

No. 686,094.

Patented Nov. 5, 1901.

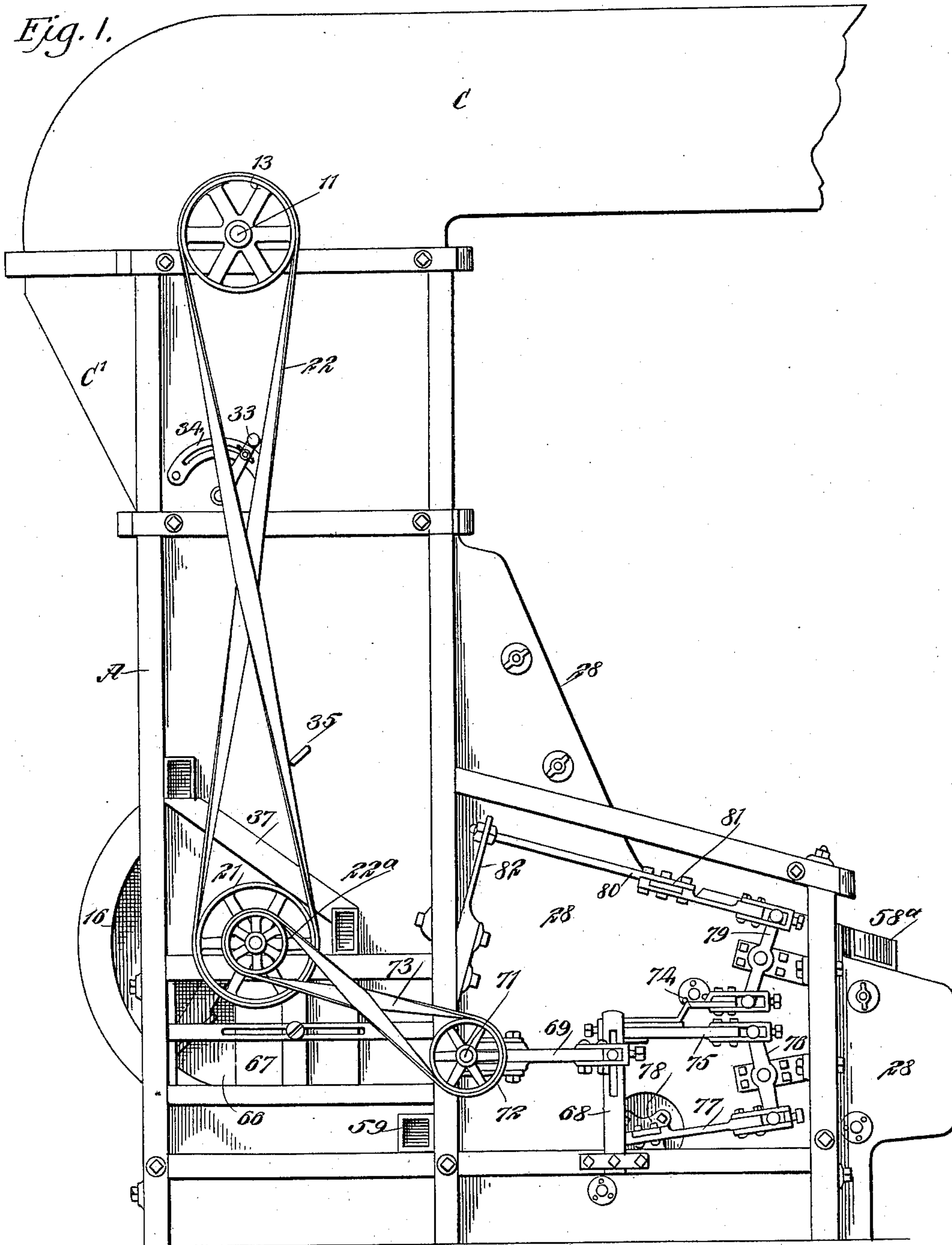
A. LEIKEM.
MACHINE FOR CLEANING WHEAT.

(Application filed Mar. 13, 1900.)

(No Model.)

5 Sheets—Sheet 1.

Fig. 1.



