(No Model.)

3 Sheets—Sheet 1.

J. ELLIS.

THRASHING MACHINE.

No. 285,595. Patented Sept. 25, 1883.

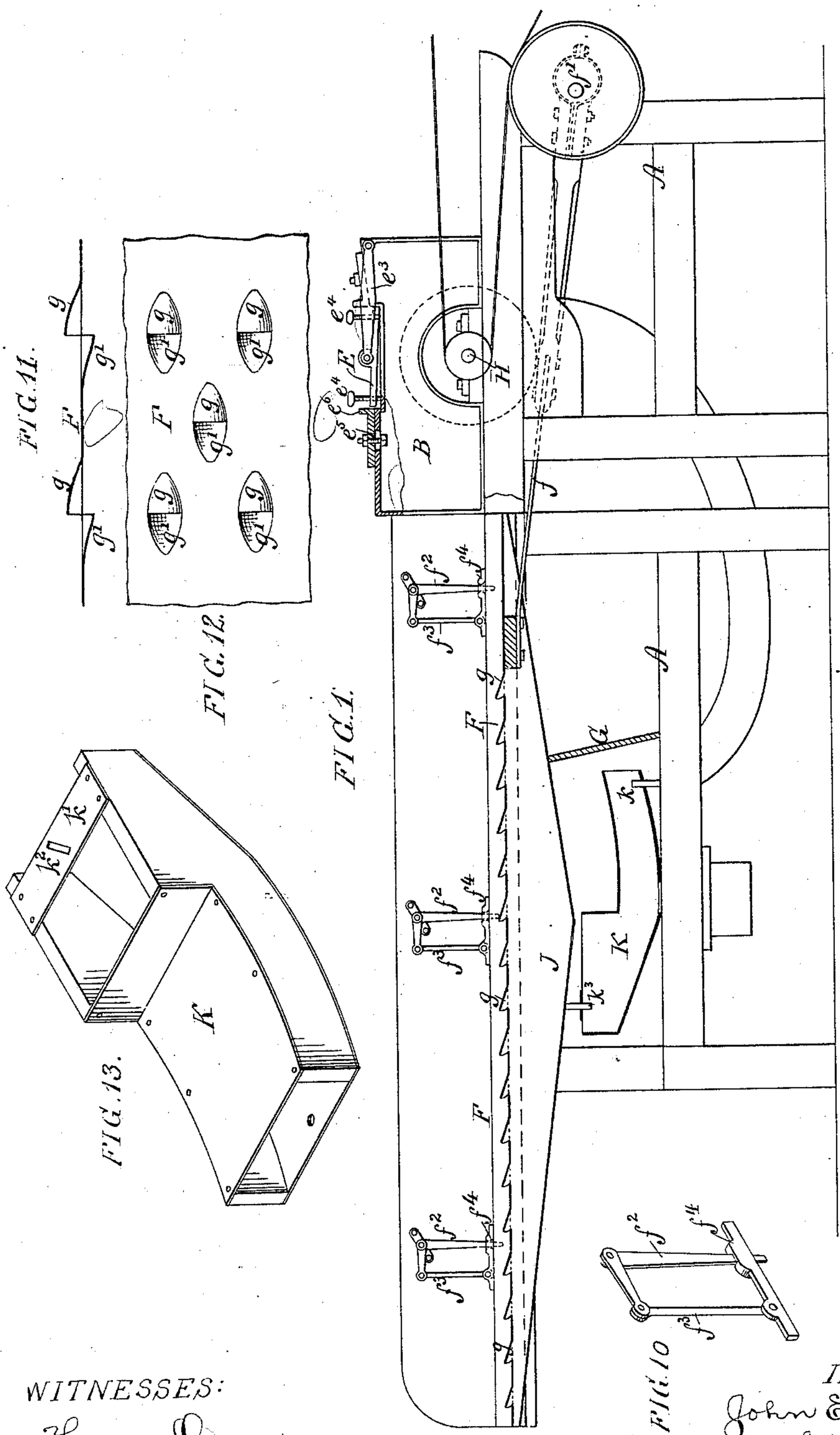

FIG. 11.

FIG. 12.

FIG. 13.

FIG. 10.

WITNESSES:

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Hamilton O. Turner.

INVENTOR:

John Ellis

by his Attorneys

Howson and Sons

(No Model.)

