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PATENTED MAR. 12, 1907.

C. N. HATFIELD.

GRAIN AND SEED CLEANER, SEPARATOR, AND GRADER.

APPLICATION FILED AUG. 23, 1906.

2 SHEETS—SHEET 1.

Fig. 1

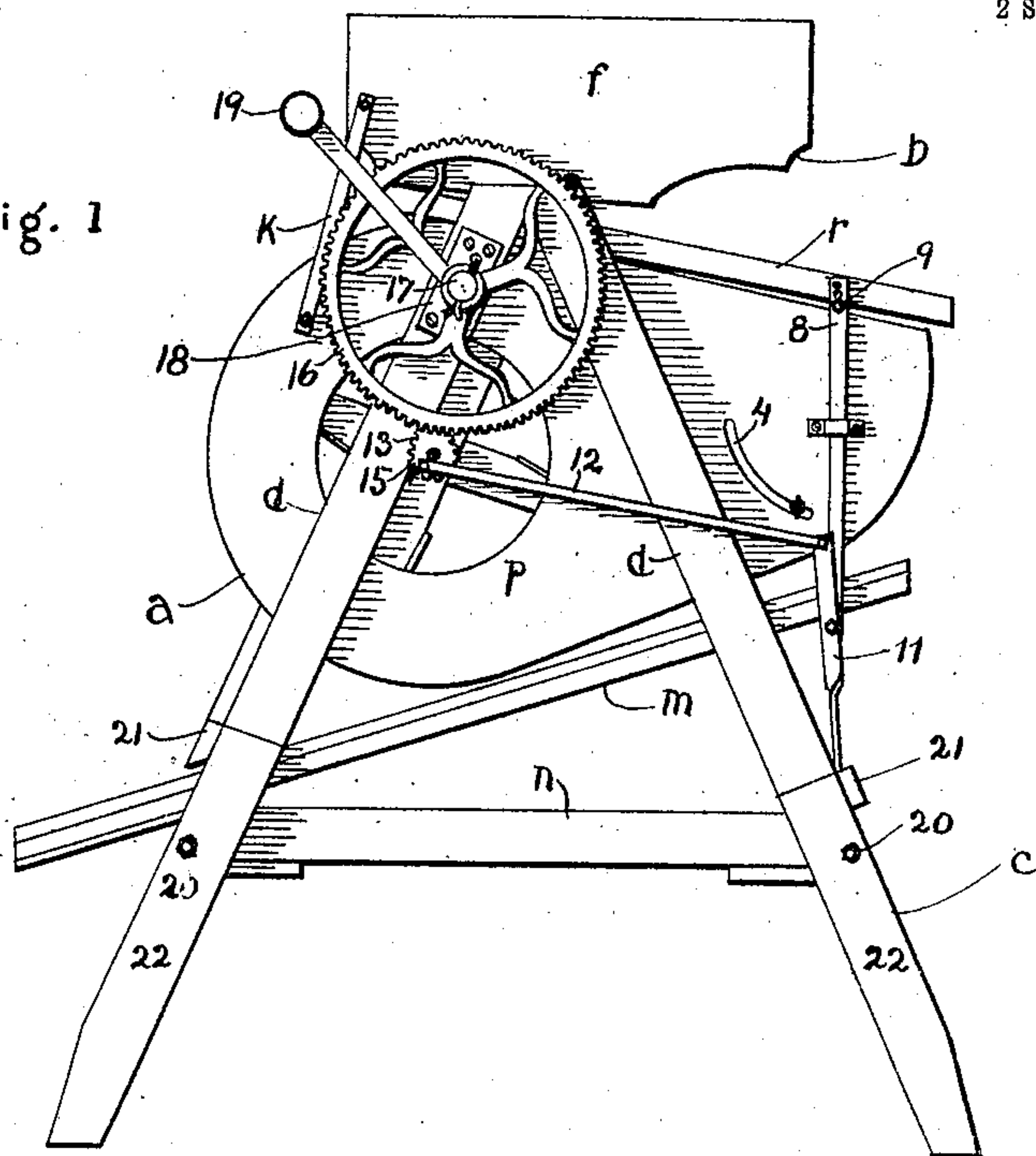
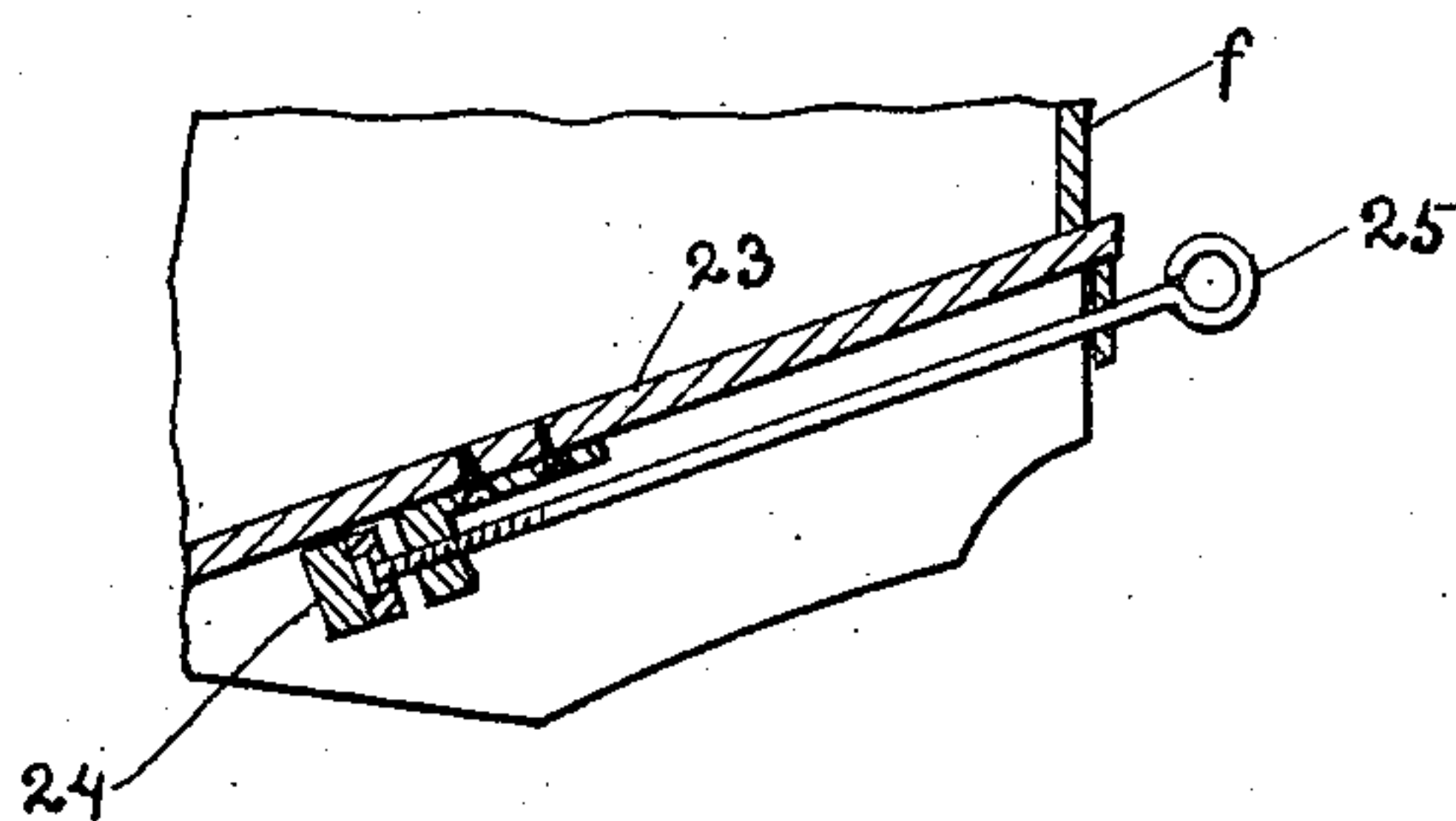


Fig. 4.



Witnesses

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2 SHEETS—SHEET 2.