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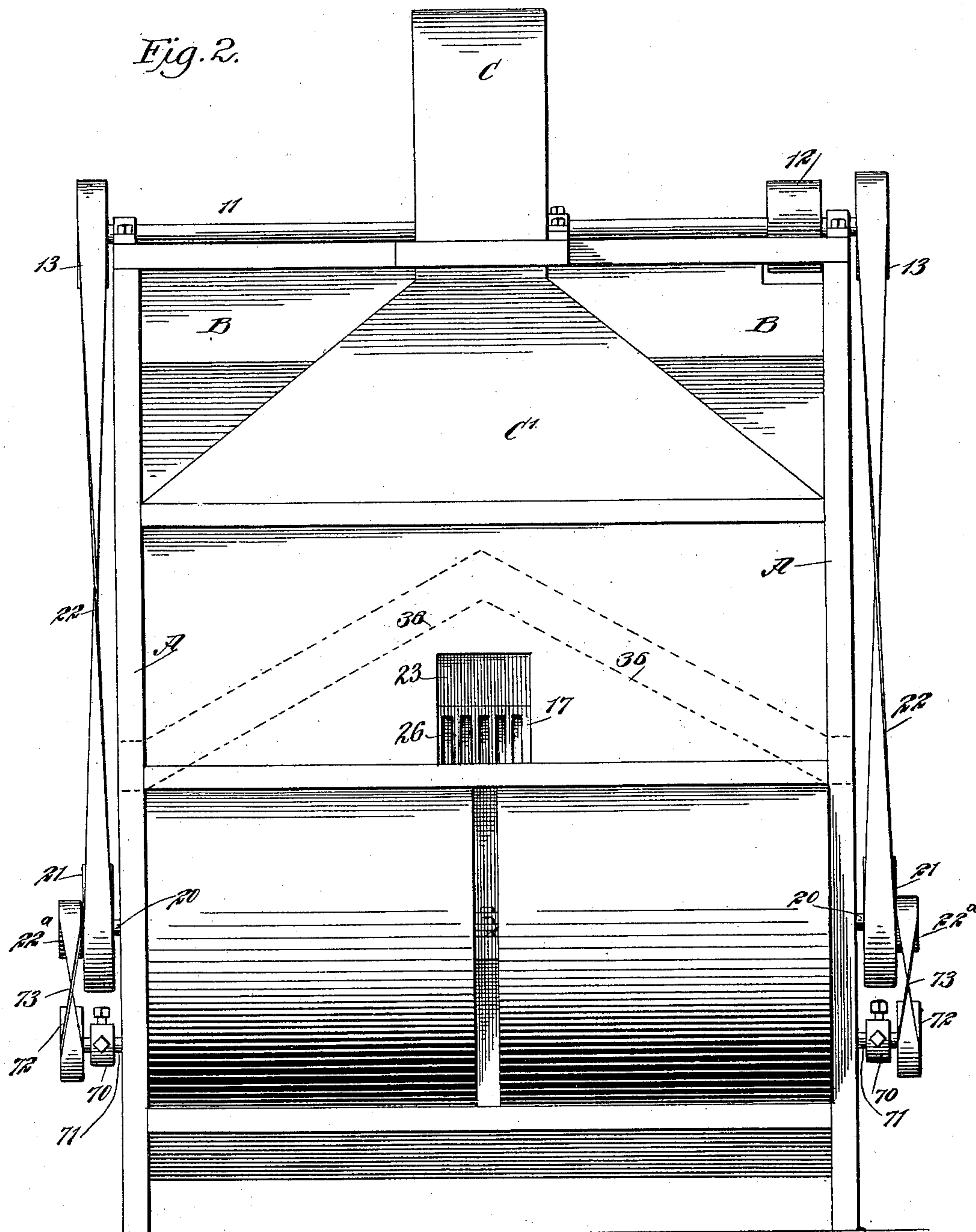
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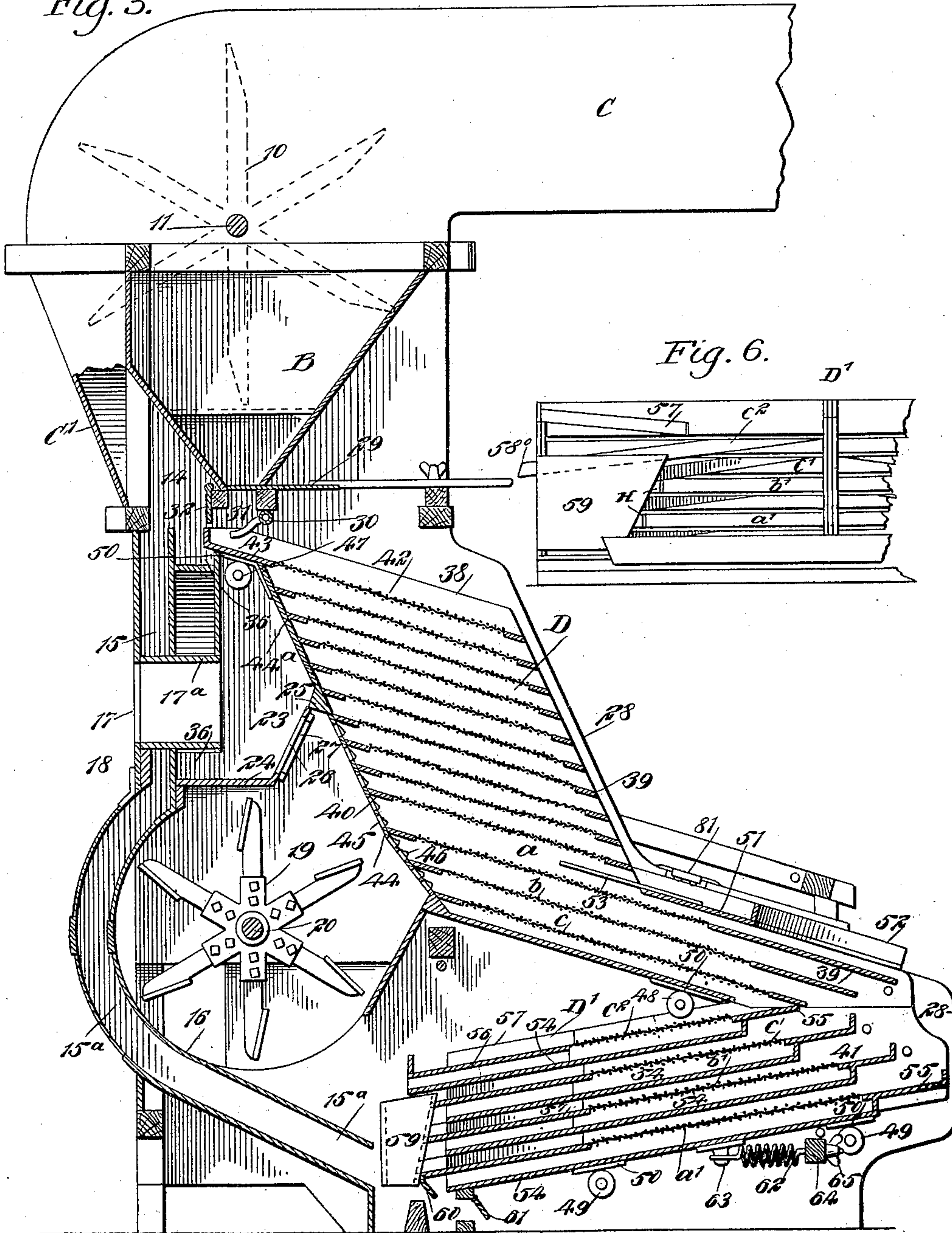
MACHINE FOR CLEANING WHEAT.