3 Sheets—Sheet 2.

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No. 285,595. Patented Sept. 25, 1883.

FIG. 2.

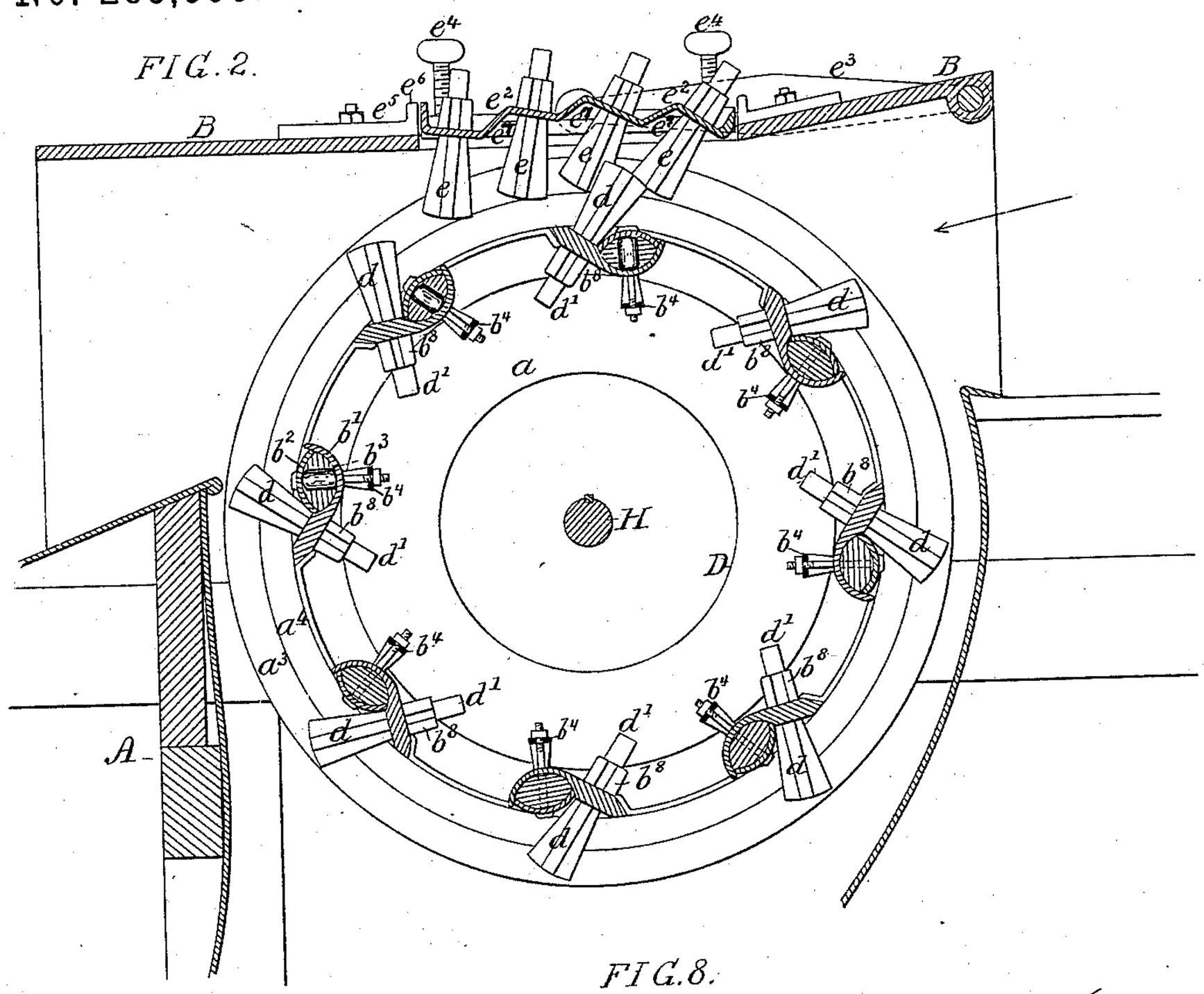

FIG. 8.

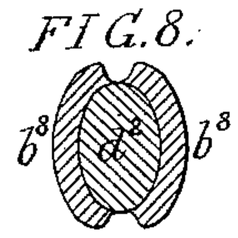

FIG. 4.

