

(No Model.)

4 Sheets—Sheet 1.

F. F. LANDIS.
GRAIN CLEANING DEVICE.

No. 447,834.

Patented Mar. 10, 1891.

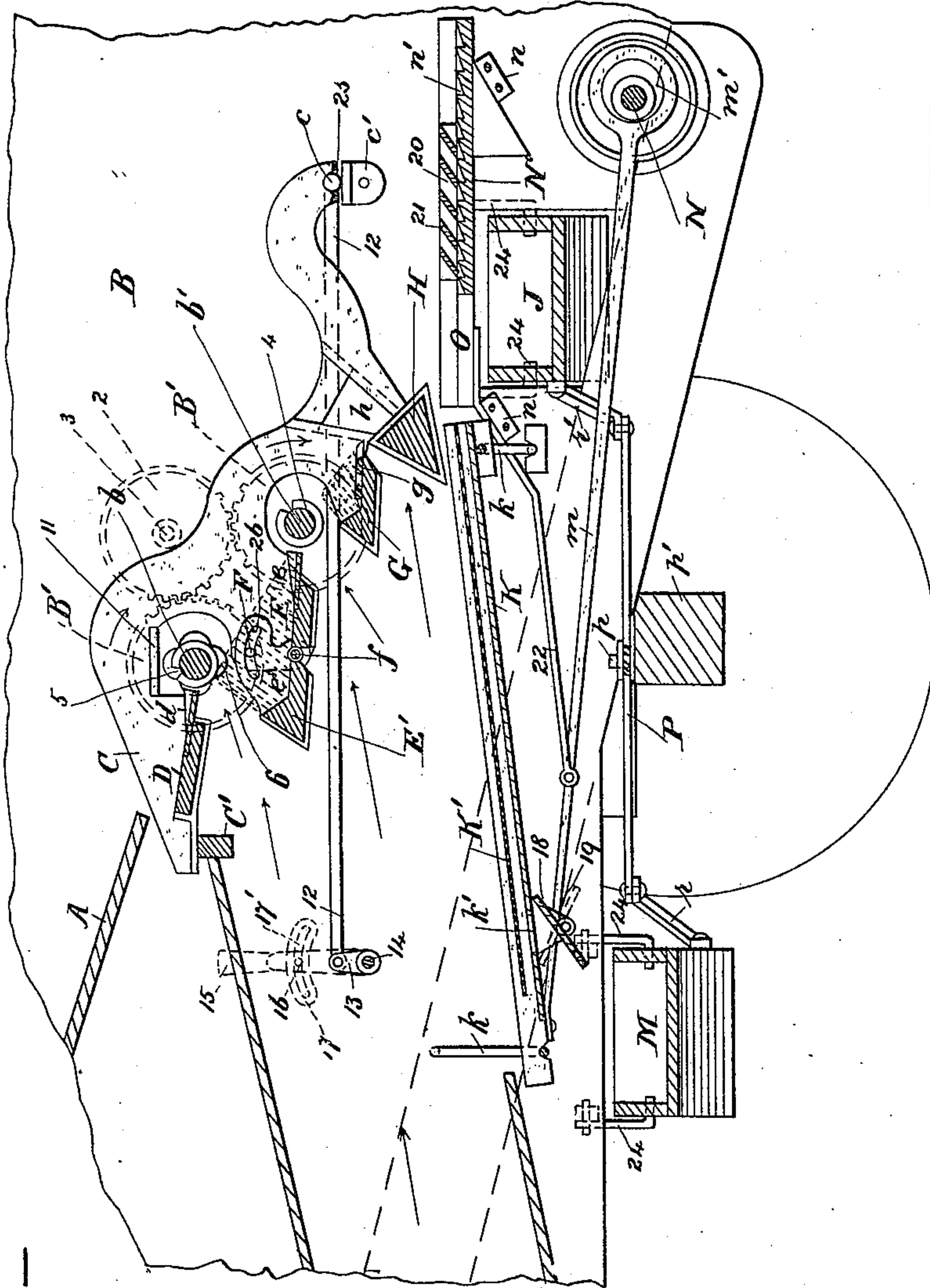
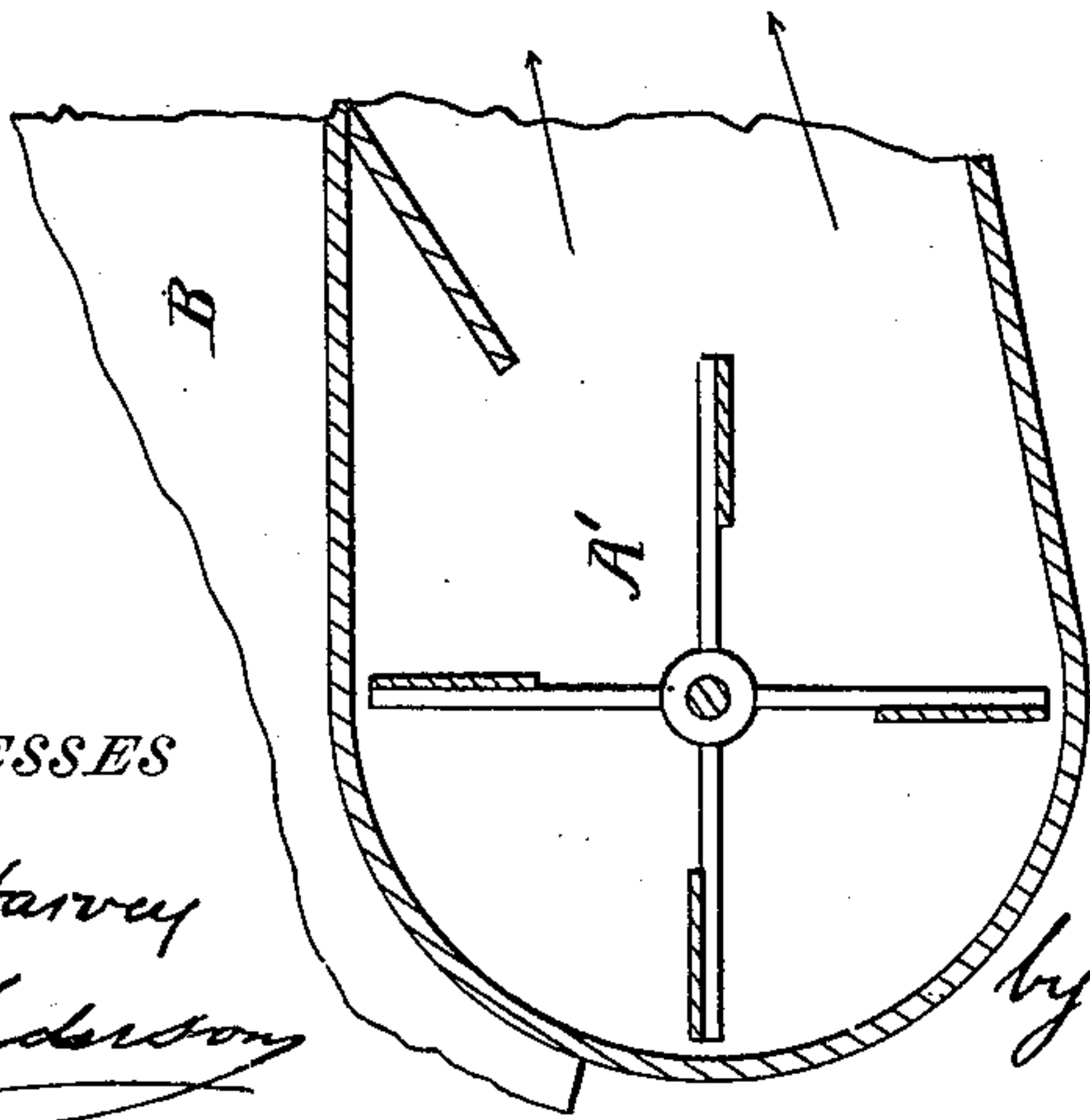