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Fig. 3.



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Fig. 4.

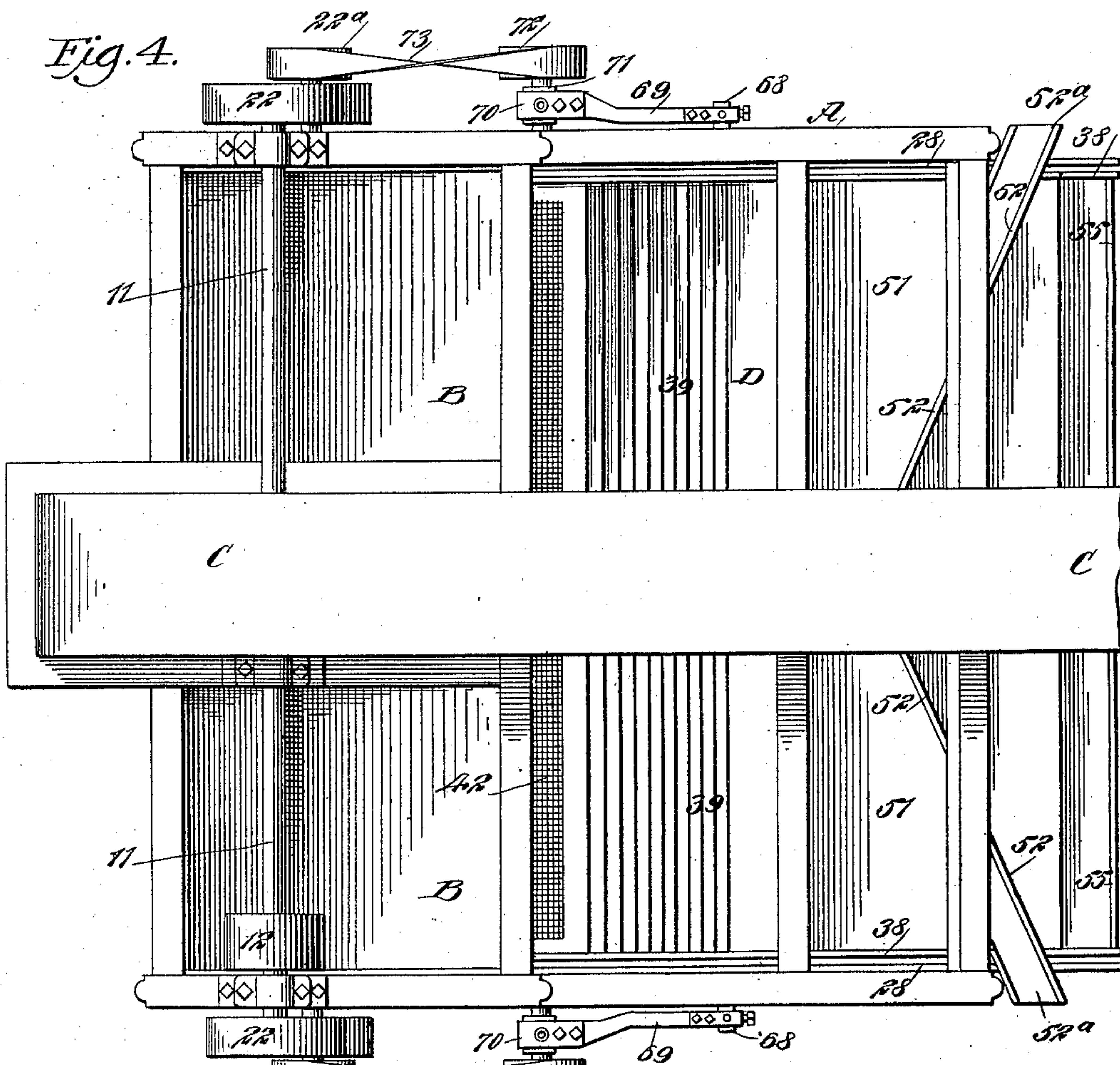
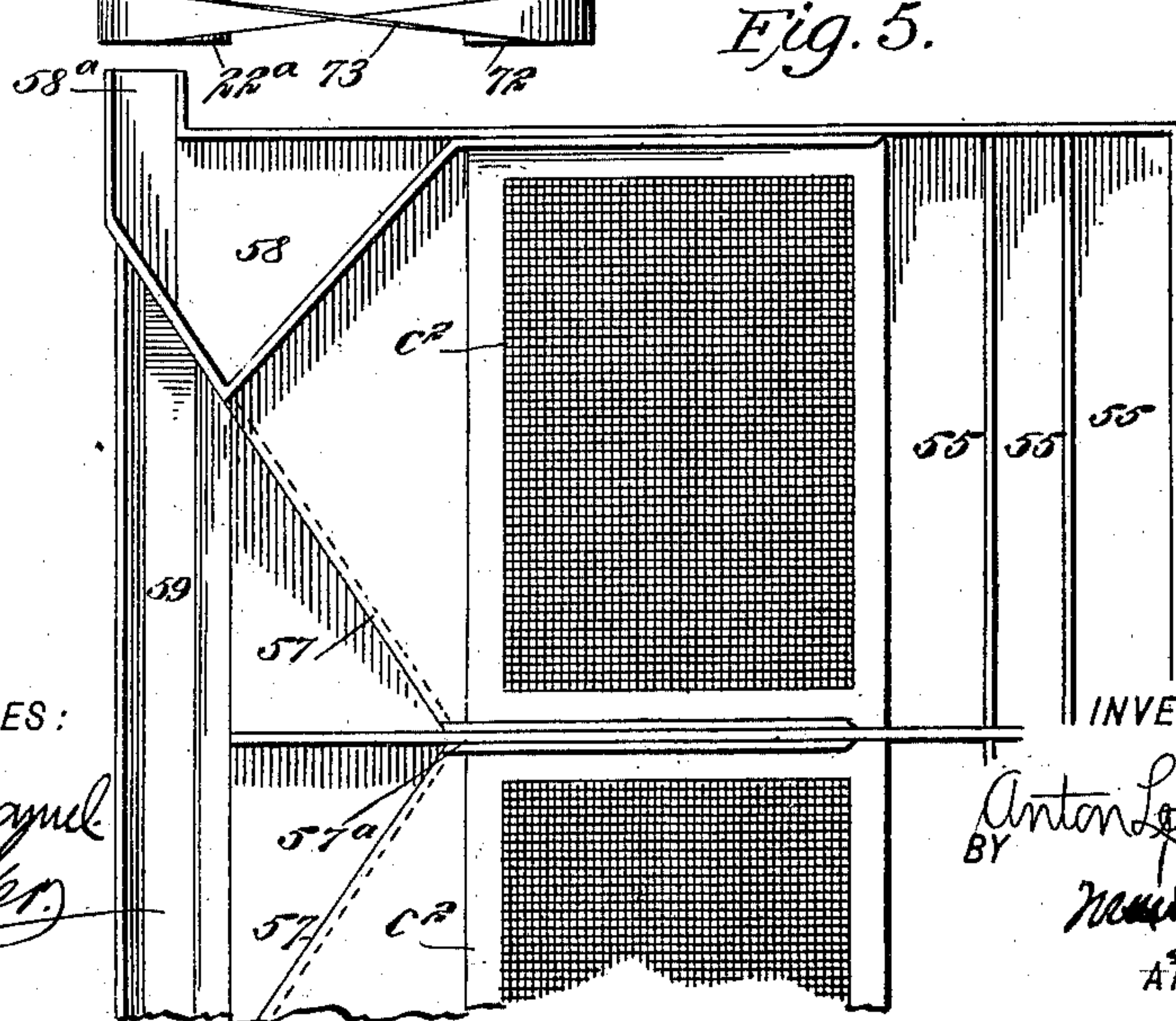


