

(No Model.)

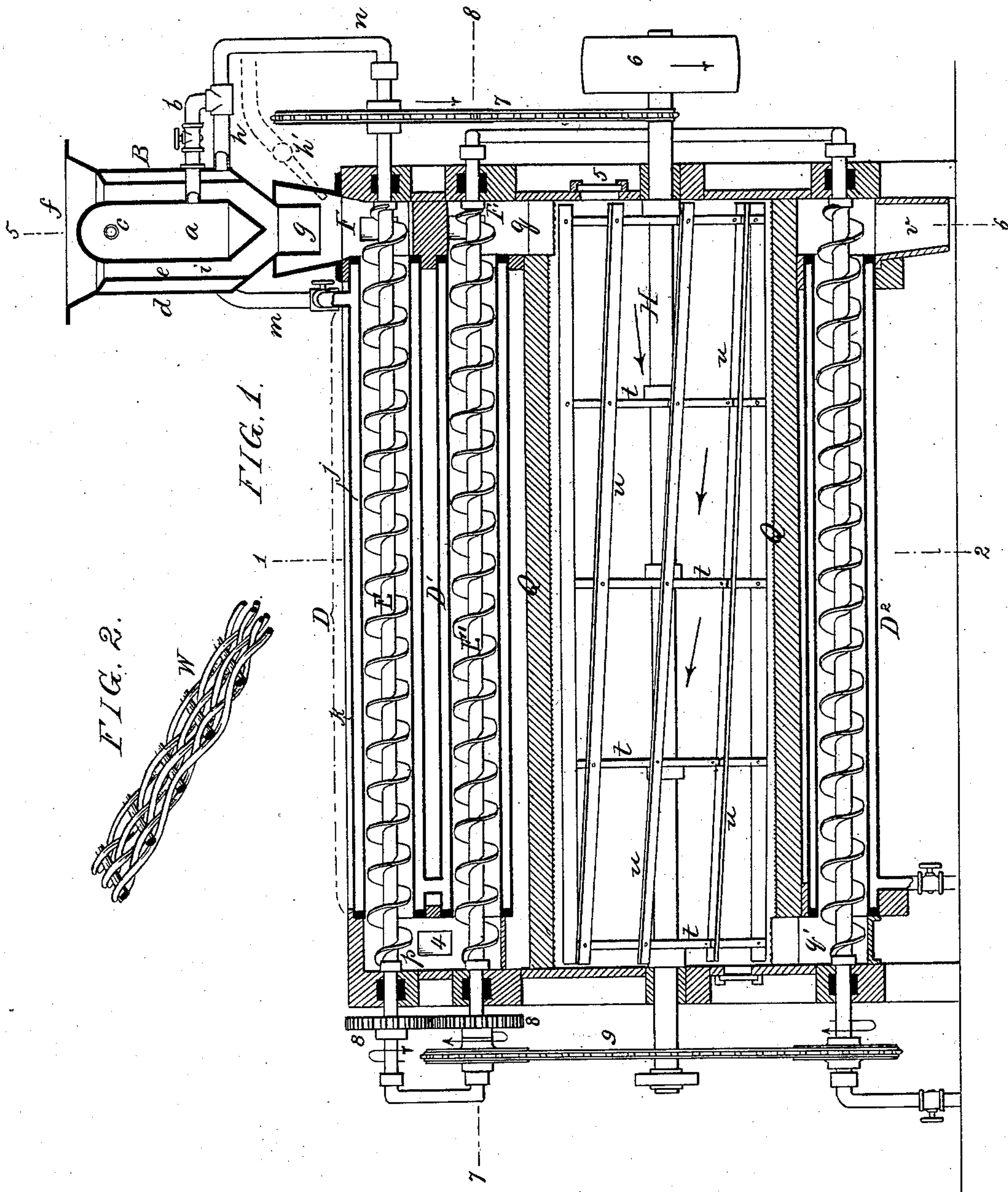
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W. L. TETER.