Fig. 1



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Attorney

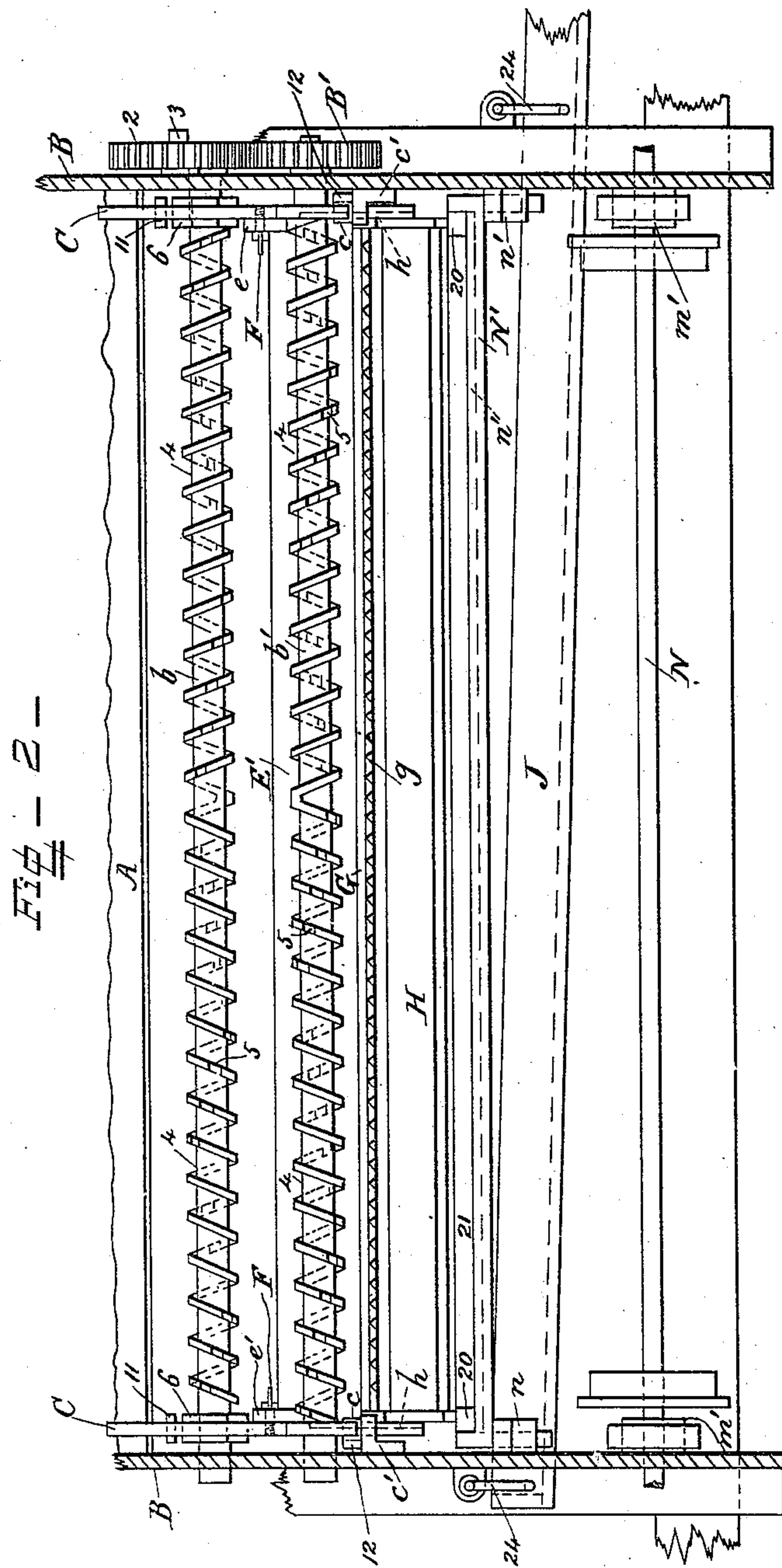