Fig. 2.

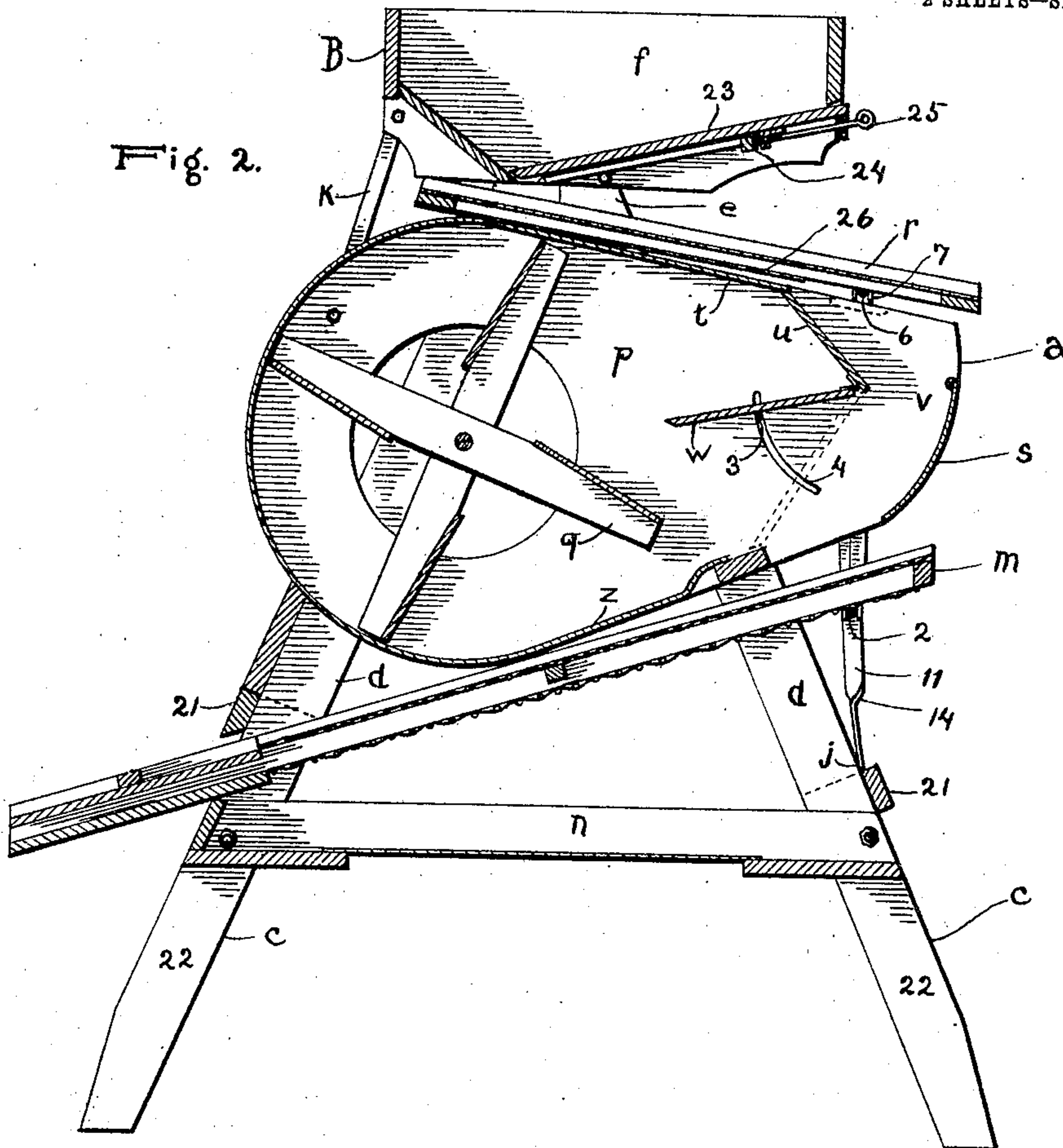