Fig. 5.



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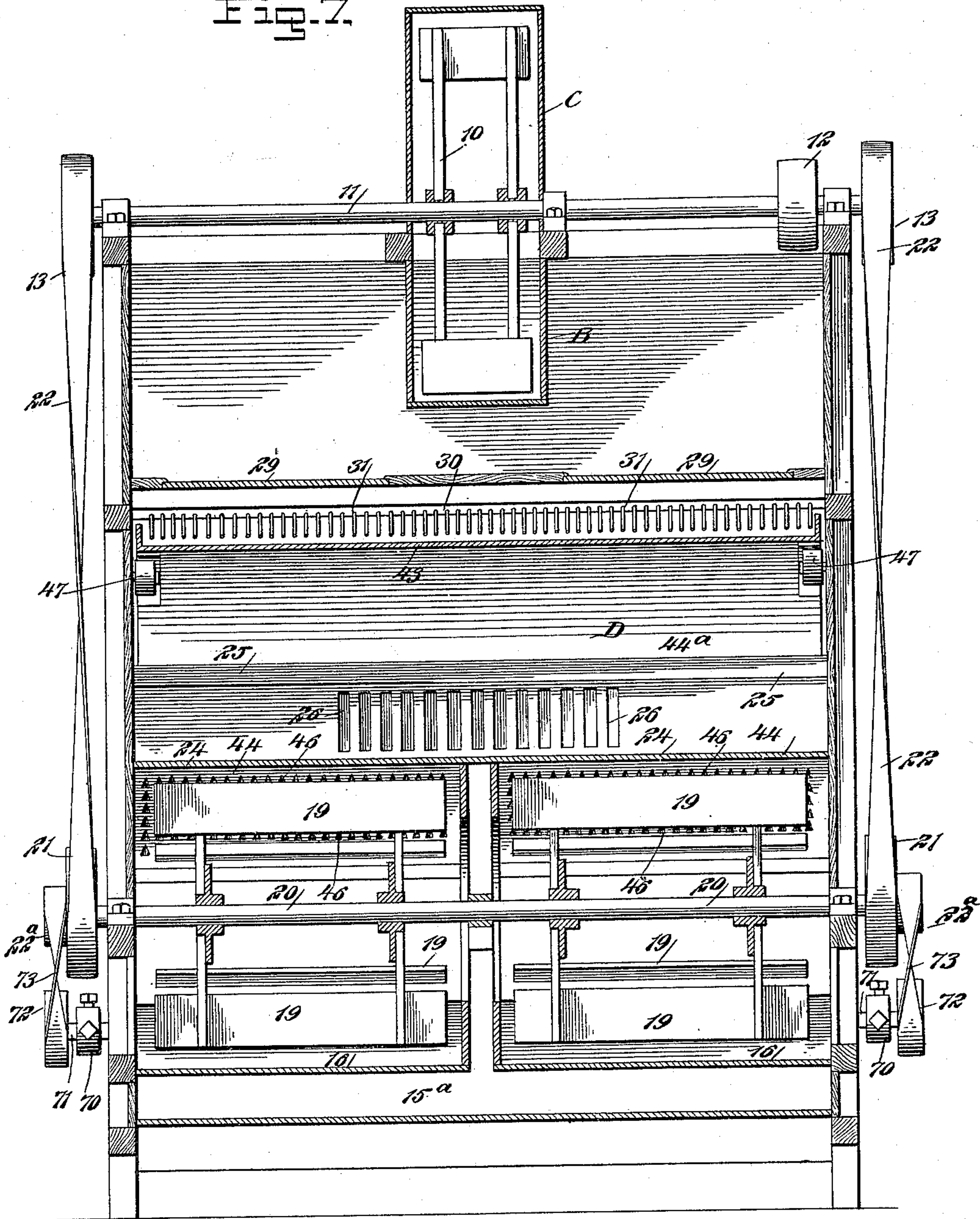
MACHINE FOR CLEANING WHEAT.

