(No Model.) 6 Sheets—Sheet 1.

P. E. GOOD.

THRASHING MACHINE.

No. 551,542. Patented Dec. 17, 1895.

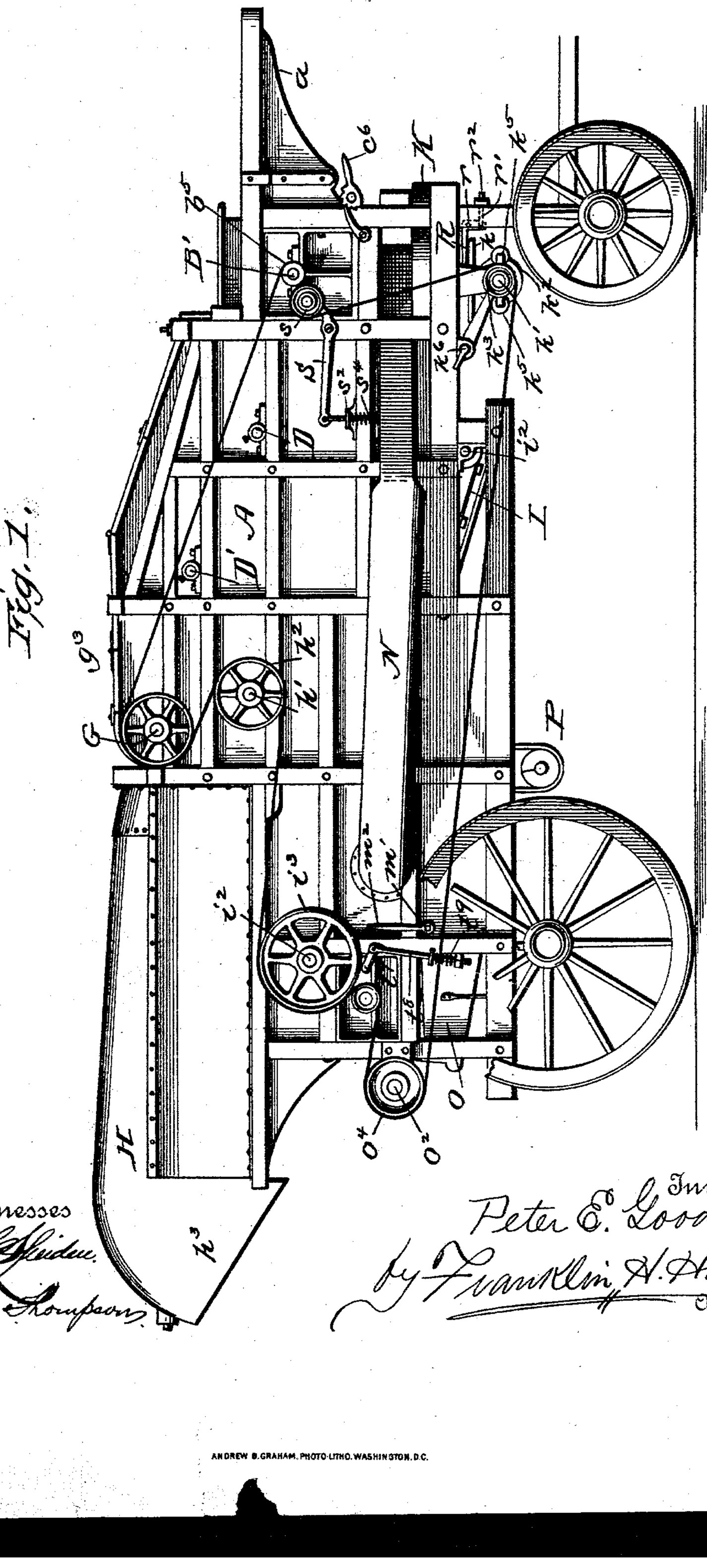

Fig. 1.

Witnesses
Thos. L. Sheldon.
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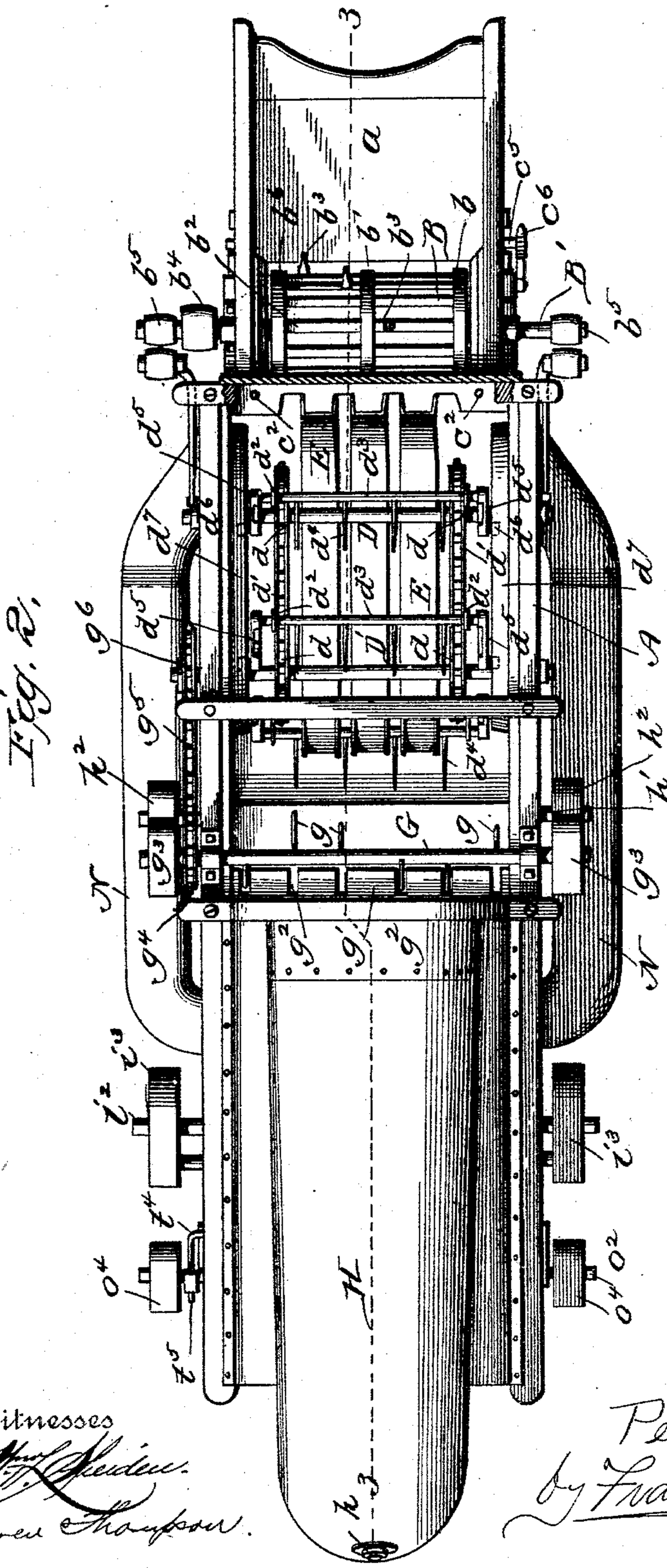
(No Model.)