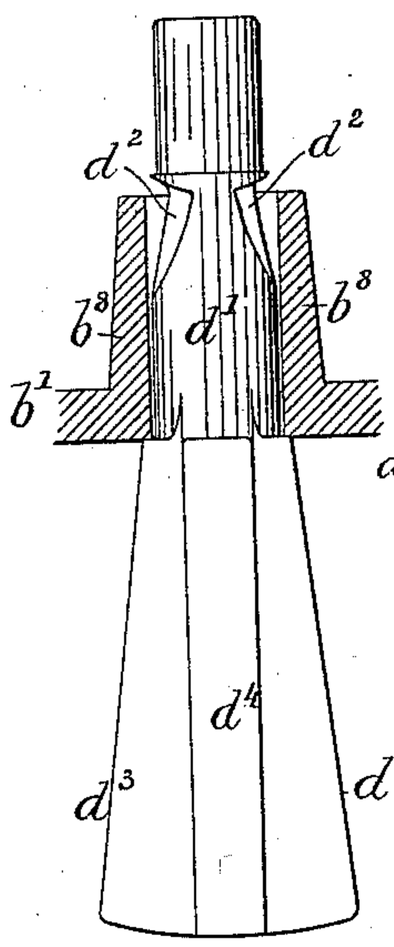

FIG. 5.

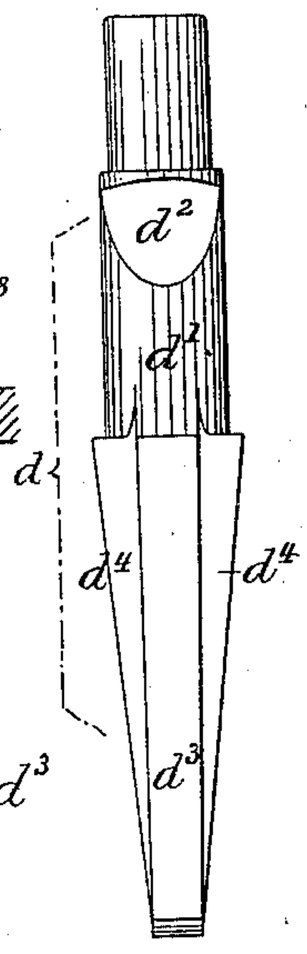

FIG. 6.