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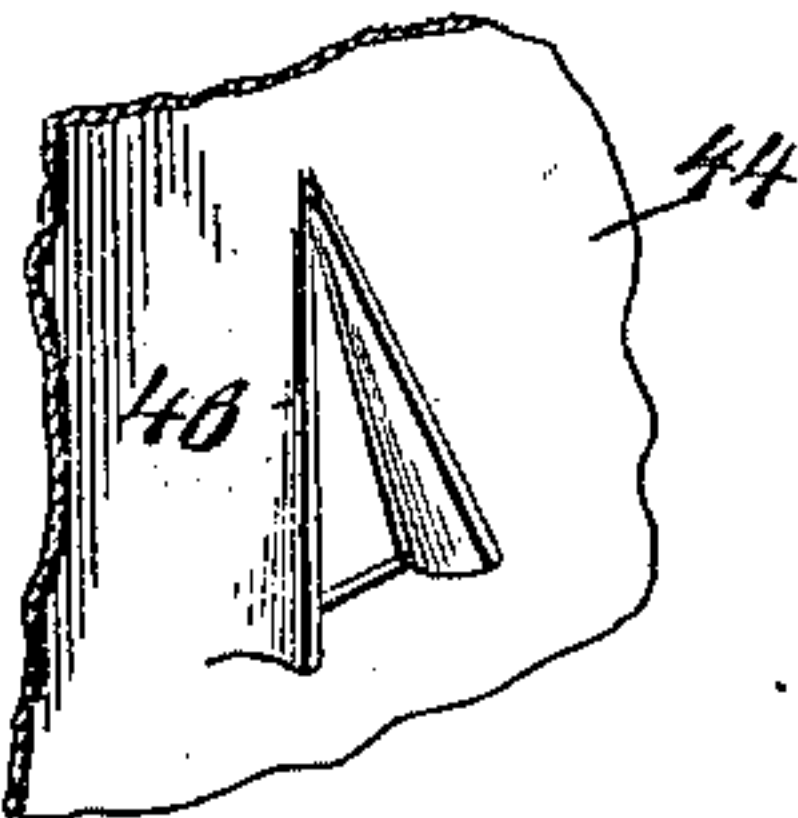
Fig. 7.



WITNESSES:

Fig. 8.

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UNITED STATES PATENT OFFICE.

ANTON LEIKEM, OF CHICAGO, ILLINOIS.

MACHINE FOR CLEANING WHEAT.

SPECIFICATION forming part of Letters Patent No. 686,094, dated November 5, 1901.

Application filed March 13, 1900. Serial No. 8,464. (No model.)

To all whom it may concern:

Be it known that I, ANTON LEIKEM, a citizen of the United States, and a resident of Chicago, in the county of Cook and State of Illinois, have invented a new and Improved Machine for Cleaning Wheat, of which the following is a full, clear, and exact description.

The object of the invention is to provide a simply-constructed machine which will thoroughly separate all foreign matter from wheat and in which the screens are so made and so disposed that the kernels of wheat will not be injured during the process of separation and to provide means for subjecting the material to the influence of a suction-fan not only when the material leaves the hopper, but also when the selected material leaves the machine.

Another purpose of the invention is to provide a means for regulating the air-supply or degree of suction and likewise the inward discharge of foreign material from the machine.

The invention consists in the novel construction and combination of the several parts, as will be hereinafter fully set forth, and pointed out in the claims.

Reference is to be had to the accompanying drawings, forming a part of this specification, in which similar characters of reference indicate corresponding parts in all the figures.

Figure 1 is a side elevation of the improved machine. Fig. 2 is a rear elevation thereof. Fig. 3 is a vertical section through the machine, taken at a point near its center. Fig. 4 is a plan view of the machine. Fig. 5 is a partial plan view of the lower set of riddles or sieves. Fig. 6 is a detail side elevation of a portion of the lower riddles. Fig. 7 is a vertical section through rear portion of the machine, the section extending through the fan and its casings; and Fig. 8 is an enlarged perspective view of an upper riddle back plate and one of its openings and spurs.

The body-frame A of the machine is usually rectangular and upright and is provided at its upper portion with two hoppers B, and a trunk C is placed between the said hoppers, the said trunk having a downward extension C' located at the back of the main or body frame, the lower portion of the extension extending from side to side of the frame, as

shown in Fig. 2. This extension C' of the trunk C is in communication with the interior of the body-frame at the rear of the hoppers B, as illustrated in Fig. 3. A suction-fan 10 is located within the trunk adjacent to its lower extension C', and this suction-fan is secured on a shaft 11, journaled in suitable bearings at the upper portion of the body-frame, and the shaft 11 is provided with pulleys 13 at its ends and with a driving-pulley 12, adapted to be connected with any source of power.