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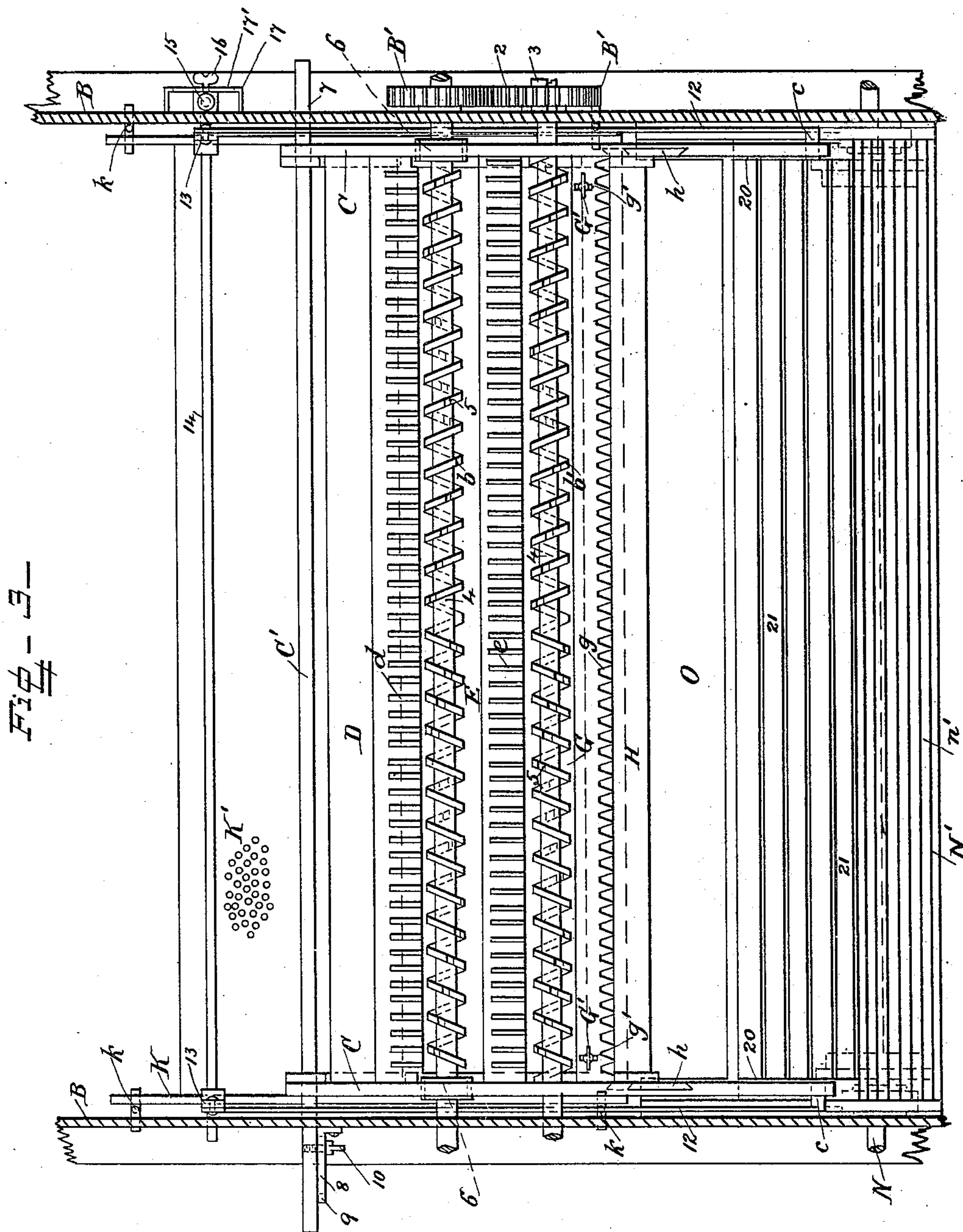
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