6 Sheets—Sheet 2.

P. E. GOOD.

THRASHING MACHINE.

No. 551,542. Patented Dec. 17, 1895.



Witnesses
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(No Model.) 6 Sheets—Sheet 3.

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THRASHING MACHINE.

No. 551,542. Patented Dec. 17, 1895.

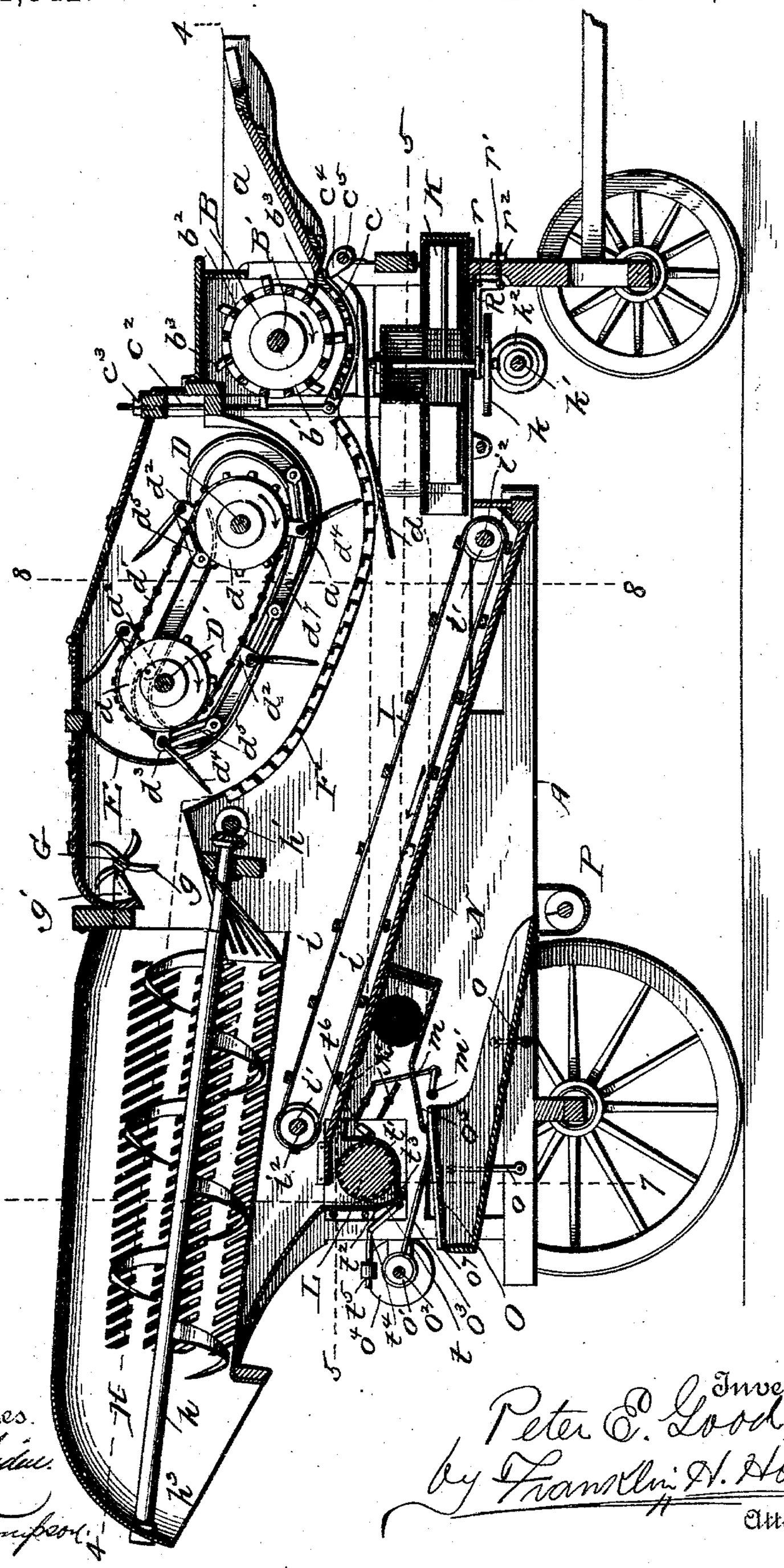

Fig. 3.

Witnesses.
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(No Model.) 6 Sheets—Sheet 4.

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THRASHING MACHINE.

No. 551,542. Patented Dec. 17, 1895.