The extension C' of the trunk C is in direct communication with a chamber 14 at the rear of the hoppers and is also in direct communication with a vertical flue 15, which flue is below the bottom portion of the hoppers and extends from side to side of the body-frame and is connected with flues 15^a at the lower rear portion of the body-frame, the inner walls of which flues 15^a constitute fan-casings 16, as illustrated in Fig. 3. The lower flues 15^a extend forward and downward to a point near the bottom portion of the machine. When the lower portions of the flues 15^a are opened, air is drawn up through the said flues and the flue 15 by the suction-fan 10. An opening 17 is made in the outer wall of the flue 15, and a box-casing 17^a extends from said opening through the flue into a chamber to be hereinafter described and which receives air from a fan.

A fan 19, adapted to supply air to the upper set of riddles, to be hereinafter described, is located in each of the casings 16 above referred to, and these fans are secured upon a shaft 20, or each fan may be provided with a separate shaft; but the outer ends of the continuous shaft or the outer ends of the independent shafts when employed extend through the sides of the body-frame A and are provided with pulleys 21, connected by belts 22 with the upper fan-shaft 11, and similar pulleys 22^a are likewise located on the outer ends of the shafts 20, as illustrated in Fig. 2.

A chamber 23 is located back of the upper portion of the upper series of riddles referred to and above the lower fan-casings 16, the bottom of which chamber is formed by a horizontal partition 24, and the amount of air to be delivered by the fan 19 to the said riddles

may be regulated by opening or closing slides 27, which normally close openings 26 in the front portion of said chamber 23 between the bottom 24 and a cross-piece 25, as illustrated in Fig. 3. The casing 17^a, leading from the back opening 17, extends into the chamber 23, and the object of this opening 17 and casing 17^a is to provide an escape for the current of air created by the fan 19, and thereby enable the blast to be regulated when very light grain is being handled, as the air can enter the chamber 23 when the slides 27 are opened more or less, and the air thus admitted will pass out through the opening 17. Wings 28 are formed at the sides of the front portion of the body-frame A, and these wings are given a forward and a downward inclination, being very much wider at the bottom than at the top, as illustrated in Fig. 1. Each hopper is provided with a regulating-slide 29 in its bottom, and the material as it passes out from the hoppers is separated to a greater or a less extent by placing bars or rods 30 beneath the outlets of the hoppers and projecting fingers 31 from these bars or rods beneath the outlets, as illustrated in Fig. 3, and the amount of suction that is to be brought to bear upon the upper portion of the riddles is regulated by valves 32, pivoted at the rear of the hoppers B near their outlets, as shown in Fig. 3, and these valves may be operated from the exterior of the machine through the medium of levers 33, which may travel between segments 34 and the outer side faces of the body-frame, as illustrated in Fig. 1, the levers 33 being held in adjusted position by bolts and thumb-screws, or equivalent devices. The doors 27, controlling the openings in the chamber 23, may be operated from the exterior of the machine through the medium of rods 35, as shown in Fig. 1.

A chute 36 is located in the chamber 23, and this chute extends downward in opposite directions from its center, the center of the chute being at about the transverse central portion of the body-frame, as shown in dotted lines in Fig. 2, and this chute is adapted to receive and to carry off grass-seed, light oats, or any foreign material that may be removed by the suction-fan from the material delivered to the riddles and, as shown in Fig. 1, the outlets of the chute 36 are connected with exterior spouts 37, which may lead to any desired points.

In connection with the hoppers B of the machine two series of riddles D and D' are employed—namely, an upper and a lower series—and these riddles are complete in themselves and extend from one side of the frame to the other. The upper series of riddles consists of side pieces 38, connected at the front by stepped bars or boards 39 and at the rear by corresponding boards, bars, or plates 40. Corresponding front and rear boards, bars, or plates 39 and 40 are connected by sieves 42 of any desired mesh. The upper rear portion 43 of the upper series of riddles D extends

over the upper portion of the chute 36 and below the outlets of the hoppers and below the valves 32. The sieves 42 are given a downward and a forward inclination, and the lower sieves are of much greater length than the upper and intermediate sieves, and these longer lower sieves are designated, specifically, as *a*, *b*, and *c*. The forward boards or plates 39, with which these latter sieves are connected, may be longer or shorter than the corresponding boards or plates of the upper sieves. The upper part of the upper section D of the riddles at the back is closed or boarded up, as shown at 44^a, while the covering for the lower portion of the back preferably consists of a metal sheet 44, having openings 45 therein, and these openings are so made as to provide forwardly and inwardly extending spurs 46. (Shown in detail in Fig. 8.) The openings 45 are preferably triangular, the apex being uppermost, and the spurs 46 are formed by carrying the metal which is cut in producing the openings rearward to the right and left, producing side flanges for the openings, as disclosed in Fig. 8. These openings or perforations in the back of the upper series of riddles serve to admit a blast of air which travels upward through the sieves 42, and said blast of air serves to keep the oats afloat and at the same time allows the wheat to fall straight down through the sieves, while the oats and sticks are worked off from the sieves by reason of their being given a lateral or shaking motion, to be hereinafter described. The spurs 46 are formed at the back of the upper series of riddles to prevent grain from falling through the openings 45, as the grain upon striking the spurs will have a tendency to roll forward from the openings 45. The upper section D of the riddles, as has been stated, is inclined downward and forward; but the lower set of riddles D' incline downward and rearward, and the two series or sets of riddles are connected at their forward portions in any desired manner. These riddles are supported in the frame of the machine by means of rollers 47, which engage with the upper rear portions of the upper series D, and by rollers 49, which engage with the bottom portion of the lower series of riddles D', and a further support is provided for these riddles by placing rollers 48 between the two series in position to engage with the bottom of the upper series of riddles, as shown in Fig. 3. Preferably the supporting-rollers 47, 48, and 49 are grooved to receive tracks 50, secured to the frames or casings of the riddles. At the front portion of the upper series of riddles D, where the frame is widest, a horizontal partition or cover 51 is constructed, having partitions 52 leading from the center diagonally in opposite directions to opposite sides, as is shown in Fig. 4, and these partitions 52 connect at their outer ends with chutes 52^a, as is also shown in Fig. 4. These partitions serve to direct heavy foreign material to the chutes, which material

will not pass through the sieves 42 but slides down the front stepped plates or bars 39, and the amount of material thus directed to the chutes 52^a may be controlled by a slide 53, which extends rearward from the partition or cover 51, as shown in Fig. 3.