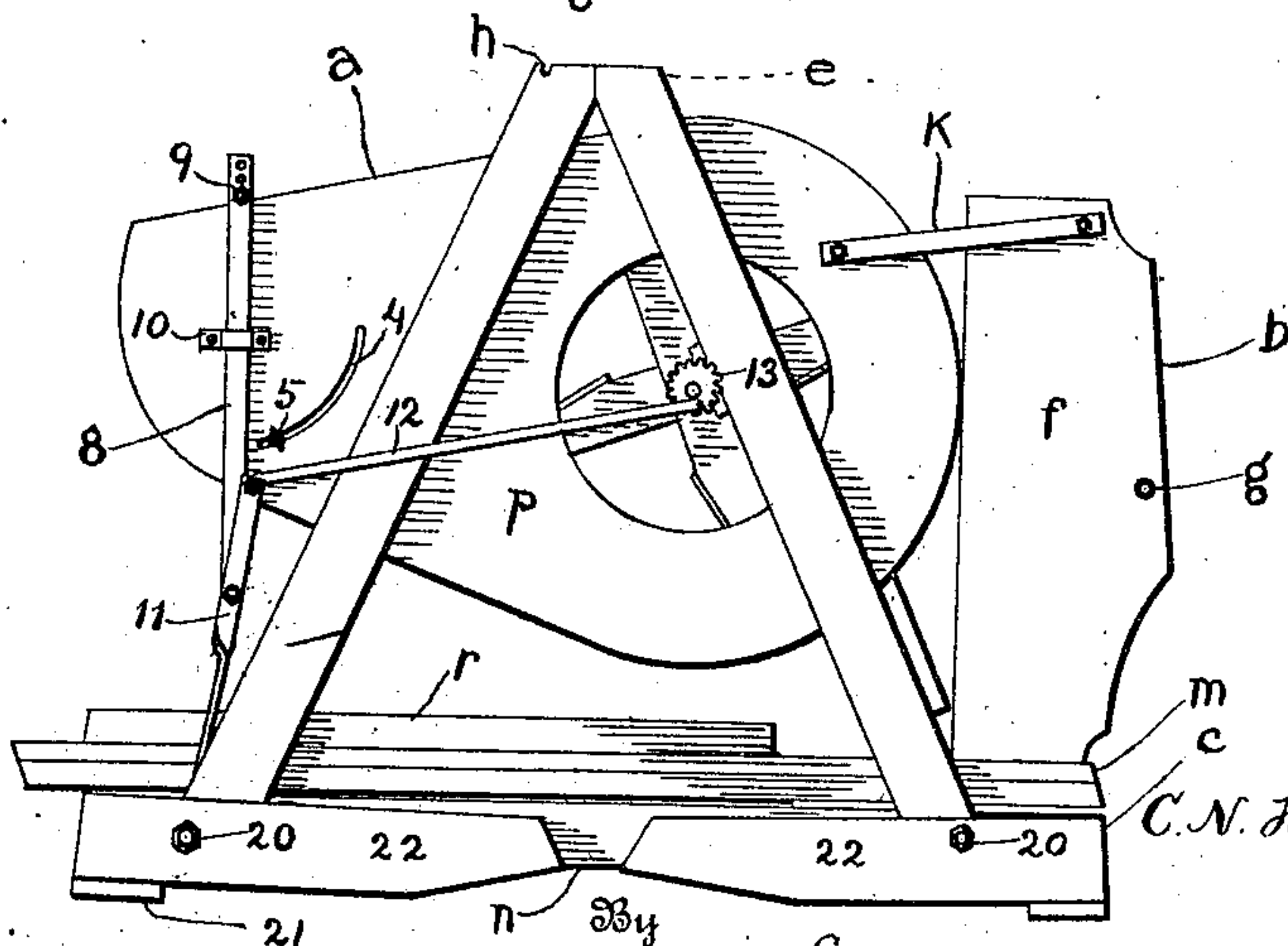