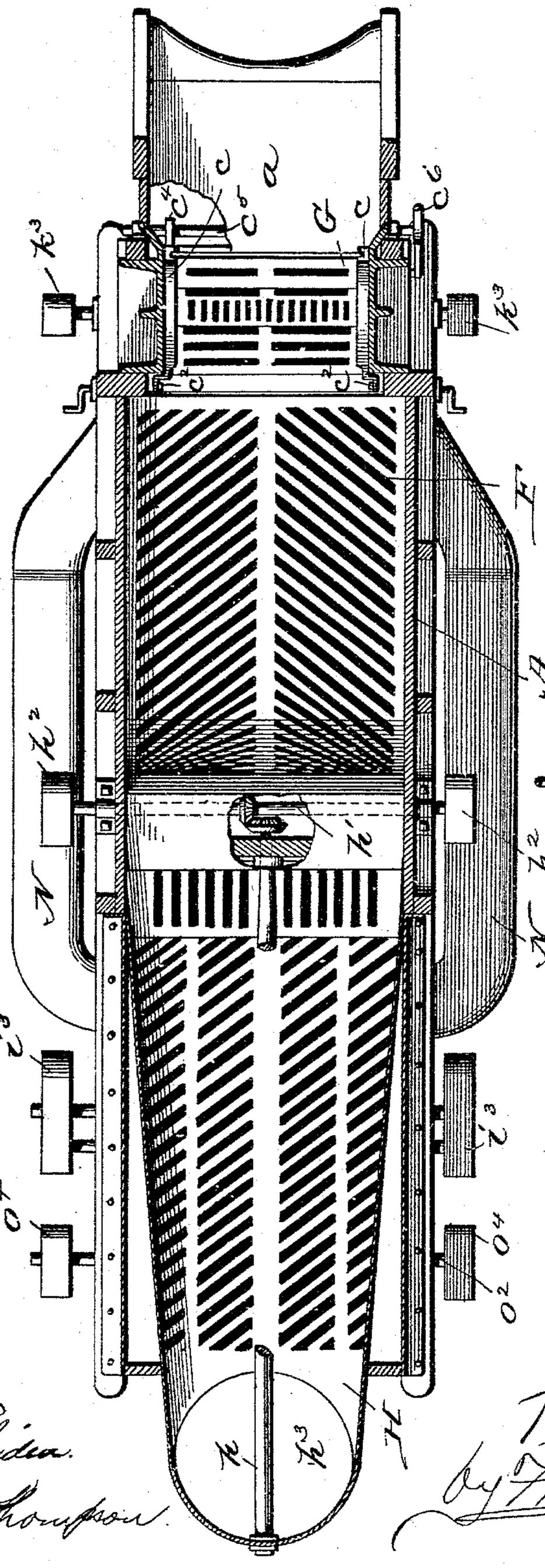

Fig. 4.

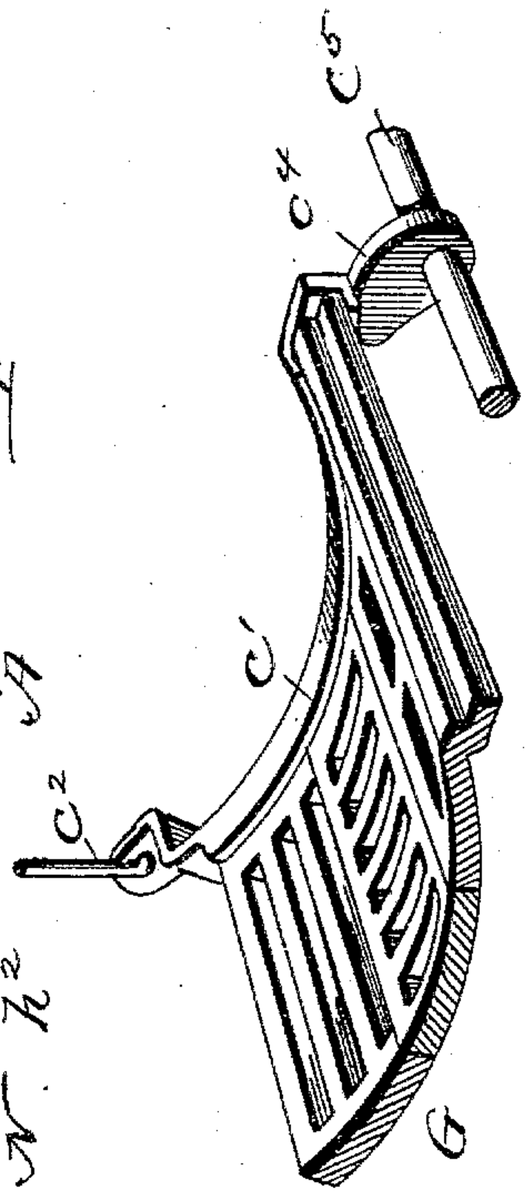

Fig. 9.

Witnesses
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(No Model.) 6 Sheets—Sheet 5.

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THRASHING MACHINE.

No. 551,542. Patented Dec. 17, 1895.