The lower riddle comprises four sieves and their attachments—namely, a lower sieve *a'*, which receives material from the upper sieve *a*, an intermediate sieve *b'*, which receives material from the upper sieve *b*, a second intermediate sieve *c'*, which receives material from the upper sieve *c*, and an uppermost sieve *c'*, which receives material that is delivered to the bottom of the upper riddle, which material is passed through the lowermost sieve *c* of the upper riddle. Each section of the lower riddle consists of a sieve attached to a forward board or plate 55 and to a rear board or plate 56, and a bottom board or plate 54 is provided for each sieve of the lower riddle, said plate 54 being located beneath the sieve and extending from the front support of the sieve to the rear support therefor. Upon the upper surface of the rear supporting board or plate of each sieve of the lower riddle diagonal guards 57 are employed, (shown in Figs. 3 and 5,) which extend in opposite directions from a center bar 57^a, and at the sides of the delivery end of the uppermost of the lower series of sieves—namely, the sieve *c'*—a receptacle 58 is formed, having outlet-spouts 58^a. The bottom of the receptacles is formed by the bottom board of the sieve *c'*, and the spouts 58^a conduct all material which passes through the sieve *c'* out at the side of the machine, which material consists wholly of small foreign seed, such as cockles and wild mustard. All of the wheat that reaches the sieve *c'* passes over the lower end of the sieve into a trough 59, which extends from side to side of the machine and is provided with an outlet at its bottom arranged to deliver material in front of the inlet of the flue 15^a, as shown in Fig. 3. Thus it will be observed that through the action of the suction-fan 10 any light material that has escaped the action of the upper fans of the upper riddle will be removed as the material empties from the trough 59. The amount of air to be drawn into the flues 15 and 15^a is regulated by valves 60 and 61, as shown in Fig. 3. The conducting arrangement connected with the sieve *c'* is just the reverse of that of the sieves below it in this respect. The material which passes through the sieve *c'* is conducted to the side of the machine and that which passes over the sieve toward the center and into the trough 59, whereas in the sieves *a'*, *b'*, and *c'* the material which passes over is conducted to wells H, (see Fig. 6,) one of which is located at each side of the machine within the same. These wells extend from just below the bottoms of the receptacles 58 (appearing substantially the same in plan view) to a point just below the lower end of the suction-flue 15^a, and may be spouted from there to any desired ele-

vator or conveyer. The material conducted to these wells consists entirely of oats, having been separated from the wheat by passing over the sieves *a'*, *b'*, and *c'*, and the wheat which has passed through the sieves is conducted toward the center of the machine and is winnowed again and may then be spouted to any desired point.

As has been stated, the riddles D and D' have rocking or shaking movement, and after they have been moved rearward they are returned forward, mainly through the instrumentality of springs 62, attached to studs 63, secured to the bottom portion of the lower riddle D' and to a cross-beam 64 at the forward lower portion of the frame, the tension of the springs 62 being controlled by thumb-nuts 65 or the equivalents of the same.

With reference to the valves 32 at the outlets of the hoppers B, as stated, said valves regulate the suction at the upper portion of the upper riddle D. In all machines of which I have knowledge the grain falls in a solid stream, and when sufficient suction is applied to draw off the light material, such as chaff, &c., such material is accompanied by more or less wheat, whereby a loss is sustained, which loss is obviated by the use of the regulating-valves 32 and the separating-fingers 31 at the bottom portions of the hoppers.

More or less air may be admitted to the lower fans 19 by providing openings 66 in the sides of the body-frame, the said openings being controlled by doors 67, adjustably mounted on the frame. The actuating mechanism for the riddles is practically the same at each side of the frame. A rocker-arm 68 is mounted at the central lower portion of each wing or front extension 28, and each rocker-arm 68 is adjustably and pivotally connected by a rod 69 with an eccentric 70, mounted upon a shaft 71, carrying a pulley 72, and the pulleys 72 are connected by belts 73 with the pulleys 22^a, heretofore mentioned. Each rocker-arm 68 carries two connecting-bars 74 and 75 at its upper end, and each lower connecting-bar 75 is adjustably connected with one end of a centrally-pivoted lever 76, and the other end of each lever 76, through the medium of another connecting-rod 77, is attached to the lower side portions of the framing of the riddles, as shown at 78 in Fig. 1. Each upper connecting-bar 74, carried by a rocker-arm 68, is adjustably attached to one end of a second and upper centrally-pivoted lever 79, the opposite end of each of which levers 79 is adjustably attached to a longer connecting-bar 80, the said bars being in their turn connected by a cross rod or plate 81, and each upper connecting-bar 80 is also attached to a spring 82, which springs are secured to the front portions of the body-frame of the machine, as shown in Fig. 1. These springs 82 act in conjunction with the lower springs 62 to assist the riddles in moving toward the front.

