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W. CROTZER.
Thrashing-Machine.

No. 198,355. Patented Dec. 18, 1877.

Fig 1

WITNESSES

Villette Anderson

F. J. Masi

INVENTOR

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ATTORNEY

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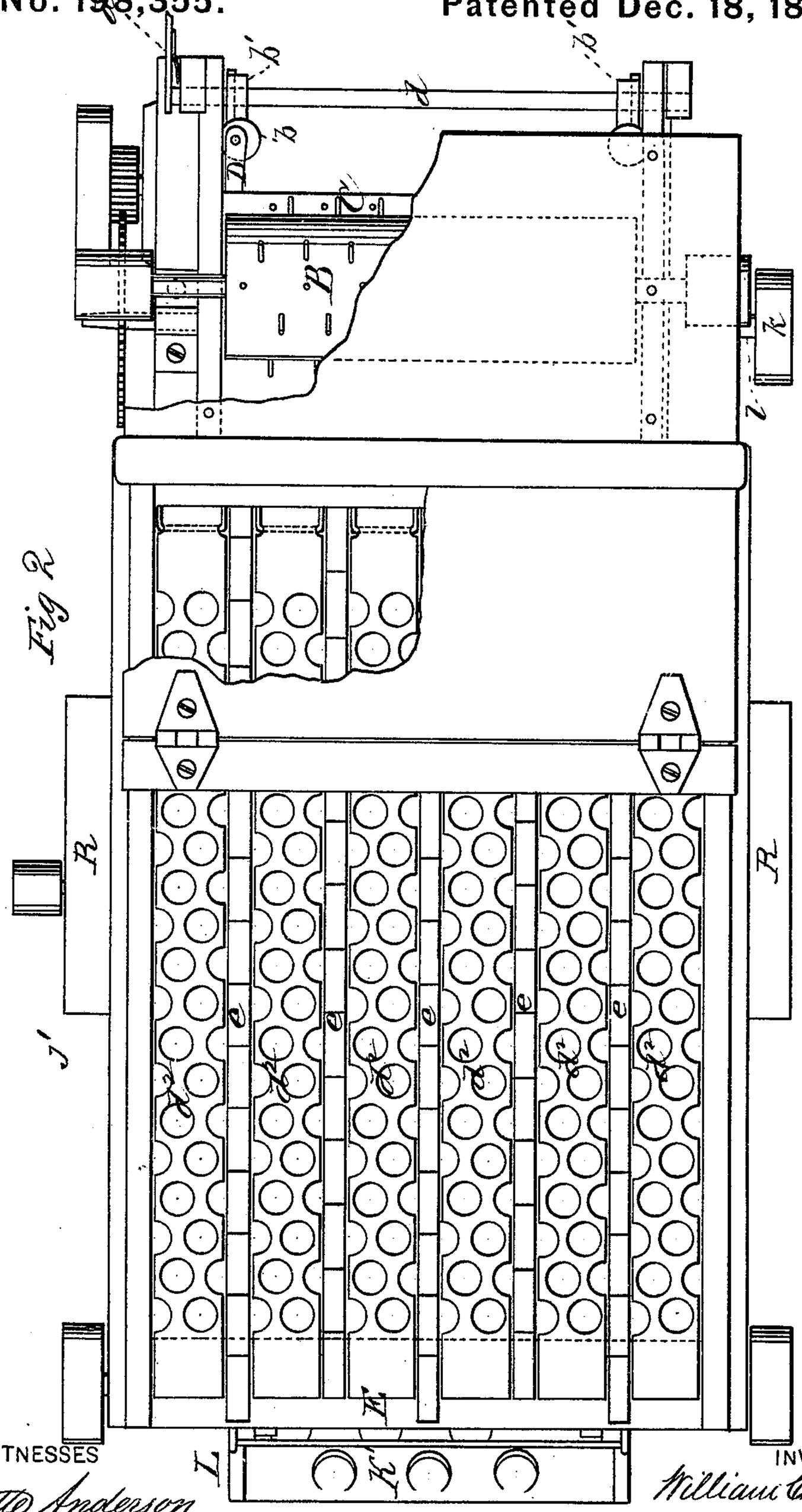