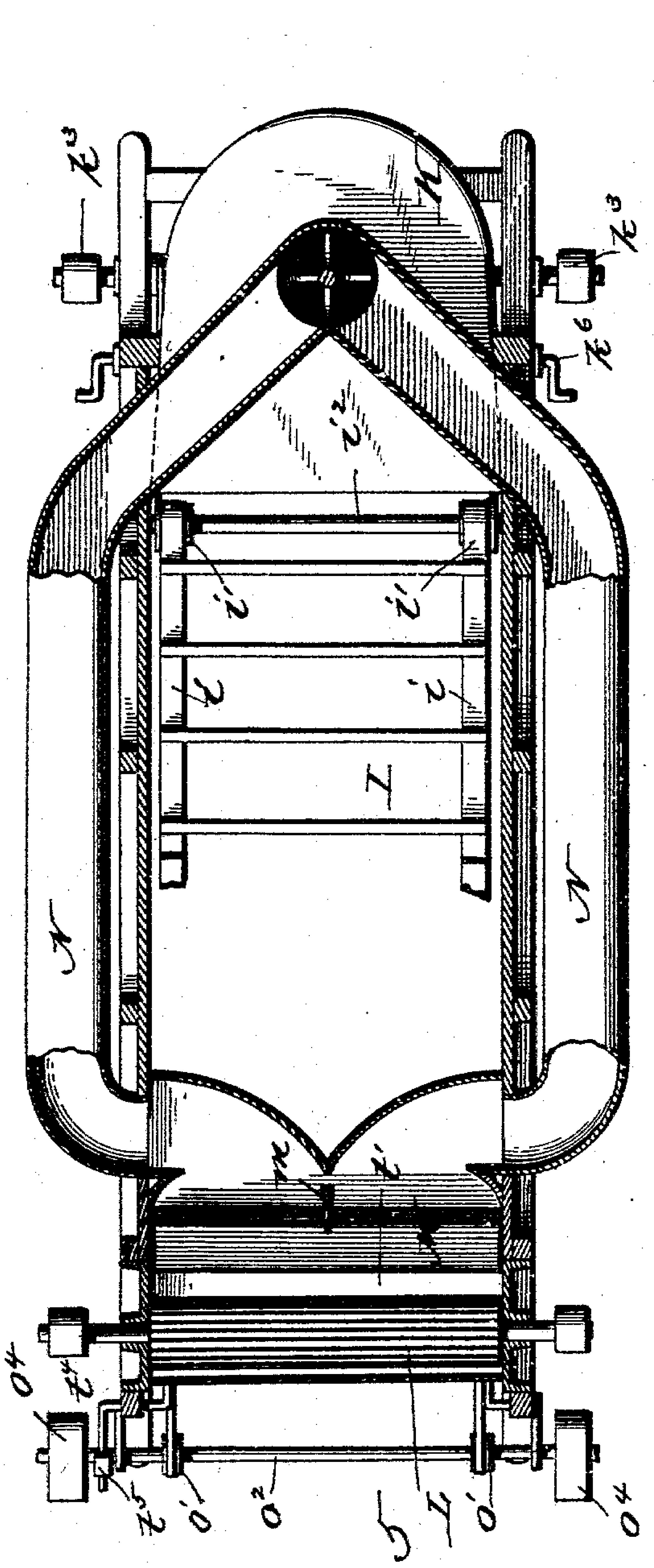

Fig. 5

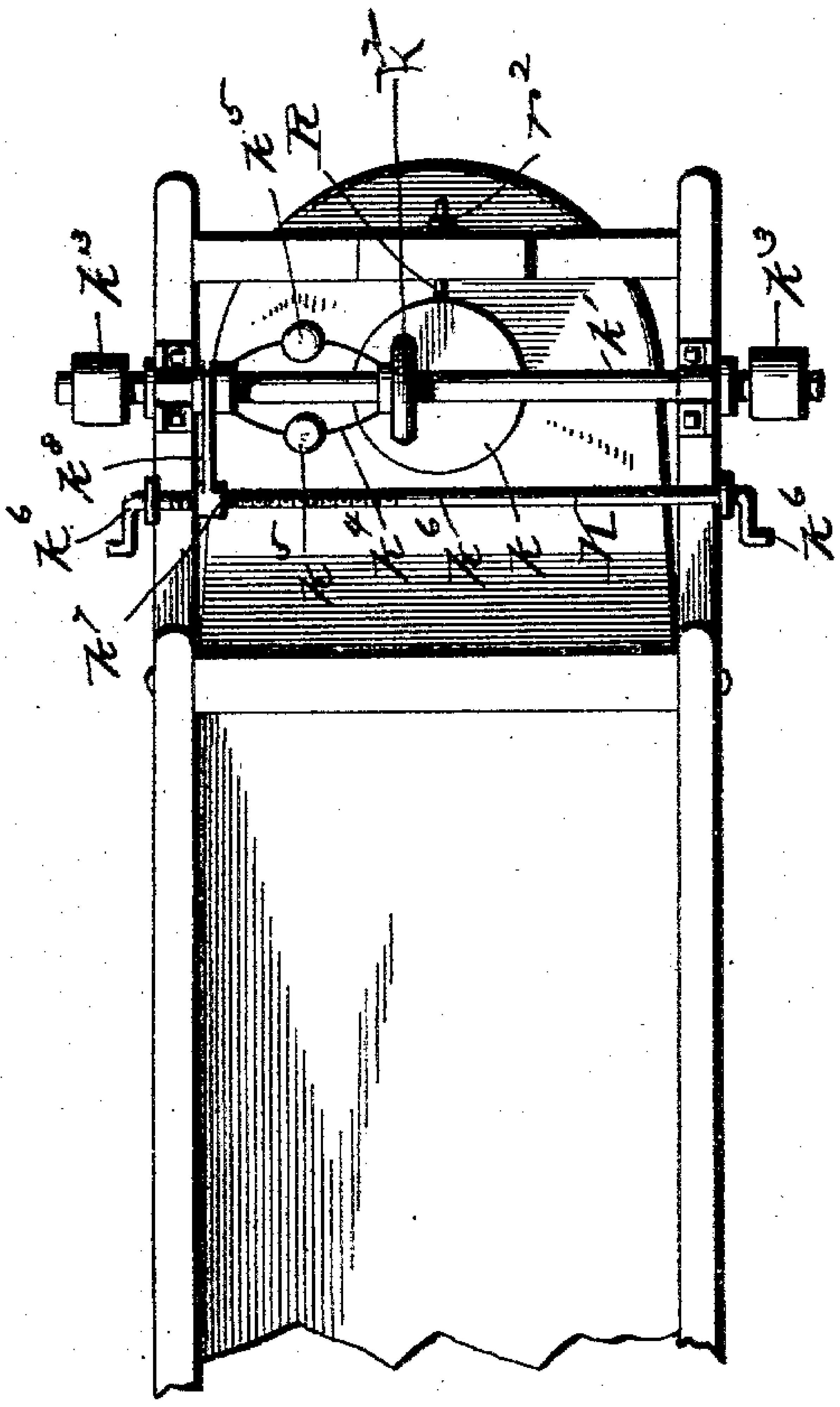

Fig. 6.