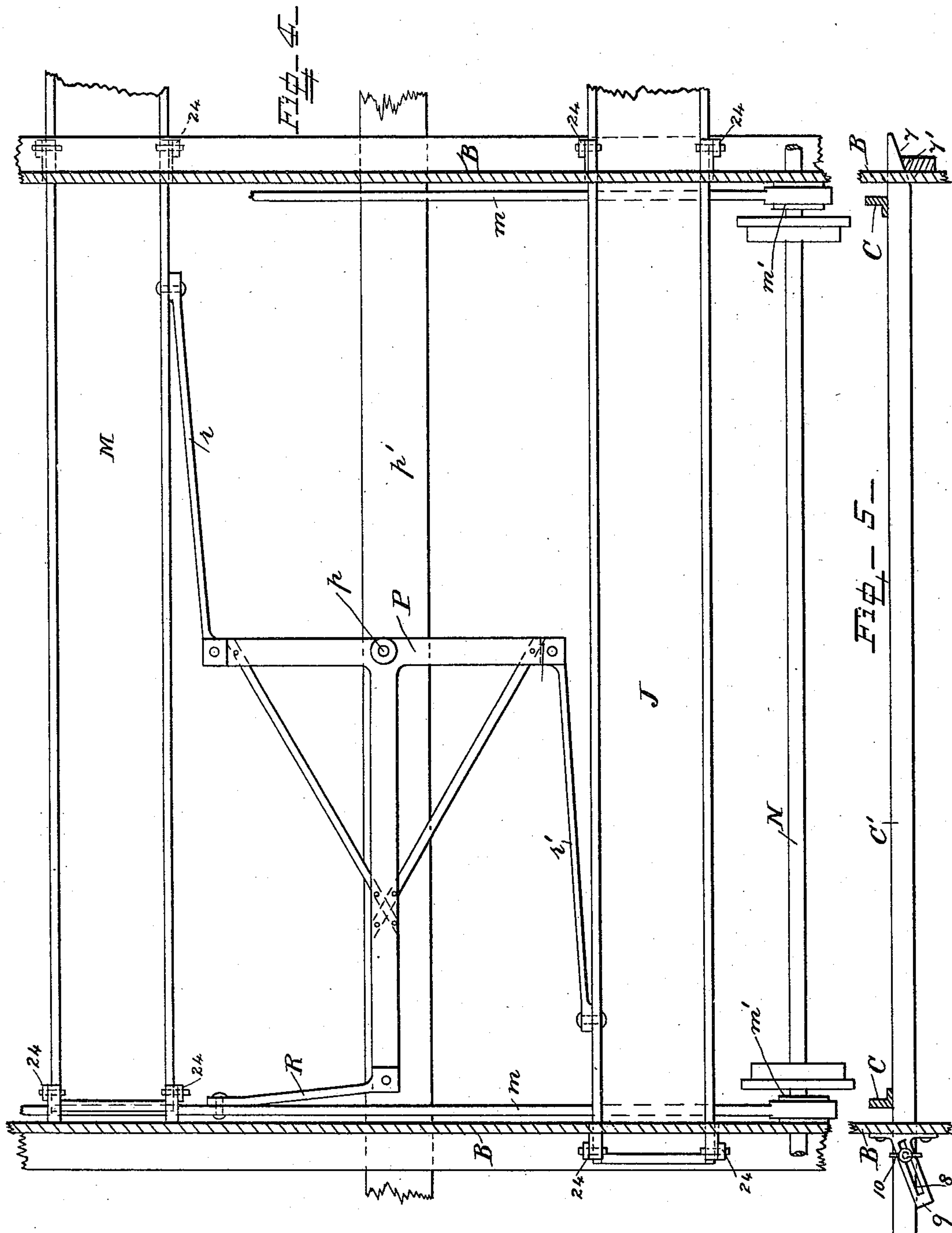
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UNITED STATES PATENT OFFICE.