Fig. 3.



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CHARLES N. HATFIELD, OF FOUNTAIN CITY, INDIANA.

GRAIN AND SEED CLEANER, SEPARATOR, AND GRADER.

No. 846,999.

Specification of Letters Patent.

Patented March 12, 1907.

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To all whom it may concern:

Be it known that I, CHARLES N. HATFIELD, a citizen of the United States, and a resident of Fountain City, in the county of Wayne and State of Indiana, have made a certain new and useful Invention in Grain and Seed Cleaner, Separator, and Grader; and I 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, reference being had to the accompanying drawings, and to letters or figures of reference marked thereon, which form a part of this specification.

Figure 1 is a side elevation of my invention. Fig. 2 is a central vertical longitudinal section of the same. Fig. 3 is a side view of the device as folded for shipment. Fig. 4 is a detail view of the means for adjusting the hopper-bottom board.

The invention relates to machines for cleaning, separating, and grading grain and seed; and it consists in the novel construction and combinations of parts, as hereinafter set forth.

The chief object of this invention is to provide a medium for the purposes in view that will be convenient to operate and easy to handle, will take up little space and yet have capacity, and which will do the work intended to be done by machines of this class. Also to provide a machine which will save freight on account of its knockdown character, and will also save much trouble to the consumer in setting up the machine.

With this object in view the screens are made detachable, and the hopper, fan-case portion, and supporting-legs are connected by pivot devices, so that the hopper and supporting-legs can be folded upon the fan-case portion to give the machine a more compact form for storage in transportation.

The blast of the fan-case is provided with a swinging air-board adjoining a grain-conveying board in front of the fan, said air-board having a rod fastened to it and projecting through an arc slot of the fan-case to serve in adjusting the air-board up or down, according to requirement in throwing a blast against a sheet-iron concave deflector in front of the air-board in order to lift out such light material as the cleaning-screen above fails to separate from the seed and grain.

The machine is operated by means of a large cog-wheel in engagement with the end

pinion of the transverse fan-shaft, having eccentric connection with lateral horizontal bars which are in engagement with lateral vertical spring-bars rigidly secured at the lower ends and connected by a transverse rod, which supports the grading-screen. In connection with the rod supporting the grading-screen is an upward-extending bar on each side of the machine, these bars being pivoted at the proper height to give the desired vibratory motion to the shoe carrying the cleaner-screen, said shoe being supported by a transverse rod connecting the upper ends of the bars.

The screens are supported on the transverse iron rods above referred to and are held in position thereon by downward-projecting pins or studs which engage said rods in front and rear, so as to cause said screens to move with said rods. Nevertheless these screens are readily detachable by lifting them from their supporting-rods.

In the accompanying drawings, illustrating the invention, the letter *a* designates the middle or fan-case portion of the machine; *b*, the upper or hopper portion, and *c* the folding supports forming the lower portion.

Frame-bars *d*, on each side of the fan-case, meet together above the fan-case, their ends joining each other and forming lateral bearings *e*, between which the body of the hopper *f* is received, said hopper being supported thereon by means of laterally-projecting bolts *g*, which engage groove-bearings *h* of said frame-bars. The hopper is also supported by means of strap-arms *k*, which are pivoted thereto in rear and also to the sides of the fan-case. Normally these strap-arms extend upward; but when the hopper is lifted from its bearings and folded over in rear of the barrel of the fan-case these arms are in approximately horizontal position. In this folded position the hopper is designed to rest on the end of the long grading-screen *m*, the latter having been detached and laid on the horizontal waste-box *n* below.

When in inclined or working position, the grading-screen *m* rests in rear on bearings of the waste-box and in front on the transverse rod 2 of the operating mechanism.

The fan-case *p* is secured to the frame-bars and is provided with a fan *q* in its rear or barrel portion and in front with an arched inclined deflector grain-board *s*, of sheet-iron, lying across the bottom portion of the mouth of the fan-case, which has an opening for passage of

grain in rear of such grain-board. The top *t* of the fan-case is provided with a terminal grain-board *u*, lying across the upper portion of the mouth of the fan-case and which is inclined oppositely to the deflector grain-board *s*, from which it is separated by an interval *v*, which is the mouth of the chaff-flue. Having its upper or pivotal edge adjacent to the inclined grain-board *u* is the swinging air-board or valve-gate *w*, which may be turned upward under the upper grain-board to open the throat of the fan-case or may be turned downward to narrow the same or to close it against the terminal edge of the floor *z* of the fan-case. This air-board is operated and adjusted in position by means of a threaded rod 3 attached thereto, said rod extending through an arc slot 4 of the fan-case and having a nut 5 for fixing the adjustment.