Witnesses

[illegible]

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6 Sheets—Sheet 6.

P. E. GOOD.

THRASHING MACHINE.

No. 551,542. Patented Dec. 17, 1895.

Fig. 8.

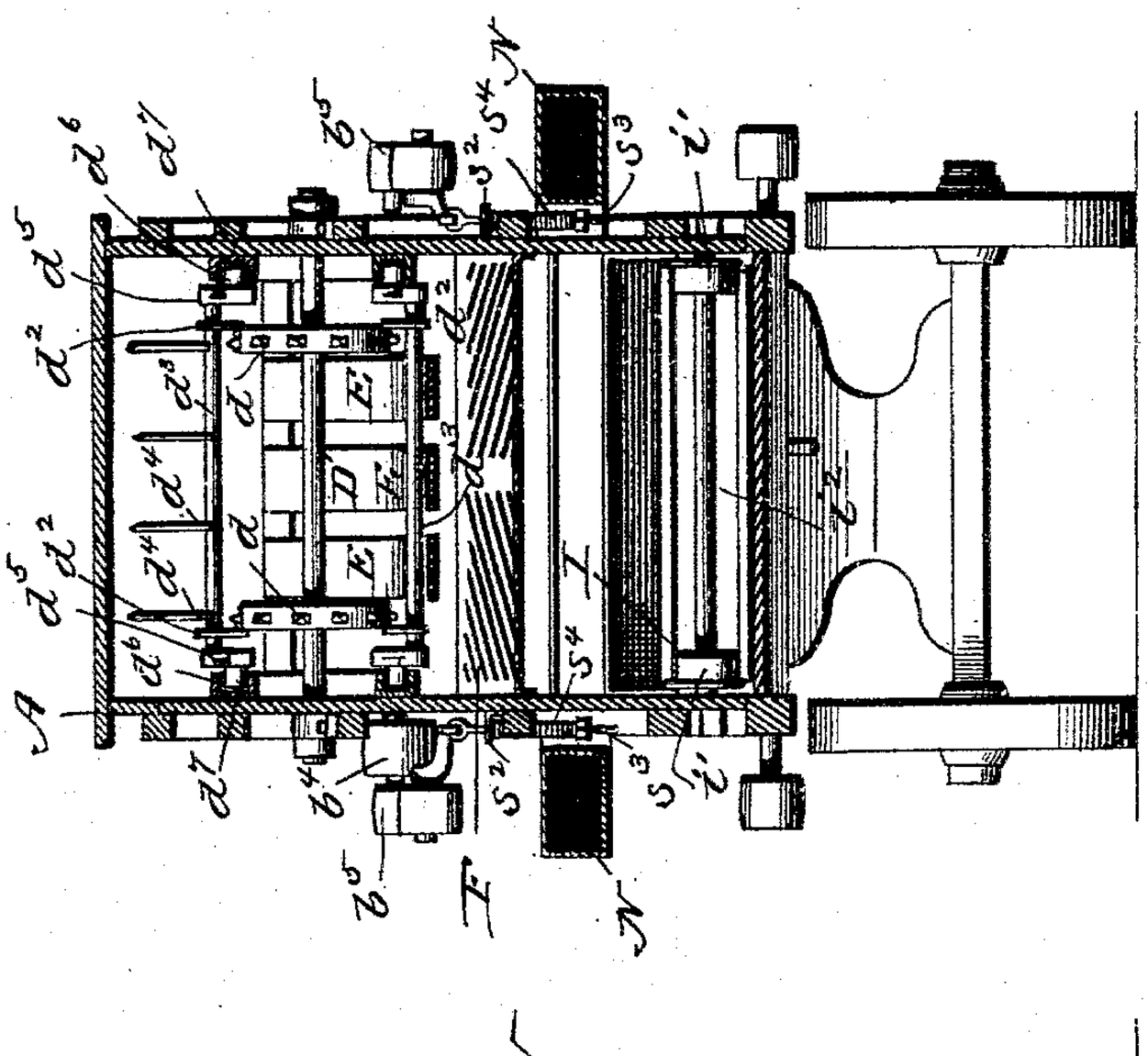
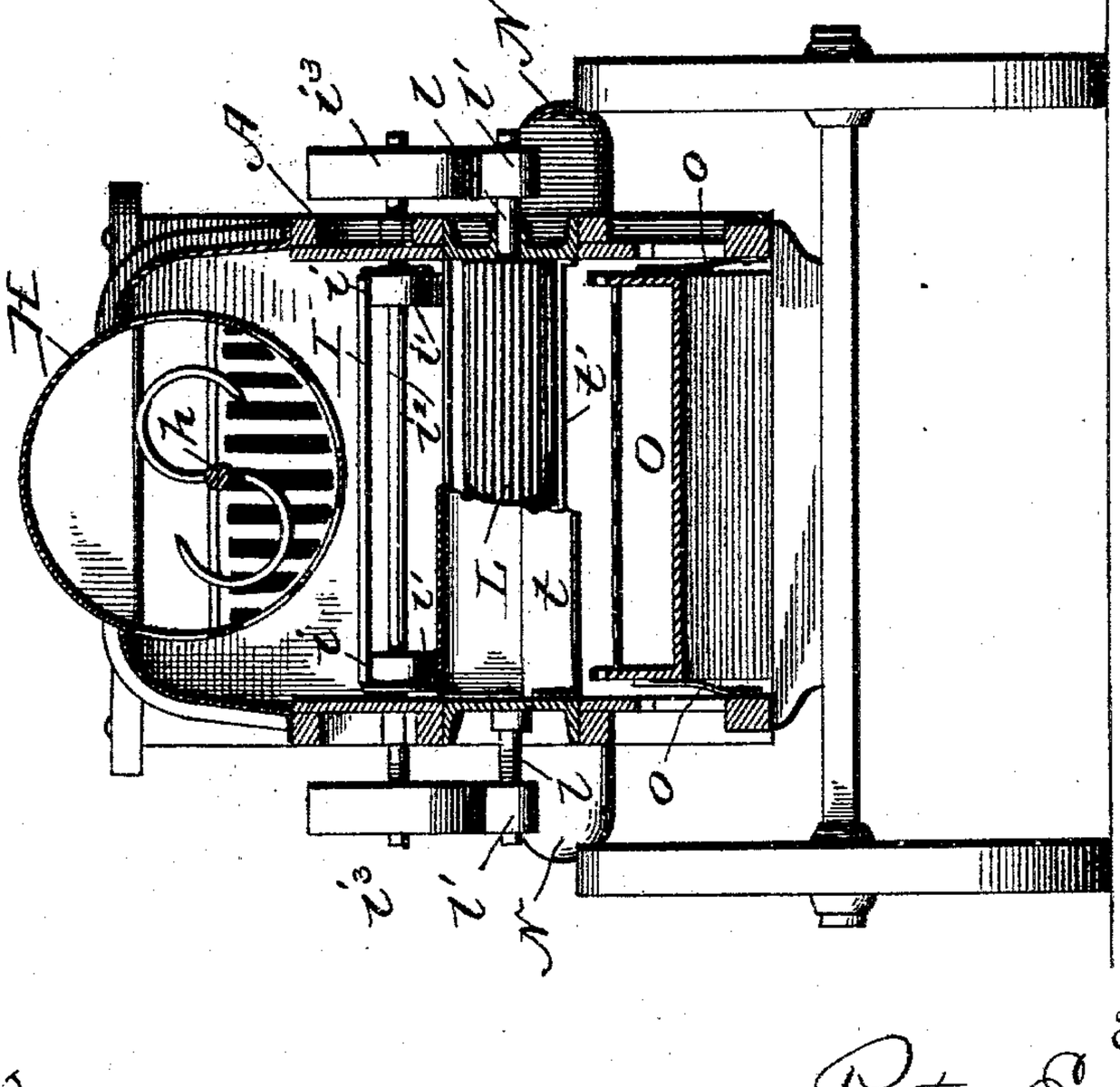