MODE OF AND MECHANISM FOR CLEANING GRAIN.

No. 286,744.

Patented Oct. 16, 1883.



WITNESSES:

Harry Drury  
Thomas H. Egan

INVENTOR:

William L. Teter  
by his attys.  
Howson and Co.

(No Model.)

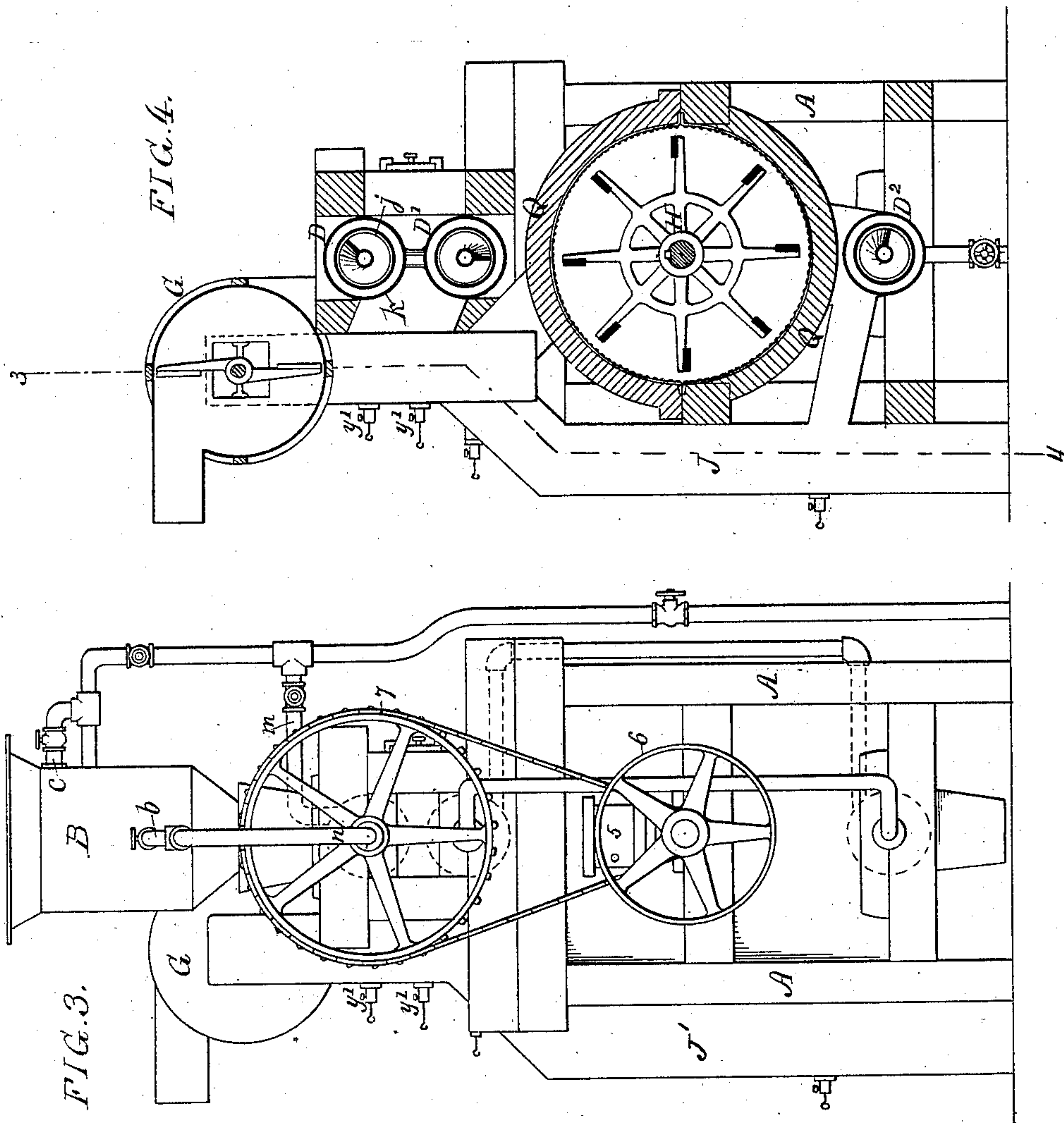
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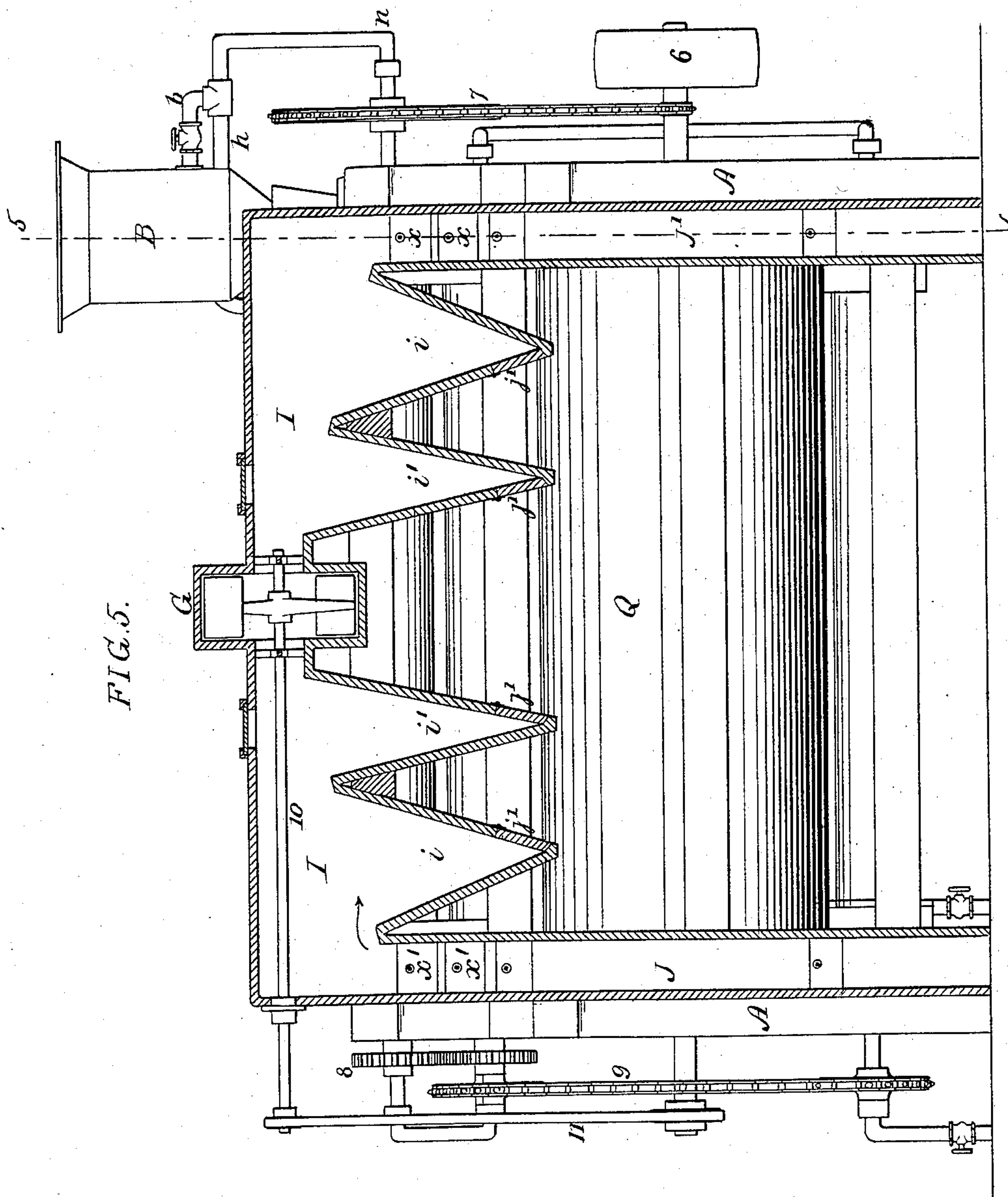
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## MODE OF AND MECHANISM FOR CLEANING GRAIN.