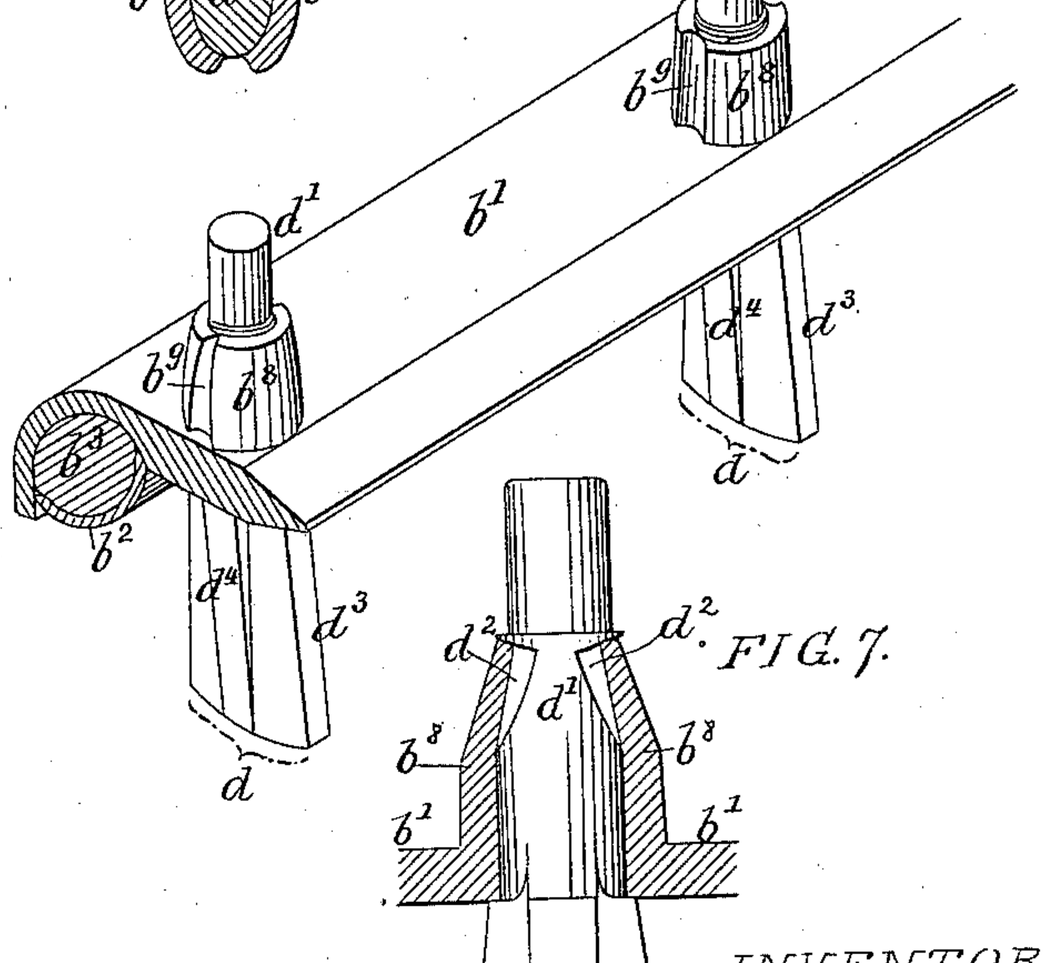

FIG. 7.

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(No Model.) 3 Sheets—Sheet 3.

J. ELLIS.

THRASHING MACHINE.

No. 285,595. Patented Sept. 25, 1883.

FIG. 3.

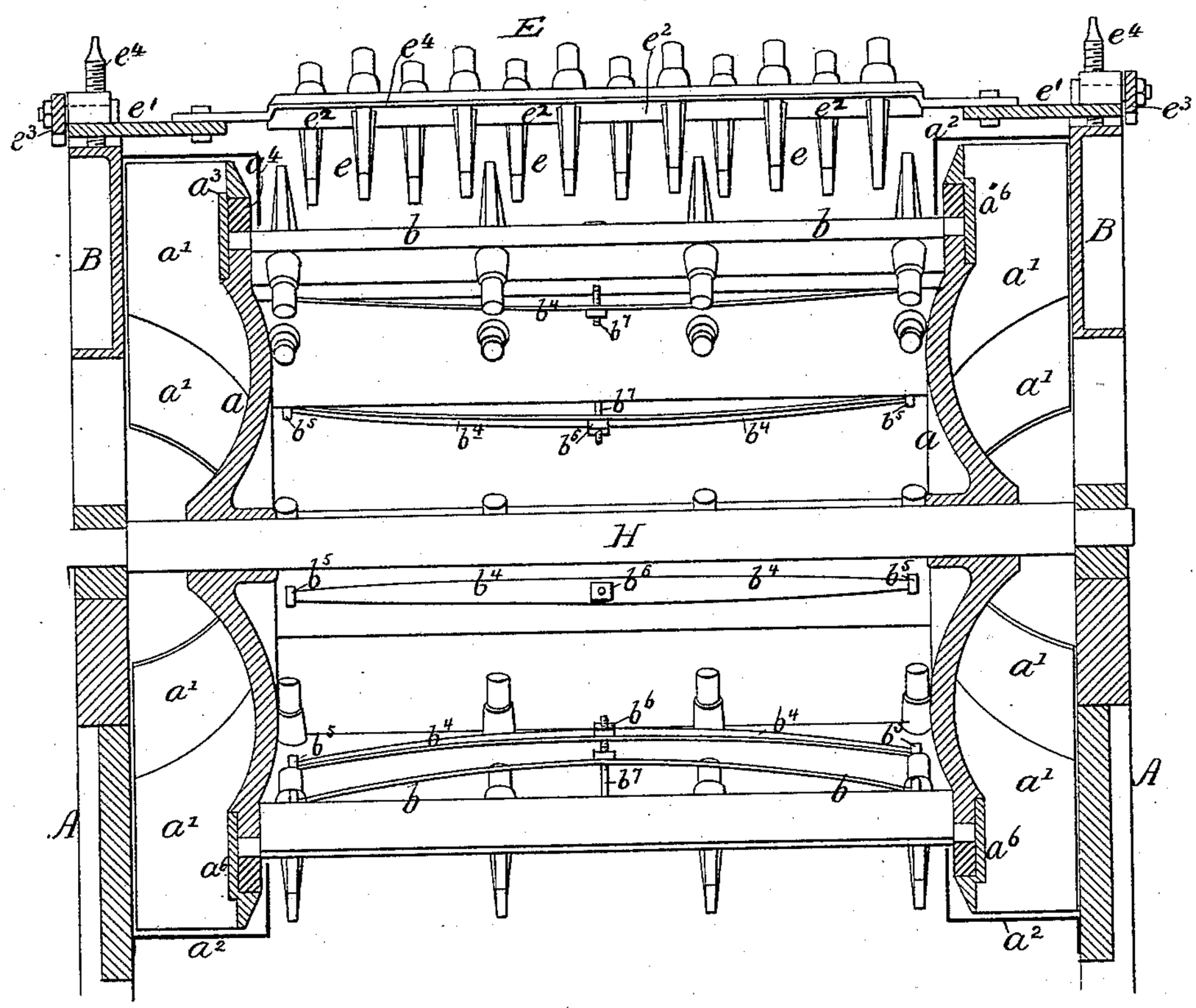
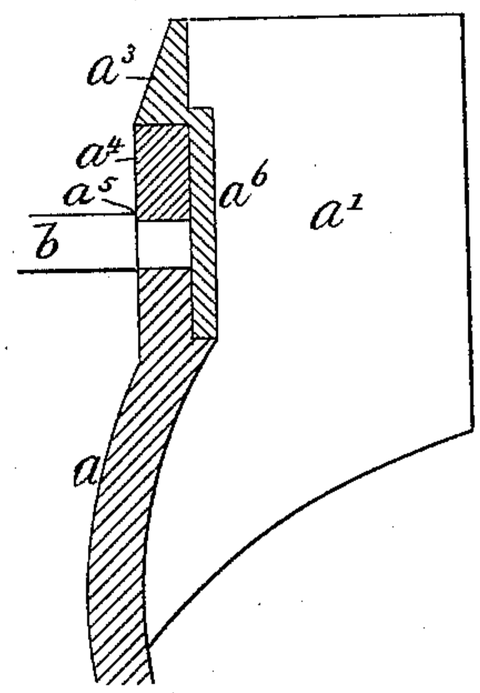