Fig. 7.



Witnesses
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Morgan Thompson.

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UNITED STATES PATENT OFFICE.

PETER E. GOOD, OF ETNA GREEN, ASSIGNOR OF ONE-HALF TO HOWARD ZIMMERMAN, OF LEESBURG, INDIANA.

THRASHING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 551,542, dated December 17, 1895.

Application filed September 9, 1895. Serial No. 561,948. (No model.)

To all whom it may concern:

Be it known that I, PETER E. GOOD, a citizen of the United States, residing at Etna Green, in the county of Kosciusko and State of Indiana, have invented certain new and useful Improvements in Thrashing-Machines; and I do 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 the letters of reference marked thereon, which form a part of this specification.

This invention relates to certain new and useful improvements in grain-separators for use in connection with thrashing-machines, and it has particular reference to that class of separators in which the separation of the grain is in whole or in part effected by means of an air-blast.

The invention has for its object, among others, the provision, in connection with a separator of the character above mentioned, of a blower which is located beneath one end of the machine and in connection therewith of pipes so disposed with reference to the body of the machine as to supply an incoming forced air-blast at one end of the machine, near its bottom, and at the opposite end of the machine an exhaust or suction blast, which blasts serve to effectually separate the chaff from the grain.

The invention has for a further object the provision of mechanism whereby the speed of the blower or fan-shaft may be automatically regulated, said mechanism being so placed with reference to the machine as to be entirely out of the way, and to occupy but little space.

A further object of the invention resides in the peculiar construction of the feeding mechanism and means employed in conveying the straw through the machine, and finally the object of the invention consists in the general improvement in the construction and operation of this class of machinery, whereby an efficient, serviceable, and inexpensive grain-separating machine is produced.

To these ends and to such others as the invention may pertain, the same consists in the peculiar construction and in the novel combination, arrangement, and adaptation of parts, all as more fully hereinafter described, shown in the accompanying drawings, and then specifically defined in the appended claims.

The invention is clearly illustrated in the accompanying drawings, which, with the letters of reference marked thereon, form a part of this specification, like letters indicating the same parts throughout the several views, and in which drawings—

Figure 1 is a side elevation of my improved separator. Fig. 2 is a plan view of the same with a portion of the top covering removed. Fig. 3 is a longitudinal section taken on the line 3 3 of Fig. 2. Fig. 4 is a horizontal section taken on the line 4 4 of Fig. 3. Fig. 5 is a similar view on the line 5 5 of Fig. 3. Fig. 6 is an under side view of the front portion of the machine, showing the mechanism for governing the speed of the fan. Figs. 7 and 8 are sectional views taken on the lines 7 7 and 8 8, respectively, of Fig. 3. Fig. 9 is a detail perspective view of a portion of the concave.

I will first describe the thrashing mechanism, with the delivery of the grain upon the grain carrier, and afterward the mechanism for separating and cleaning.

Reference now being had to the details of the drawings by letter, A designates the casing of the separator, which is suitably braced and sufficiently rigid to support the bearings of the operating parts.

The feed-hopper *a* is located at the forward end of the machine, and through said hopper the material to be thrashed is fed to the cylinder.