FRANK F. LANDIS, OF WAYNESBOROUGH, PENNSYLVANIA.

GRAIN-CLEANING DEVICE.

SPECIFICATION forming part of Letters Patent No. 447,834, dated March 10, 1891.

Application filed November 8, 1890. Serial No. 370,799. (No model.)

To all whom it may concern:

Be it known that I, FRANK F. LANDIS, a citizen of the United States, residing at Waynesborough, in the county of Franklin and State of Pennsylvania, have invented certain new and useful Improvements in Grain-Cleaning Devices; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to grain-cleaning devices for use in separators of the class shown and described in a separate application for Letters Patent filed on September 15, 1890, Serial No. 365,074.

This invention consists in the novel construction and combination of the parts hereinafter fully described and claimed, whereby the tailings and dirt are removed from the grain.

In the drawings, Figure 1 is a longitudinal section through the cleaning devices and the fan. Fig. 2 is an end view of the cleaning devices. Fig. 3 is a plan view of the cleaning devices from above. Fig. 4 is a plan view from above of the devices for vibrating the discharge-spouts. Fig. 5 is a detail view of the sliding bar C'.

A is an inclined board which conducts the mixed grain and tailings to the cleaning devices, the straw and light chaff having been previously removed.

A' is a revolving fan or blower which forces a blast of air through the cleaning devices in the direction of the arrows in Fig. 1.

B is the casing of the separator.

b is the upper cleaning-roll, and b' is the lower cleaning-roll, both of which are journaled in the said casing.

B' are similar toothed wheels secured upon the end of the rolls outside the casing, and 2 is an idle-wheel journaled on the pin 3, projecting from the casing and intergearing with both of the wheels B', so that both rolls may be driven in the same direction, as indicated by the arrows in Fig. 1, by any approved driving mechanism.

Each roll b and b' is provided with spiral grooves 4, which meet in the center of the roll and run in opposite directions, in the form of right and left handed screw-threads, to the

ends of the roll. Each screw-thread is preferably provided with notches 5 at various points of its periphery, but these notches may be omitted, if desired. The upper roll b has cams 6 upon its ends for jolting the grain-plates.

C are two side plates for supporting the grain-plates. The front or upper ends of these side plates rest upon the transverse bar C', supported between the casing-sides, and the rear or lower ends of the side plates are provided with notches 25, which engage with the bosses c on the ends of the rods 12, which rest upon the brackets c', secured to the casing. The bar C' is provided with an inclined portion 7, which slides upon an inclined guide portion 7' on the casing at one end and has its other end secured to the inclined slot 8 of the guide-bracket 9 by means of the thumb-screw 10. When the bar C' is pushed in, as shown in Fig. 5, the side plates are held clear of the cams 6; but when the said bar is pulled out the side plates are lowered, so that they may be jolted by the revolving cams, which bear against the wearing-plates 11, secured to the said side plates. This jolting motion is advantageous when the grain is wet and does not slide freely.

D is the upper grain-plate secured between the side plates C, and d is the upper fluted plate secured to the plate D in front of the upper roll. This fluted plate might be dispensed with altogether and the flutes might be cut in the edge of the plate D. The grain and tailings from the board A slide over the fluted plate d and a portion of the grain falls between the grooves of the roll by gravity against the pressure of the blast. The tailings, which consist chiefly of broken heads of wheat and other similar matter, are carried over the grooved roll, and the object of making the grooves in the form of spiral threads is to work the tailings crosswise against the ends of the flutes on the grain-plate. This changes their position, so that they do not fall between the rolls and the flutes, but are tilted sidewise and carried over the roll. The notches 5 also assist by catching hold of broken heads and carrying them over the roll. The spiral grooves might be made continuous in one direction from one end of the roll to the other; but they are preferably right and

left handed, so as to work the material away from the center of the roll, where it is apt to be most plentiful, and spread it evenly all across the roll.

5 E is the second grain-plate provided with the fluted plate *e* and secured in front of the roll *b'* in a similar manner to the grain-plate D and fluted plate *d* just described.

E' is an adjustable retaining-plate secured to the plates *e'*, which are pivoted by the pins *f* to the side plates C in front of the grain-plate E, and F are thumb-screws passing through curved slots 26 in the plates *e'* for securing the plate E' at any desired angle.

15 The grain and tailings heap up upon the plates E and E', as indicated by the dotted lines in Fig. 1, and the adjustment of the retaining-plate E' adapts the device to different sorts of grain which slide at different angles.