The grading-screen *m* underlies the fan-case and the opening thereof in rear of the lower grain-board.

Over the fan-case is located the cleaner-screen *r*, which overlies the interval between said grain-boards and is separated by an interval from the top of the lower grain-board. This screen is in normal position inclined forward and downward and is supported between the upper bearings *e* of the frame upon the top of the fan-case in rear and in front upon a transverse rod 6, which it engages by means of small pegs or pins 7, projecting downward in front and in rear of said rod. The height of this rod is adjustable to vary the angle of inclination of the cleaner-screen, and in order to provide for this adjustment the vibratory levers 8 have several perforations in series in their upper ends for engagement with the ends of the rod 6, which is provided with a terminal thumb-nut 9 to facilitate disengagement. These levers 8 are adjustable, and they extend upward and are pivoted to studs of clips 10, which are secured to the sides of the fan-case. Their lower arms are provided with perforations for engagement with the ends of the transverse rod 2, which supports the upper end of the grading-screen. This transverse rod also serves to connect the spring-levers 11 to the levers 8, above referred to, these connections being made at points below the upper ends of said spring-levers, to which are connected the lateral bars 12, which extend rearward to engage wrist-pins of the eccentrics 13, which are located on bearings projecting from the sides of the fan-case. The lower ends of the spring-levers 11 are rigidly secured to the edges of the frame-bars, as indicated at *j*, and in order to facilitate this attachment and at the same time to provide for pivoting these spring-levers to the vibrating levers 8 the spring-levers, which are of flat or strap metal, are twisted one-half around, as at 14. One of the eccentrics 13 is toothed, as shown at 15, to provide a pin-

ion to engage the driving cog-wheel 16, which is pivoted on a stud-bearing 17, secured to the side of the fan-case by means of a plate 18, carrying such stud-bearing. The driving cog-wheel is provided with a crank-handle 19.

The framing-bars *d d* are secured to each other and braced in position by means of the waste-box *n*, to which they are rigidly attached. This box extends horizontally under the grading-screen, and to it and to the lower end portions of the frame-bars *d d* are secured by pivot-bolts 20 the folding supports *c c*, which consist of transverse brace-bars 21 and legs 22, secured to these brace-bars. These supports are designed to be folded upward and toward each other under the waste-box when the machine is arranged for packing for transportation. When the machine is to be set up, the supports are unfolded downward and outward to outwardly inclined position, in which they are braced by the engagement of the transverse bars 21 with the lower ends of the frame-bars *d d*.

The separator is designed to operate upon the mixture of grain, seed, and other stuff put into the hopper, which passes therefrom through a transverse opening in its bottom between its inclined wall and the edge of an adjustable bottom-board, 23 resting on a transverse cleat-bearing 24 of the hopper. A rotary threaded rod 25 is provided as a means of adjusting the hopper-board to increase or lessen the feed to the cleaning-screen below. This rod 25 has a threaded engagement with a flange 25^a of a clamp 25^b, secured to the adjustable hopper-board, and has its lower end in engagement with the stationary transverse bar 24. The larger pieces of chaff and other waste pass over the screen, while the seed and grain and small light stuff pass through it to the floor 26 of this screen, whereby they are conducted to the inclined grain-board at the end of the top of the fan-case and pass downward and forward over the same to the flue between the board and the oblique concave deflector. Through the flue the grain and seed pass down to engage the head of the inclined grading-screen, while the small pieces of chaff and light stuff are blown out through the flue by the blast from the fan, which is regulated by means of the adjustable air-board.

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

1. In a grain cleaner and separator, side frames having each two converging bars intersecting at the top, a waste-box connecting said frames at the bottom, a fan-case above the waste-box, a folding hopper having end links pivotally connected thereto and to said fan-case, and screens located intermediately of the hopper and waste-box, said converging bars having folding leg extensions normally

abutting at their ends against the lower ends of said bars and adapted to fold inward against the waste-box.