B designates the thrashing-cylinder, which is composed of two heads *b b*, an intermediate spider *b'*, and parallel bars b^2. Spikes b^3 are arranged spirally around the cylinder, being secured to the bars b^2 in a suitable manner. The cylinder is supported on shaft B' revolving in bearings secured to the main frame. Shaft B' is provided with pulley b^4, which is belted to the engine or other source of power, and pulleys b^5 b^5, which are belted to other portions of the machinery.

C designates the concave, lying under the

thrashing-cylinder, and is composed of several sections, three being shown in the present case. These sections are held at each end in grooved supports c, fitting closely against the casing on either side, and are provided with either longitudinal or transverse slots or a combination of both, as illustrated in Figs. 4 and 9, thus permitting the grain freed by the cylinder to pass through and find its way to the grain-carrier D, over the chute d.

To one end of each support is pivoted a rod c^2, said rod passing up through the casing A and being provided with an adjusting-nut c^3 on its support end. The other end of each support rests on cams c^4 carried by the transverse shaft c^5 supported in bearings on the main frame. The shaft c^5 is provided at one end with a lever c^6. By turning the nuts c^3 and lever c^6, the concave may be adjusted in relation to the cylinder C.

I will now describe the beater mechanism.

D D′ are transverse shafts carrying sprocket-wheels d d, which are coupled together in pairs on each side by the sprocket-chains d'. Said sprocket-chains d' are provided at intervals with lugs d^2, in which are pivoted the transverse rods d^3 carrying the fingers d^4. To the outer ends of the rods d^3, adjacent to the casing, are secured the crank-arms d^5, provided at their free ends with friction-rollers d^6, traveling in cam-grooves d^7 on each side of the casing. The cam-grooves d^7 are of such form that the fingers d^4 will stand nearly at right angles to their path of travel during their upward and backward sweep, but will lie nearly in the plane of their path of travel during their forward and downward sweep, as shown in Fig. 3.

E E designate curved guards between which the fingers d^4 project, thus preventing the straw from becoming entangled in the sprocket wheels and chains.

F designates a grate composed of parallel bars extending obliquely outward and backward, as shown in Fig. 4. The upper face of this grate is curved, to conform to the path of travel of the fingers d^4 in their backward sweep.

G× designates a transverse shaft, revolving in suitable bearings and provided with fingers g which are arranged preferably in spiral order. A guard g', formed with openings g^2 through which the fingers g pass, prevents the straw from winding around the shaft or becoming entangled.

The shaft G× is provided with a band-pulley g^3 at each end, and also with a sprocket-wheel g^4. A chain g^5 passes around the wheel g^4 and also around a similar wheel g^6 on the shaft D′, whereby motion is imparted to the latter.

H designates the tailer, which is composed of a cylinder with a portion of its surface slotted, to form a grating, as shown in Fig. 3. A shaft h extends longitudinally through the cylinder H and is rotated by means of bevel-gear connection with the transverse shaft h' provided with band-pulleys h^2 at each end. The shaft h is provided with a series of curved blades or fingers arranged in spiral order and forming an auger or conveyer for carrying the straw to the discharge-opening h^3 at the rear end of the machine. The discharge-opening is formed in a bend or elbow in the cylinder, which is also provided with a bearing for one end of the shaft h.

I designates the grain-carrier, consisting of two endless belts i passing around rollers i' secured to transverse shafts i^2. These belts are connected by transverse bars and the whole is driven by band-pulleys i^3 on one of the shafts i^2. An inclined board extends upward and backward parallel with the belts just described, and forms the bottom of the grain-carrier. As the grain falls through the various gratings from the thrashing mechanism it is exposed to the blast from the fan K which drives off all of the lighter impurities.

L designates a fluted scouring-cylinder, extending across the machine near its rear end, being secured to transverse shafts l carrying band-pulleys l'. The cylinder L is contained in a hopper or trough formed by a relief-valve and self-adjusting concave t t', pivoted at t^2 and t^3 respectively.

The relief-valve t is held in its closed position by means of the transverse rod t^4 provided near its center either with arms or a U-shaped bend which bears against the valve t. The rod t^4 is provided at one of its ends with an angular extension carrying an adjustable weight t^5. It will be seen that by this arrangement the apron will be held normally closed by the weight, but will yield at any predetermined pressure which has been gaged by the weight t^5.

The concave t' is held in yielding contact with the fluted roller L by a rod t^6, similar to the rod t^4, and provided at one end with a crank-arm t^7. To the free end of the crank-arm t^7 is pivoted a rod t^8 which passes through a bracket secured to the main frame, and provided at its end with an adjusting-nut. A coiled spring t^9 encircles the rod t^8 between the ear and the nut, and the tension of said spring holds the concave t' in yielding contact with the roller L, as heretofore described.

M M are transverse slats, pivoted at their longitudinal centers in the sides of the machine. These slats are connected by a rod with an arm m on a transverse shaft m' provided on the outside of the casing with a short hand-lever m^2, by means of which the slats are adjusted.

The wind-trunk N which enters the eye of the fan K opens into the casing on both sides, just forward of the slats M, creating a suction-blast at that point, which blast can be regulated by opening or closing the slats.

O is a screen supported on links o at each side and shaken longitudinally by eccentrics o' on the shaft o^2 through the strap connec-

tions o^3. The shaft o^2 revolves in bearings secured to the main frame and is provided at each end with a band-wheel o^4.

In operation, the grain is delivered to the hopper L by the grain-carrier. The revolution of the fluted scouring-cylinder carries the grain in even feed up over the apron l', from the upper edge of which it falls over the slats M M upon the inclined board o^5, and during this descent it is exposed to the suction-blast from the fan K, which removes any light impurities which may remain. The grain is then passed over the inclined board o^5 to the screen O, which removes any heavy foreign material not taken off by the fan-blasts. The grain, after passing through the screen, passes to the conveyer P over the inclined board o^6, forming the bottom of the machine, and is delivered to the side of the machine, while the screenings pass over the rear end at o^7.