Fig 2

WITNESSES

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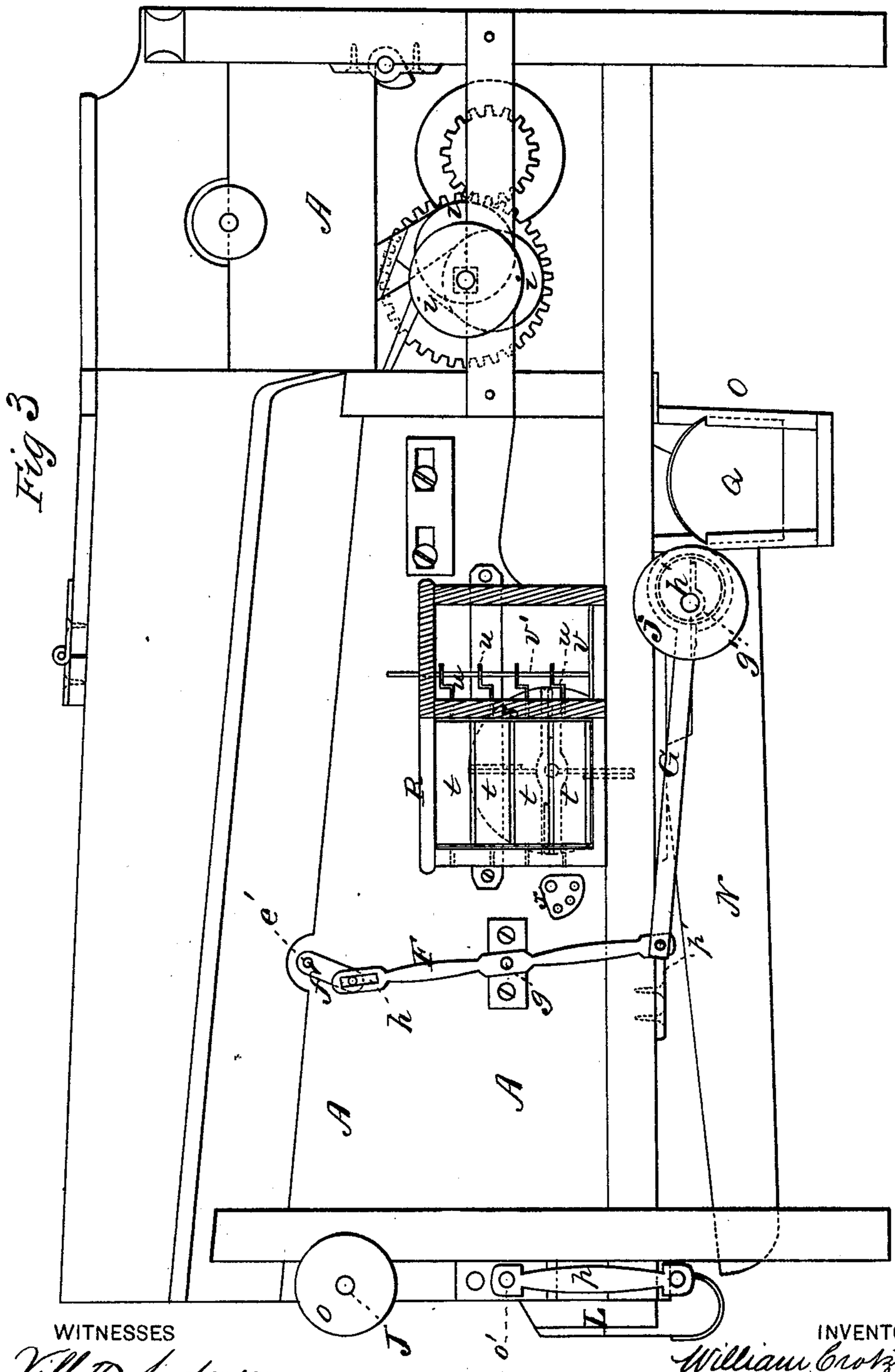

Fig 3

WITNESSES

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W. CROTZER.
Thrashing-Machine.