It is believed to be a mechanical impossi-

bility to make a perfect separation of wheat and oats while large and small wheat is mixed with large and small oats, especially when the separation is attempted by passing the grain through one set of sieves in such mixed condition, which operation is usually carried out in most machines employed for separating wheat. When the two riddles or two series of sieves are employed, as shown in Fig. 3, a thorough separation of the grain is, however, obtained. When the grain has passed through the sieves of the upper riddle D and has been received upon the uppermost longer sieve *a*, which has perforations of suitable size to allow nothing but the large kernels of wheat and large oats to pass over, this material falls upon the lower sieve *a'* in the lower riddle D', which has perforations of suitable size to separate the grain received thereon. All the grain that passes through the upper sieve *a* falls upon the lower sieve *b*, the mesh of which is such as to allow nothing but the largest kernels to pass over and be delivered to the lower corresponding sieve *b'*, the mesh of which is of the right size for that character of grain, and all of the grain that passes through the sieve *b* is received upon the sieve *c* of the upper riddle D, the mesh of which sieve is of suitable size to cause the largest kernels delivered thereto to pass over and fall upon the lower corresponding sieve *c'* of the lower riddle D'. After the grain has been separated by the sieves of the lower riddle the cockles and waste material find their way into the receptacles 58 and out through the chutes 58^a, while the good grain is delivered into the trough 59 and when falling from the said trough is winnowed, as above stated.

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

1. In a grain-separator, reciprocating riddles having a back section provided with openings and forwardly and downwardly extending spurs adjacent to the openings, and a fan arranged to force currents of air through the said openings and upward through the riddles.

2. In a grain-separator, the combination with a reciprocating riddle, a hopper discharging onto the riddle, and a fan for forcing a current of air up through the riddle, of a chamber in rear of the hopper and the upper end of a riddle and opening into the space between the outlet of the hopper and the riddle, a valve for controlling said opening, an exhaust-fan, a flue leading from the exhaust-fan to the chamber, and a flue leading from the said chamber and opening in front of the discharge of the riddle, substantially as described.

3. In a grain-separator, the combination with a reciprocating riddle, a hopper above the riddle and discharging thereon, separating-fingers below the outlet of the hopper, and a fan in rear of the riddle and forcing a cur-

rent of air up through the riddle, of a chamber in rear of the hopper and the upper end of the riddle, and opening into the space between the riddle and the outlet of the hopper, an exhaust-fan, a flue leading from the exhaust-fan to the chamber, and a flue leading in rear of the casing of the first fan and opening in front of the discharge of the riddle, substantially as described.

4. In a grain-separator, a reciprocating riddle, a hopper discharging onto the riddle, a chamber in rear of the hopper, and having a valved connection with the space above the riddle at the outlet of the hopper, an exhaust-fan connected with the chamber, and a flue extending downwardly from the said chamber and terminating in front of the grain-discharge, substantially as described.

5. In a grain-separator, a reciprocating riddle, a hopper discharging onto the riddle, a fan for directing a current of air upward through the riddle, a chamber in rear of the hopper and having a valved connection with the space between the riddle and outlet of the hopper, an exhaust-fan connected with the chamber, and a flue leading from the said chamber, said flue forming a casing for the first-named fan and extending downwardly with its end terminating in front of the discharge of the riddle, substantially as described.

6. In a grain-separator, a reciprocating riddle, a hopper discharging onto the riddle, a chamber in rear of the hopper and communicating with the upper portion of the riddle, a fan discharging currents of air upward through the riddle, an exhaust-fan communicating with the chamber, and a flue leading from the said chamber to a point in front of the discharge of the riddle, said flue forming a casing for the first-named fan, substantially as described.

7. In a grain-separator, a reciprocating riddle having the lower portion of its back section perforated, a fan-casing in rear of the perforated portion of the back section of the riddle, a fan in said casing, a chamber above the fan-casing and communicating with the outer air, and a valve controlling communication between the chamber and fan-casing, substantially as described.

8. In a grain-separator, a reciprocating riddle, a hopper discharging onto the riddle, a chamber in rear of the hopper, and having a valved communication with the upper part of the riddle, an exhaust-fan connected with the chamber, a fan for directing currents of air upward through the riddle, a chamber above the casing of the last-named fan, and a chute in the last-named chamber for conducting away the foreign material removed by the exhaust-fan, substantially as described.

9. In a grain-separator, a reciprocating riddle having the lower portion of its back section perforated, a fan-casing in rear of the said perforated portion of the back section,

a fan in said casing for directing currents of air upward through the riddle, a chamber above the fan-casing and having a valved communication therewith, said chamber communicating with the outer air, a hopper discharging onto the riddle, a chamber in rear of the hopper and having a valved connection with the upper portion of the riddle, and an exhaust-fan communicating with the last-named chamber, substantially as described.

10. In a grain-separator, a riddle containing a plurality of screens, and having a back section, a portion of which is provided with openings having flanges at their edges forming inwardly and downwardly projecting spurs, substantially as and for the purpose set forth.

11. In a grain-separator, a riddle containing a series of screens, the lowermost screens being longer than the upper ones, and having a cover arranged over their elongated portions, and upon which cover the upper shorter screens discharge, substantially as described.

12. In a grain-separator, a riddle containing a series of screens, the lowermost ones of which project beyond the others, a cover for the elongated portions of said screens, and a

slide extending inwardly from said cover, substantially as described.

13. In a grain-separator, a riddle formed of an upper and lower section, each having a series of screens, the screen of one being inclined in an opposite direction to those of the other, means for slidably supporting the riddle, a spring connected with the bottom section of the riddle and the supporting-frame, a rocker-arm, means for operating the rocker-arm, two centrally-pivoted levers, a connection between one end of each lever and the rocker-arm, a connection between one end of one lever and the riddle-frame, a spring having one end secured to the supporting-frame, and a connection between the free end of the spring and the end of the other lever, substantially as described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

ANTON LEIKEM.

Witnesses:

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WILLIAM GOLDFINGER.