20 The grain falling from the upper fluted plate is cleaned from dirt by the blast and slides off the front of the heap and the tailings and the remaining grain fall from the upper roll onto the rear side of the heap and are operated on by the second fluted plate and roll.

G is the third grain-plate secured between the side plates C behind and below the second grooved roll, and *g* is a toothed comb provided with teeth and adjustably secured to the plate G by means of the thumb-screws G', which pass through the slots *g'*.

35 H is a triangular dividing-bar secured to the wedge-shaped end brackets *h*, which are dropped into correspondingly-shaped recesses in the side plates C, so that the apex of the bar comes under the teeth of the comb *g*, and so that the said bar may be easily removed. The object in making the bar H removable is in order that a screen may be inserted in its place when timothy or other small seed is being cleaned. The comb is made adjustable, because the bar H is supported by the plates C, which also support the comb, and the distance between the teeth of the said comb and the apex of the bar H could not otherwise be varied.

45 The remaining grain falls between the teeth of the comb *g* and slides off the front of the bar H, and the tailings slide off the rear side of the bar H and fall into the tailings-spout J. The distance between the teeth of the fluted plates *d* and *e* and the rolls D and E is adjusted to suit different sorts of grain by means of the rods 12, from the rear ends of which the before-mentioned bosses *c* project. The front ends of the rods 12 are pivoted to the levers 13, secured on the shaft 14, which is journaled in the casing. A handle 15 is secured to one end of the shaft 14 outside the casing, and 16 is a thumb-screw which passes through the curved slot 17' in the plate 17 for securing the handle in any desired position after it has been turned to adjust the distance between the fluted plates and the rolls.

65 K is a gather-board pivoted to the casing by means of the links *k*, and K' is a screen of

perforate material secured above the said gather-board and vibrating with it. The grain slides off the screen and falls into the grain-spout M, and the fine heavy dirt and the very small seeds—such as grass-seeds—which pass through the screen slide down the gather-board. The gather-board is provided with an opening *k'* across its lower end near the grain-spout, and 18 is a tilting guide-slat pivoted to the brackets 19 below the said opening. Thrashermen do not usually trouble themselves to remove the fine dirt and grass-seed from the grain, and the guide-slat 18 is usually set, as shown in Fig. 1, so that the small seeds may slide off it into the grain-spout. Whenever it is thought desirable to remove the grass and other small seeds from the grain, the guide-slat is tilted over on its pivots, as indicated by the dotted lines in Fig. 1, and the grass-seed is allowed to accumulate in a heap on the ground at the rear of the grain-spout. The gather-board and screen are vibrated longitudinally by means of the eccentric-rods *m* and the eccentrics *m'*, secured upon the shaft N of the straw-stacker and elevator, to which rotary motion is imparted in the usual manner.

N' is a shaking-shoe supported on the upwardly and rearwardly inclined guides *n* behind the cleaning devices. The bottom of this shoe is provided with the serrations *n'* for causing the material which falls upon it to be carried over its surface and discharged out of the rear of the machine.

O is a space in front of the shoe through which the tailings may fall into the tailings-spout. The tailings which fall into this spout contain unthrashed grain and are returned to the thrashing-cylinder by an ordinary elevator, which is not shown in the drawings, as it does not form a part of the present invention. It sometimes happens that when the machine has been for some time in operation heavy rubbish will be repeatedly carried through the machine. This coarse matter—such as sticks, cornstalks, and other rubbish—is got rid of by means of the sliding frame 20, provided with a series of inclined slats 21. This frame usually rests upon the shoe N' behind the space O, but when it is pushed forward over the tailings-spout it prevents this rubbish from falling into the spout and causes it to be carried over the space O onto the serrations *n'* and thereby discharged out of the rear of the machine. The shoe N' is reciprocated by means of the rods 22, which are attached to the eccentric-rods *m*, and the inclined guides *n* give the necessary tossing motion, which, together with the serrations, causes the material on the shoe to be carried to the rear.