No. 198,355. **Patented Dec. 18, 1877.**

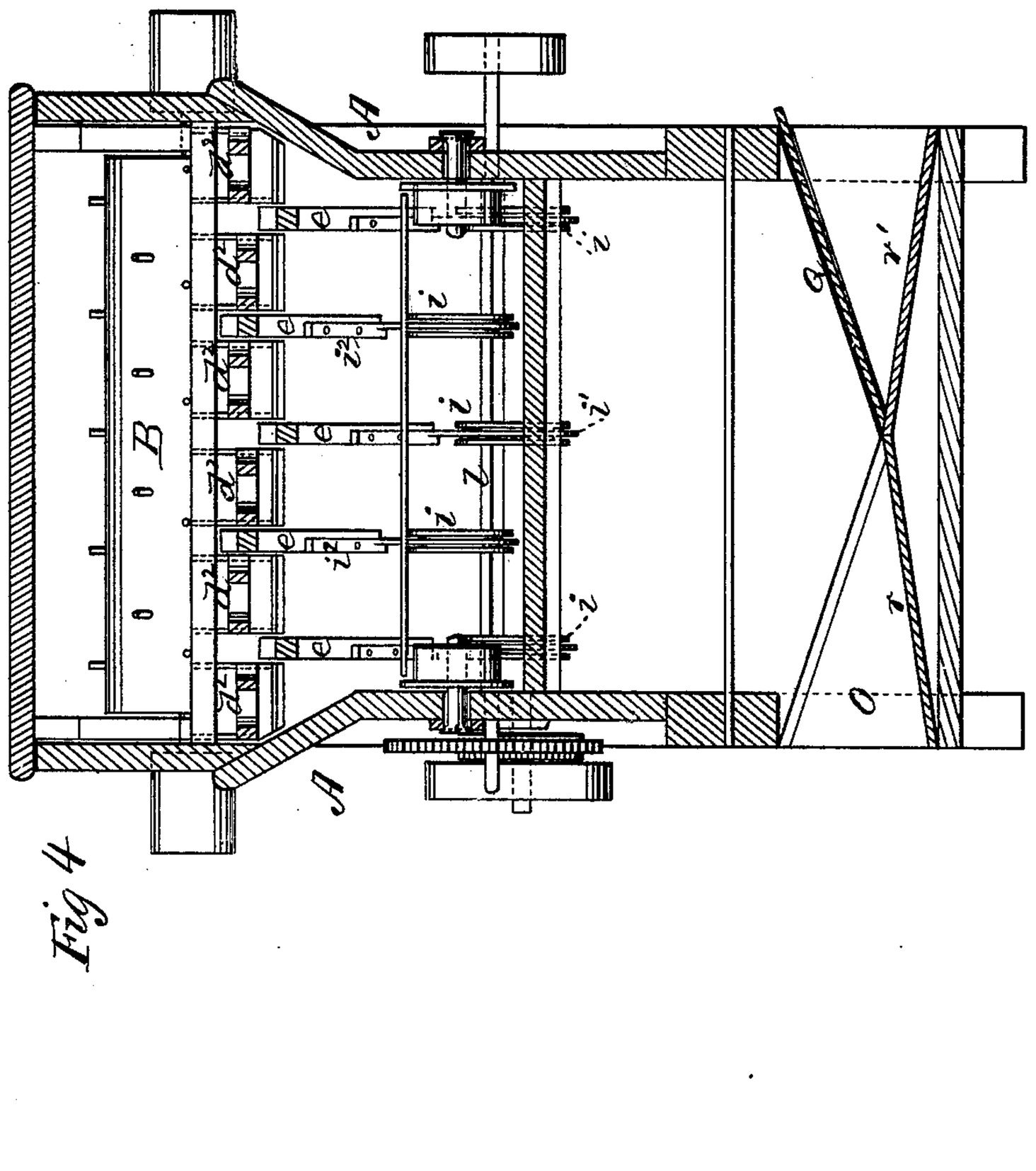

Fig 4

WITNESSES

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William Crotzer.