FIG. 9.



WITNESSES:
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INVENTOR:
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UNITED STATES PATENT OFFICE.

JOHN ELLIS, OF POTTSTOWN, PENNSYLVANIA, ASSIGNOR TO GEORGE B. ELLIS, OF SAME PLACE.

THRASHING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 285,595, dated September 25, 1883.

Application filed March 5, 1883. (No model.)

To all whom it may concern:

Be it known that I, JOHN ELLIS, a citizen of the United States, and a resident of Pottstown, Montgomery county, Pennsylvania, have invented certain Improvements in Thrashing-Machines, of which the following is a specification.

My invention relates to certain details, fully described hereinafter, in the construction of a grain thrashing and cleaning machine, the objects of the invention being to simplify the construction of the machine and to insure the effective performance by the various parts of the duties for which they are intended.

In the accompanying drawings, Figure 1, Sheet 1, is a side view, partly in section, of a thrashing-machine with my improvements; Fig. 2, Sheet 2, a longitudinal section of part of the machine on a larger scale than Fig. 1; Fig. 3, Sheet 3, a transverse section on the same scale as Fig. 2; and Figs. 4 to 13, inclusive, detached views of various parts of the machine, illustrating features of the invention.

A is the frame of the machine; B, the cylinder-box; D, the cylinder; E, the concave; F, the shaking-table, and G the blast-box. The cylinder has opposite heads *a a* secured to the shaft H, and to said heads are secured the opposite ends of the transverse bars *b* of the cylinder, carrying the teeth *d*. Each bar comprises two plates, b' and b^2, and a bar, b^3, secured between said plates, both of which are curved, so as to form a chamber for the reception of the bar b^3, and to obtain the greatest strength with the least amount of metal.

The bars b^3 are intended for balancing the cylinder, and are made of wood, with recesses for the reception of leaden plugs or other weights—such as shown in Fig. 2, for instance—by properly distributing which the cylinder can be accurately balanced and the smooth running of the same insured.