2. In a grain cleaner and separator, side frames having each two converging bars intersecting at the top, a waste-box connecting said frames at the bottom, a fan-case above the waste-box, a folding hopper having end links pivotally connected thereto and to said fan-case, and detachable screens located intermediately of the hopper and waste-box adapted when detached to lie upon said waste-box, said hopper being adapted to fold downward until it rests upon said screens.

3. In a grain cleaner and separator, side frames having each two converging bars intersecting at the top, a waste-box connecting said frames at the bottom, a fan-case above the waste-box, a folding hopper having end links pivotally connected thereto and to a portion of the separator, said hopper lying between the meeting ends of said converging bars, and having a pin-and-groove connection therewith, detachable screens located intermediately of said hopper and waste-box, and folding leg extensions of said converging bars.

4. In a grain cleaner and separator, a fan-case having a lower inclined deflector grain-board lying across the bottom portion of the mouth thereof and an opening for passage of grain in rear of said grain-board, an upper grain-board lying across the upper portion of the mouth of the fan-case, having an opposite inclination to that of the lower grain-board, and acting to deliver the grain thereupon, said grain-boards being separated by an interval from each other, a terminal blast-regulating board pivoted to the lower end of the upper grain-board, a fan in said fan-case, a screen overlying the fan-case and the interval separating said grain-boards and separated by an interval from the top of the lower grain-board, and a screen underlying the fan-case and the opening thereof in rear of the lower grain-board.

5. In a grain cleaner and separator, side frames, a waste-box at the bottom of said frames, a hopper at the top of the same, an intermediate fan-case, detachable screens, and operating-levers for said screens having transverse rod connections, the upper of said screens resting at its upper end upon the fan-case and having at its lower end a forked connection embracing one of said transverse rod connections, the lower of said screens resting at its lower end upon the waste-box and having at its upper end a detachable forked connection with the other of said transverse rod connections.

6. In a grain cleaner and separator, side frames, a waste-box at the bottom of the same, a hopper at the top of the same, an intermediate fan-case, screens located inter-

mediately of the hopper and waste-box, operating means for said screens, having spring-levers provided with a rigid connection with the separator at their lower ends, gearing having an operating connection with said spring-levers to vibrate the same, and intermediately-pivoted levers having an operating connection with said screens and with said spring-levers.

7. In a grain cleaner and separator, side frames, a hopper, a fan-case, screens, and operating means for said screens having a spring-lever provided with a rigid connection with the separator at its lower end, gearing having a pitman connection with said spring-lever to vibrate the same, an intermediately-pivoted lever having a pivotal connection at its ends with said screens and with said spring-lever.

8. In a grain cleaner and separator, side frames, a hopper, screens, a fan-case, and operating means for said screens having spring-levers provided with a rigid connection at their lower ends with the separator, gearing having a pitman connection with said spring-levers, intermediately-pivoted levers having at their ends a transverse rod connections with said screens and with said spring-levers.

9. In a grain cleaner and separator, side frames having each two upward-extending bars provided with folding lower extensions, a fan-case, and upper and lower screens within and supported by said side frames, and a folding hopper having end links pivotally connected thereto and to a portion of the separator.

10. In a grain cleaner and separator, side frames having each two upward-extending bars provided at their lower ends with folding leg extensions normally abutting at their lower ends against the lower ends of said bars, a fan-case, and upper and lower screens within and supported by said side frames, and a folding hopper having end links pivotally connected thereto and to a portion of the separator.

11. In a machine of the class described, the combination with spring-levers rigidly attached by their lower ends to the frame and having their upper ends in connection with the driving-shaft, of adjustable vibrating levers, transverse rods connecting the upper and lower ends of such levers, a detachable cleaning-screen in engagement with the upper transverse rod, and a detachable grading-screen in engagement with the lower transverse rod.

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

CHARLES N. HATFIELD.

Witnesses:

O. C. THOMAS,
F. M. LAMB.