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ATTORNEY

UNITED STATES PATENT OFFICE.

WILLIAM CROTZER, OF WOODBURY, PENNSYLVANIA, ASSIGNOR OF ONE-HALF HIS RIGHT TO DAVID F. KEAGY, OF SAME PLACE.

IMPROVEMENT IN THRASHING-MACHINES.

Specification forming part of Letters Patent No. **198,355**, dated December 18, 1877; application filed July 28, 1877.

To all whom it may concern:

Be it known that I, WILLIAM CROTZER, of Woodbury, in the county of Bedford and State of Pennsylvania, have invented a new and valuable Improvement in Machines for Thrashing and Cleaning Grain; and I do hereby declare that the following is a full, clear, and exact description of the construction and operation of the same, reference being had to the annexed drawings, making a part of this specification, and to the letters and figures of reference marked thereon.

Figure 1 of the drawings is a representation of a longitudinal vertical section of my invention. Fig. 2 is a plan view thereof. Fig. 3 is a side view of the same; and Fig. 4 is a vertical cross-section thereof.

This invention relates to certain improvements in thrashing-machines; and it consists in certain combinations of parts, as hereinafter more fully specified.

In the annexed drawings, the letter A designates the suitably-braced frame of my improved casing, and B a spurred drum, mounted in suitable bearings at the front end of said frame.

C indicates the concave, arranged below said drum, and provided with spurs, between which those of said drum pass. The concave is composed of a fixed and a movable part, *a a'*, the latter being supported at each end by a vertically-vibrating concave lever, D, pivoted to the sides of the frame, and carrying upon its free end a preferably rubber spring, *b*, the lower end of which bears upon a second lever, *b'*, having its fulcrum at *c*, near or at the middle of the length of lever D. The free end of lever *b'* rests upon a cam, *c'*, at each end of a shaft, *d*, which, being rotated by a lever, d^1, raises the said lever and decreases the interval between the drum and the concave, according to the necessities of the case. Should a bundle of grain of unusual thickness be fed to the machine, the pressure thereby occasioned will cause springs *b* to yield, thus allowing it to pass through without injury either to the drum or to its spurred concave. From the concave the grain passes to the rear upon a shaker, E, that is composed of spaced perforated strips d^2, separated by serrated strips *e*. Strips d^2 are hinged at their front ends, and extend therefrom the whole length of the frame in an upwardly-inclined position, and every other strip is caused to vibrate simultaneously, thereby sifting the grain from the straw by means of a rock-shaft, *e'*, having spaced alternating arms *f*.

The shaft *e'* receives a rocking motion through the medium of a crank, *f'*, upon each end, a vertically-vibrating lever, F, centrally fulcrumed at *g* to the side of the frame, and having an oblong slot, *h*, in its upper end, in which the wrist-pin of said crank works, a connecting-rod, G, and an eccentric, *h'*, upon a transverse rock-shaft, *g'*, about midway of the length of the frame. Shaft *g'* has upon one end a pulley-wheel, *j*, and derives motion through the medium of a pulley-wheel, *j'*, and an endless belt from a shaft, *l*, upon the front end of the frame.

The shaft *l* is provided with a number of alternating eccentrics, *i*, in line with the serrated strips *e*, between the shaker strips that are connected with the ends of said strips *e* by means of rings i^1 and rods i^2. The front ends of the serrated strips are provided with metallic strips *k'*, that pass under a metallic guide-rod, *l'*. When the shaft *l* is actuated, the eccentrics will impart a reciprocating and vertically-vibrating movement to the serrated strips or saws, which are alternately raised, projected, and retracted, and thus impart a constant movement of the straw and grain from the cylinder to the rear end of the machine. During this movement the grain falls through the perforations in the shakers upon a diaphragm, the straw being discharged at the rear end thereof.