The tailings-spout and the grain-spout are pivotally suspended from the casing crosswise of the machine by similar links 24, and have a reciprocating motion imparted to them in the following manner:

P is a double bell-crank lever pivoted on

the pin *p*, which is carried by the support *p'*. The opposite ends of this lever are respectively connected to the grain-spout by the rod *r*, and to the tailings-spout by the rod *r'*, and the middle arm of the said lever is connected to one of the eccentric-rods *m* by means of the rod *R*. These rods *r r' R* are preferably made of flexible wood or other similar elastic material, so that they may be springy enough to form operative connecting-rods without a multiplicity of pivotal joints and connections.

What I claim is—

1. The combination, with a grain-plate provided with flutes, of a roll provided with spiral grooves and journaled behind the said flutes at the rear of the said plate, substantially as and for the purpose set forth.

2. The combination, with a grain-plate provided with flutes, of a roll journaled at the rear of the said plate and provided with spiral grooves and notches arranged out of line with each other on its periphery between the grooves, substantially as and for the purpose set forth.

3. The combination, with a grain-plate provided with flutes, of a roll journaled at the rear of the said plate behind the said flutes and provided with right and left handed spiral grooves extending from the center to the opposite ends of the roll, substantially as and for the purpose set forth.

4. The combination, with a grain-plate and a revoluble grooved roll at the rear of the said plate, of an adjustable retaining-plate pivoted to the front of the said grain-plate, substantially as and for the purpose set forth.

5. The combination, with a grain-plate, of a toothed comb adjustably secured to the said plate, and a removable dividing-bar supported below the points of the teeth of the said comb, substantially as and for the purpose set forth.

6. The combination, with the side plates, of a grain-plate secured to the side plates, the toothed comb secured to the said grain-plate, and the removable dividing-bar provided with wedge-shaped end brackets adapted to be dropped into pockets in the side plates, whereby the said bar may be supported below the teeth of the comb, substantially as set forth.

7. The combination, with the upper and lower grooved cleaning-rolls, of the side plates, a support for the front ends of the side plates to slide on, brackets for supporting the rear ends of the side plates, the grain-plates secured to the said side plates in front of the cleaning-rolls, the rods pivotally connected to the rear ends of the side plates, and the

cross-shaft provided with a handle and with levers pivoted to the said rods, whereby the distance between the grain-plates and the rolls may be adjusted, substantially as set forth.

8. The combination, with the reciprocating gather-board provided with an opening across its lower end, of the perforated screen secured above the gather-board and vibrating with it, the brackets secured to the gather-board, and the tilting guide-slat pivoted in the said brackets below the said opening, with one or the other of its edges bearing against the under side of the gather-board and adapted to discharge the small seeds into the grain-spout or to one side of it, substantially as set forth.

9. The combination, with the tailings-spout, of the shaking-shoe situated at the rear of the tailings-spout and provided with a serrated bottom, and a frame provided with a series of inclined slats and adapted to be slid on the said shoe over the said tailings-spout, whereby coarse rubbish may be removed from the tailings, substantially as set forth.

10. The combination, with the longitudinally-reciprocating gather-board, of the grain-spout and the tailings-spout, both pivotally supported crosswise of the machine, the revoluble eccentrics and the eccentric-rods connected to the said gather-board, the shaking-shoe behind the said tailings-spout, the rods secured to the eccentric-rods and to the said shoe, the double bell-crank lever pivoted between the two said spouts, the rods connecting the respective spouts with the opposite arms of the bell-crank lever, and the rod connecting the middle arm of the bell-crank lever with one of the said eccentric-rods, whereby all the said reciprocating parts may be operated by the said eccentrics, substantially as set forth.

11. The combination, with the brackets secured to the casing, of the longitudinally-adjustable side plates for carrying the grain-plates, said side plates having their rear ends pivotally supported on the said brackets, a transverse bar forming a support upon which the front ends of the said side plates may slide, the revoluble cams on one of the grain-rolls, and the inclined guides supporting the said transverse bar and permitting it to be moved transversely to lower the said side plates onto the cams, substantially as set forth.

In testimony whereof I affix my signature in presence of two witnesses.

FRANK F. LANDIS.

Witnesses:

HERBERT W. T. JENNER,
G. AROID ANDERSON.