The fan K is located near the forward end of the machine. The vertical fan-shaft is supported in bearings in the fan-casing and is provided at its lower end with the friction-disk k.

k' is a transverse shaft revolving in suitable bearings and having feathered near its center a friction-disk k^2, the periphery of which contacts with the under face on the disk on the fan-shaft. When the shaft k' is revolved by the application of power to the band-pulleys k^3 on each end, the motion imparted to the disk k through frictional contact with the disk k^2 is increased or decreased as the point of contact is moved to or from the center of the disk k.

k^4 are flat springs attached at one end to a collar feathered on the shaft k' and at the other end to the disk k^2, said springs carrying balls k^5.

It will be seen that if the speed of the shaft k' increases from any cause the increased centrifugal force will cause the balls to stand off farther from the center of revolution, thereby drawing the disk k^2, and consequently its point of contact, farther from the center of the disk k, thereby diminishing the relative speed of the fan. The first adjustment of the disks k and k^2 is made by means of a transverse shaft k^6, provided with cranks at each end and screw-threaded for a portion of its length. A nut k^7 travels on this screw-threaded portion, said nut being provided with a forked arm k^8, embracing a groove encircling the collar on the shaft k'.

R is a bell-crank lever pivoted at r, one arm of which is bifurcated to embrace the fan-shaft and bear upon the upper surface of the friction-disk k. To the other arm of said lever is pivoted a rod r', passing through some fixed portion of the casing and provided with an adjusting-nut r^2. By operating the nut r^2 the contact between the friction-disks may be increased or diminished, as will be understood upon reference to Fig. 3.

S is the belt-tightener, consisting of a lever carrying at one end the band-wheel s, and at the other end pivotally connected with the rod s', said rod passing through bracket s^2, and provided at its lower end with the adjusting-nut s^3. A coil-spring s^4 encircles the rod between the bracket and the adjusting-nut and the slack in belt is taken up by the elasticity of spring. The system of belting is illustrated clearly in Fig. 1, and it needs no detailed description.

From the foregoing description of the mechanism only a brief statement of the operation of the machine will be necessary.

The material to be thrashed passes between the cylinder and concaves when the thrashing process begins. It is then seized by the fingers d^4 and carried back between the grate F and guards E.

Between the moving fingers and the stationary grate the straw is thoroughly agitated before being directed by the fingers g on shaft G to the tailer, where it is subjected to the action of the blades thereon which insures the removal of every particle of grain and passes the straw out of the tailer-spout.

The passage of the grain through the hopper and over slats M and screws O to the delivery-spout has been described already.

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

1. In a separator, the thrashing-cylinder, the traveling fingers, cam guides for controlling their movements, and a grate located below the fingers, combined with a revolving shaft provided with fingers, and located in the rear of the traveling fingers, the slotted guard located just behind said shaft, the slotted tailer, a revolving shaft extending through the tailer and provided with curved fingers, an endless carrier, located below the grating, and a fan, substantially as described.

2. In a separator, a fluted scouring cylinder extending across the rear end of the frame under the tailer, and an endless carrier, combined with a trough in which the scouring cylinder is placed and which is formed by a relief valve and self adjusting concave, substantially as set forth.

3. In a separator, the fluted scouring cylinder extending across the rear end of the frame under the tailer, combined with relief valve and self adjusting concave which form a trough for the cylinder, both valve and concave being provided with a regulating mechanism, substantially as specified.

4. In a separator, the fluted scouring cylinder extending across the rear end of the frame, a relief valve and self adjusting concave, which form a trough in which the cylinder is placed, and automatic adjusting devices attached to each valve and concave, combined with a fan, and wind trunks connected thereto, substantially as described.

5. In a separator, the fluted scouring cylinder, a relief valve and self adjusting concave which form a trough therefor, and adjusting

devices attached to the valve and concave, combined with a shaking screen placed below the trough, substantially as shown and described.

6. In a separator, the fluted scouring cylinder, a relief valve and self adjusting concave which form a trough for the cylinder, and adjusting devices applied to the valve and concave, combined with a fan, wind trunks connected with the fan, and the shaking screen, substantially as shown and described.

7. In a separator, the fluted scouring cylinder, a relief valve and self adjusting concave which form a trough therefor, and adjusting devices applied to the valve and concave, combined with a fan, wind trunks leading from the fan to points near the trough, and pivoted slats placed between the ends of the trunks, and the fluted scouring cylinder for controlling the suction of the fan, substantially as set forth.

8. In a separator, the fluted scouring cylinder, pivoted adjustable valve and concave which form a trough for the cylinder, and a shaking screen placed under the trough, combined with an endless carrier, a fan, wind trunks connected therewith and pivoted slats placed between the ends of the trunks and the trough, substantially as specified.

9. In a separator, a fan having an opening in the side of its casing so as to deliver a direct blast, and a suction opening through its top, combined with wind trunks which connect with the suction opening at one end, regulating slats located near the rear end of the trunk, the grooved scouring cylinder, adjustable valve and concave which form a trough for the cylinder, means for regulating the pressure of the valve and concave upon the cylinder, and a reciprocating screen located below the cylinder, substantially as shown.

10. In a separator the fan shaft having a disk at its lower end, a driving wheel for the fan provided with a friction wheel, combined with a governor connected with the said friction wheel and the screw threaded crank k^6 journaled in brackets on the main frame, and a connecting member k^8, one end of which is provided with a screw threaded aperture adapted to work on the said screw threaded rod, its other end having an eye fitted over the shaft carrying the friction disk and designed to bear against a collar thereon, substantially as shown and described.

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

PETER E. GOOD.

Witnesses:
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PHILIP SENEFF.