The diaphragm P is composed of two spaced sections, *m m'*, extending the entire length of the frame, the one below the other, with their adjacent ends overlapping, as shown in Fig. 1, which are swept, respectively, by the upper and lower branches of an endless conveyer-belt, I, actuated by means of rollers *n n'* at the upper and lower ends of the said diaphragm applied upon transverse shafts J K.

The shaft J is rotated through the medium of an endless belt and a pulley, O, and when rotated causes the grain to be swept from the upper section of said diaphragm upon the lower one, whence it is conducted by the lower

branch of belt I to the inner end of the lower section *m'*, falling from which it is received upon an inclined guide-plate, J', and directed to a lower series of shakers, K K', arranged in a shoe, L. *In transitu* it is subjected to a blast from a fan, M, that deprives it of all foreign matters that may have passed through the perforations in the shaker-strips, and blows them out of the rear open end of the frame-casing.

The screens K K' are preferably of sheet metal, and their meshes are struck out of the same, so that their tongues incline downward toward the blast, which thus prevents them from becoming clogged up. The meshes in said screens decrease in size from above downward. The shoe L is supported at its rear end by hangers *p*, pivoted at *o'* to the frame, and is connected at its front end by means of arms *p'* to the vertically-vibrating lever F and the connecting-rod G. It thus receives motion, both reciprocating and vibratory, from the eccentrics *h'* and shaft *g'*.

The grain falling off the screens is delivered into a chute or hopper, M, whence it falls into a trough, N, extending from the rear end of the machine to a transverse spout, O. In this trough, near its rear end, is mounted a roller, *q*, and upon the shaft *g'*, extending through the said trough, is a second roller, *q'*, upon which rollers is carried a conveyer-belt, P. This belt carries the grain to the spout O, where it may be bagged ready for market. This spout has a double inclined bottom, as shown at *r r'*, and the grain may be directed to one or the other side of the machine by means of a slide-plate, Q, arranged in ways at either end of said spout, and adapted to be shifted from side to side, as may be required.

The fan aforesaid is arranged in a suitable casing, and derives its air-supply from the sides of the casing through a suitable opening therein. This aperture is shut in by a frame, R, divided into two parts by a wall, *s*, one of which is provided with vibrating slats *t*, and the other with a valve, *v*, the stem *v'* of which is extended upward through the box, and connected by means of crank-arms *u* with the said slats.

The valve is closely shut in, except below, which is open. When the fan is in motion, and produces too strong a blast, the valve will rise automatically and close the slats, more or less, according to the quantity in excess, thus correcting any excess and supplying any deficiency without attention on the part of the operator. When the blast is deficient in strength the valve will fall, thus reopening the slats, increasing the supply of air, and maintaining the blast at all times of equal and constant power. S represents a wind-board, of any suitable material, journaled in rear of the fan, in or near the throat of its casing. This board is operated from the outside, and adjusted in any desired position by means of a circular sector, *x*, having a number of spaced perforations near its perimeter, and applied upon the projecting end of one of the journals.

By passing a pin through one of these perforations into a registering perforation in the casing, the said board may be held to its adjustment, and the blast directed wherever desired.

The alternately-moving serrated beams *e* prevent the return of the straw, and the plates T are to prevent the loosened grains from flying out of the machine with the centrifugal force imparted to it by the cylinder.

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

1. The combination, with the fixed and movable sections of a concave, of the concave levers D, pivoted to the sides of the frame, the springs *b*, the levers *b'*, fulcrumed at *c* and supporting said springs, the shaft *d*, and cams *c'*, substantially as specified.

2. In a thrashing-machine, the combination, with the perforated shakers d^2, hinged at their front ends, of the rock-shaft *e'*, having spaced alternating arms *f*, the cranks *f'*, and the vibrating levers F, rocking said shaft, substantially as specified.

In testimony that I claim the above I have hereunto subscribed my name in the presence of two witnesses.

WILLIAM CROTZER.

Witnesses:
WM. SIMPSON,
D. F. KEAGY.