To further strengthen and stiffen the bars, I secure to the back of each of the same a truss, b^4, which consists of a bowed plate of metal, bearing at the opposite ends against lugs b^5 on the plate b', and compressed in the center by a nut, b^6, on a bolt, b^7, whereby the plates b' and b^2 are secured together. Each plate b' of the bar *b* has a straight portion, to which the teeth *d* are secured, said bar having tubular projections b^8, to which are adapted the shanks d' of the teeth, said shanks having opposite recesses d^2, Figs. 4 and 5, into which the ends of the tubular projections b^8 are forced, so as to retain the teeth, as shown in Fig. 6, recesses b^9 being formed in the projections b^8, so as to weaken the same on opposite sides, and thus permit the forcing of the ends of the projections into the recesses of the teeth. The same result may be gained by slotting the tubular projections b^8, so as form practically two projections, one on one side and the other on the opposite side of the tooth. The recessed portions d^2 of the teeth are not flat, but curved in cross-section, as shown in Fig. 8, so that when a tooth becomes worn or broken the shank of the same may be turned, in order to distend the contracted portions of the projection b^8 and permit the removal of said shank and the insertion of a new tooth. The projection fits so closely to the recessed portion of the tooth, however, that the turning of the tooth, during the working of the machine is effectually prevented. If abrupt shoulders were presented by the recessed portion of the tooth, the distention of the projections could not be accomplished without difficulty; hence the adoption of the form shown for this portion of the tooth. The acting portion of the tooth has a central web, d^3, and side ribs, d^4, the web d^3 being flared from base to point, and the ribs starting at the point of the tooth and increasing gradually in thickness to the base. A tooth of this form possesses great strength at and near the base, and meets with less resistance than an ordinary tooth. The tooth, moreover, when thus constructed, is reversible when the front or acting face of the same becomes worn or broken.

The concave E consists of end plates, e', and transverse bars e^2, carrying the teeth *e*, two of such bars being shown in the present instance, although a single bar or more than two bars may be used, if desired.

The end plates, e', are pivoted to links e^3, hung to the frame of the machine, and each plate is furnished on opposite sides of the pivot with adjusting-screws e^4, bearing on the frame. By means of these adjusting-screws the concave may be raised or lowered vertically, or the

angle of the same in respect to the cylinder may be varied as desired; and in the event of undue pressure upon the concave, such as would be caused by the introduction of foreign matters into the machine, the entire concave will be thrown up, the links e^3 turning on their pivots to permit such movement, which, in the ordinary working of the machine, is prevented by the weight of the concave.

The adjustment of the concave to different angles renders advisable the use of the adjustable plate e^5 on the top of the box B, so that the least possible space may be allowed to intervene between the said plate and the edge of the concave bar, the plate having a flange, e^6, extending up to or above the highest point to which the edge of the concave is likely to be adjusted.

The concave bars e^2 are so shaped that a transverse rib, e^7, is formed between each row of teeth, these ribs affording additional striking or abrading faces for the material acted upon by the teeth of the cylinder, and thus assisting the teeth e in the performance of the duty for which the concave is intended.

The teeth e are similar in form to the teeth d of the cylinder, and are secured to the concave bars by the same means as those employed to secure the teeth to the bars of the cylinder; but the concave bars e^2 are so formed that the teeth e occupy different angles in respect to the line of passage of the material through the machine, the angle increasing in abruptness from the inlet to the discharge end, as shown in Fig. 2. By this means there is a gradual increase in resistance to the passage of the material, and the strain on the teeth of the concave is thus distributed more evenly over the teeth than in an ordinary concave, in which the greatest strain is exerted on the teeth nearest the feed end of the machine.

In order to save expense and render the machine compact, I utilize the heads a of the cylinder to form blast-fans, blades a' being secured to said heads on the outer sides of the latter, and the fan being inclosed in a casing, a^2, having the usual inlet and outlet. I have shown fans on both heads of the cylinder; but one head only may be thus constructed, if desired. The blades a' may be secured directly to the heads a; but in the present instance they are carried by rings a^6, each having an overhanging rim, a^3, and between said rim and the ends of the cross-bars b is interposed a ring or band, a^4, which serves to retain the ends of the bars in the sockets to which they are adapted, the whole forming a simple and effective plan of securing the bars in place. Shoulders a^5 on the bars b bear against the ring or band a^4, and serve in connection with the rim a^4 to prevent the said ring from leaving its place even though it should become broken. (See Fig. 9.)

