different planes and each extending about half the length of the shoe, oil-cloth curtains over said lower chaff-shoe screens, a sheet-metal top over the upper screen of the lower chaff-shoe, and an air-blast device for causing an air-blast between the upper and lower chaff-shoes substantially as shown and described.

4. In a machine of the class described, the combination with a hopper, and a grain-separating shoe supported on a main frame for reciprocal motion thereon; of an upper chaff-shoe and a lower chaff-shoe inclined in opposite directions to each other, the lower chaff-shoe being inclined in an opposite direction to the grain-separating shoe, said chaff-shoes being disposed between the hopper and the separating-shoe, said upper chaff-shoe having a screen, a metal bottom plate below said screen and having a discharge-outlet, said lower chaff-shoe comprising a pair of screens arranged in different planes and each extending about half the length of the shoe, oil-cloth curtains over said lower chaff-shoe screens, a sheet-metal top over the upper screen of the lower chaff-shoe, an air-blast device for causing an air-blast between the upper and lower chaff-shoes, means for controlling said air-blast device to regulate the supply of air emitted from the air-blast devices, and means for longitudinally reciprocating both of said chaff-shoes and said separating-shoe and for vertically reciprocating one of said chaff-shoes and for operating said air-blast device.

5. In a machine of the class described, the combination with a hopper, and a grain-separating shoe supported on a main frame for reciprocal motion thereon; of an upper chaff-shoe and a lower chaff-shoe inclined in opposite directions to each other, the lower chaff-shoe being inclined in an opposite direction to the grain-separating shoe, said chaff-shoes being disposed between the hopper and the separating-shoe, said upper chaff-shoe having a screen, a metal bottom plate below said screen and having a discharge-outlet, said lower chaff-shoe comprising a pair of screens arranged in different planes, and each extending about half the length of the shoe, oil-cloth curtains over said lower chaff-shoe screens, a sheet-metal top over the upper screen of the lower chaff-shoe, and an air-blast device for causing an air-blast between the upper and lower chaff-shoes, a second air-blast device for causing an air-blast between the lower chaff-shoe and the separator-shoe, means for controlling both of said air-blast devices to regulate the supply of air emitted

therefrom, and means for operating said air-blasting devices and longitudinally reciprocating both of said chaff-shoes and said separator-shoe and for vertically reciprocating one of said chaff-shoes, substantially as shown and described.

6. In a machine of the class described, the combination with a hopper, and a separator-shoe supported on the main frame for reciprocal motion thereon; of an upper and lower chaff-shoe mounted for reciprocal movement between the hopper and the separator-shoe, the upper chaff-shoe and the separator-shoe lying in parallel planes, the lower chaff-shoe lying in a plane inclined diagonally between the upper chaff-shoe and the separator-shoe, inclined hangers pivotally secured to the upper end of the upper chaff-shoe, and to the frame of the machine, hanger-bars secured near the other end of the upper chaff-shoe, angle-irons pivotally secured to the frame of the machine each including a long and a short arm, the short arm of each angle-iron being connected to one of said hanger-bars of the upper chaff-shoe, bars pivotally secured to the upper end of the lower chaff-shoe and pivotally secured to the long arm of the angle-irons, means for rocking said angle-irons to impart longitudinal reciprocal movement to the chaff-shoes and vertical reciprocal movement to the upper chaff-shoe, and means for reciprocating the separator-shoe, substantially as shown and described.

7. In a machine of the class described, the combination with a hopper, and a separator-shoe supported on the main frame for reciprocal motion thereon; of an upper and lower chaff-shoe mounted for reciprocal movement between the hopper and the separator-shoe, the upper chaff-shoe and the separator-shoe lying in parallel planes, the lower chaff-shoe lying in a plane inclined diagonally between the upper chaff-shoe and the separator-shoe, inclined hangers pivotally secured to the upper end of the upper chaff-shoe and to the frame of the machine, hanger-bars secured near the other end of the upper chaff-shoe, angle-irons pivotally secured to the frame of the machine each including a long and a short arm, the short arm of each angle-iron being connected to one of said hanger-bars of the upper chaff-shoe, bars pivotally secured to the upper end of the lower chaff-shoe and pivotally secured to the long arm of the angle-irons, means for rocking said angle-irons to impart longitudinal reciprocal movement to the chaff-shoes, and vertically-reciprocal movement to the upper chaff-shoe, and means for reciprocating the separator-shoe, said last-named means comprising a pair of vertically-disposed levers pivotally fulcrumed to the lower brace-bars of the machine-frame, a transverse rod connecting said levers together and bearing members on the under side of the separator-

shoe for engaging said transverse rod and a means for operating said levers substantially as shown and described.

8. In a machine of the class described, the
5 combination with a hopper, and a separator-shoe supported on the main frame for reciprocal motion thereon; of an upper chaff-shoe and a lower chaff-shoe inclined in opposite
10 directions to each other, the upper chaff-shoe lying in a plane parallel with the separator-shoe, an agitator carried by the upper chaff-shoe and projecting into the hopper, said
15 hopper having a discharge-outlet, adjustable gate for opening and closing said discharge-outlet of the hopper, air-blast devices dis-

charging between the upper and lower chaff-shoes and between the lower chaff-shoe and the separator-shoe, and means for operating said air-blast devices, for imparting longitudinal reciprocal motion to the separator-shoe, for
20 imparting longitudinal reciprocal motion to both chaff-shoes and for imparting vertical reciprocal motion to the upper chaff-shoe, all being arranged substantially as shown and described.

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