The shaking-table F has a combined longitudinal and vertical reciprocating motion imparted to it by the means shown in Fig. 1. The longitudinal movement is imparted by means of a rod, f, from an eccentric, f', on a shaft driven by the main belt, or in any other suitable manner. The vertical movement is due to the devices used for hanging the table. These devices comprise bell-crank levers f^2, hung to the frame A, the short arms of the levers being connected to the suspending-links f^3, and the long arms of the levers being confined laterally between lugs f^4 on the edge of the table, but being free to move vertically between said lugs. (See Fig. 10.) As the table is moved longitudinally the levers f^2 are caused to vibrate, and a lifting movement is thereby imparted to the table through the medium of the levers and the suspending-links f^3. It will be understood that the arrangement of levers and links is used at both sides of the table F.

In order to provide for the feeding of the straw forward over the table F and for the free passage of the grain and chaff through the openings therein, I make the table as shown in Figs. 11 and 12. Lateral incisions are first made at proper intervals in the sheet-metal plate forming the table, and the metal in the rear of each incision is then struck up, so as to form a tapered convex hood, g, while the metal in front of the incision is depressed to form a tapered concave recess, g', the lateral openings thus formed being large enough for the passage of the grains and chaff, which are directed by the recesses g' to said openings, the front edges of the projecting hoods g serving as feeders for the straw resting on the table. Beneath the table is the usual collecting-trough, J, which discharges into a shaking-box, K, in the blast-box G, said box K being pivoted near the front end to a pin, k, and having near the rear end a cross-bar, k', in which is an inclined slot, k^2, Fig. 13, for the reception of a pin, k^3, on the bottom of the trough J, so that as the said trough reciprocates longitudinally with the table F a lateral swinging movement will be imparted to the front end of the box K. In this box may be placed the usual riddles or screens, the chaff being discharged from the rear of the box and the grain passing through an opening in the bottom of the same to the discharge-spout.

I secure the trough J to the frame of the shaking-table F, so that the usual devices for reciprocating the trough may be dispensed with, and the machine thus rendered simpler and more compact.

I claim as my invention—

1. A beater-bar for a thrashing-cylinder, composed of two curved plates, together forming a hollow bar, and bolts for securing the plates together, one of said plates having a projecting portion adapted to receive the teeth, as set forth.

2. The combination of the hollow cylinder-bar with the weighted balancing-bars b^3, as set forth.

3. The combination of the cylinder-bar having end lugs, b^5, with the truss comprising the bars b^4, and the central compression-bolt, b^7, and nut b^6, as set forth.

4. A thrashing-machine tooth comprising a shank, d', a web, d^3, flared from the base to the point of the tooth, and central side ribs, d^4, increased in thickness from the point to the base, as specified.

5. A thrashing-machine tooth the shank of which has a recessed portion, d^2, the cross-section of which presents a curved outline, as set forth.

6. The combination of the bars having projections b^8 with the teeth, the shanks of which have recesses d^2, into which the ends of said projections are forced, as set forth.

7. The combination of the bars with tubular projections b^8, having recesses b^9, as set forth.

8. The combination of the closed end of the cylinder, the fan-vanes a', secured thereto, and a casing inclosing both the cylinder-head and the vanes, and having an opening for the admission of air, as set forth.

9. The combination of the recessed ends a of the cylinder, the bars b, having ends adapted to the recesses, the overhanging rim a^3, and the retaining ring or band a^4, as specified.

10. The combination of the links e^3, pivoted at the outer ends, so as to be free to swing upward, the concave pivoted to the inner ends of the links, and adjusting-screws e^4 near each edge of the concave, whereby the angle of the same in respect to the cylinder may be varied without interfering with or restricting the rise of the concave with the links, as set forth.

11. The combination of the pivoted and adjustable concave with the adjustable strip e^5, as specified.

12. The combination of the adjustable concave with the strip e^5, having a flange, e^6, as set forth.

13. The combination of the shaking-table of the machine with a suspending device comprising bell-crank levers, one arm of each of which is connected to the suspending-link, and the other arm under control of the table, whereby as the latter reciprocates a lifting motion is imparted thereto, as set forth.

14. The table F, having lateral openings with tapering concave recesses g' in front and tapering convex hoods in the rear of the same, as set forth.

15. The combination of the pivoted box having a cross-bar, k', with inclined slots k^2, and the trough J, having a pin, k^3, adapted to said slot, as set forth.

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

JOHN ELLIS.

Witnesses:
HARRY L. ASHENFELTER,
HARRY SMITH.