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WITNESSES:

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Thomas Hagan

*INVENTOR:*

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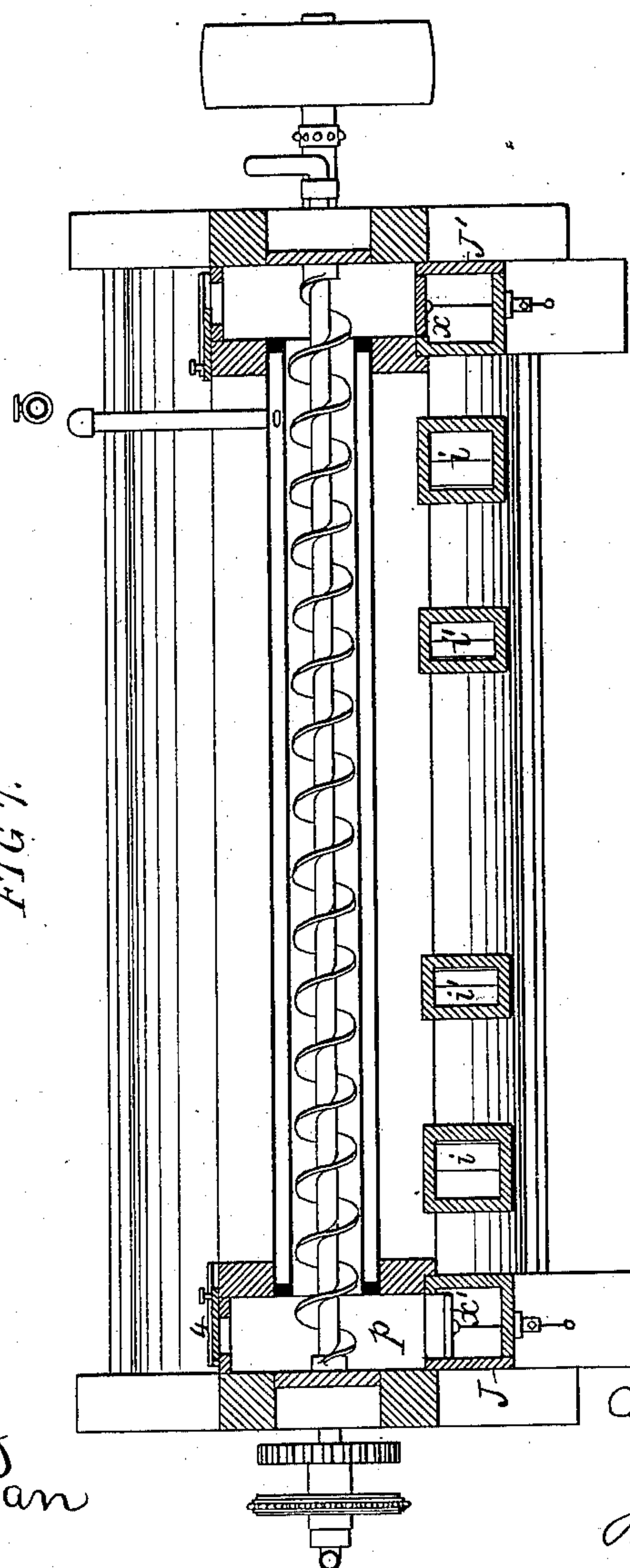
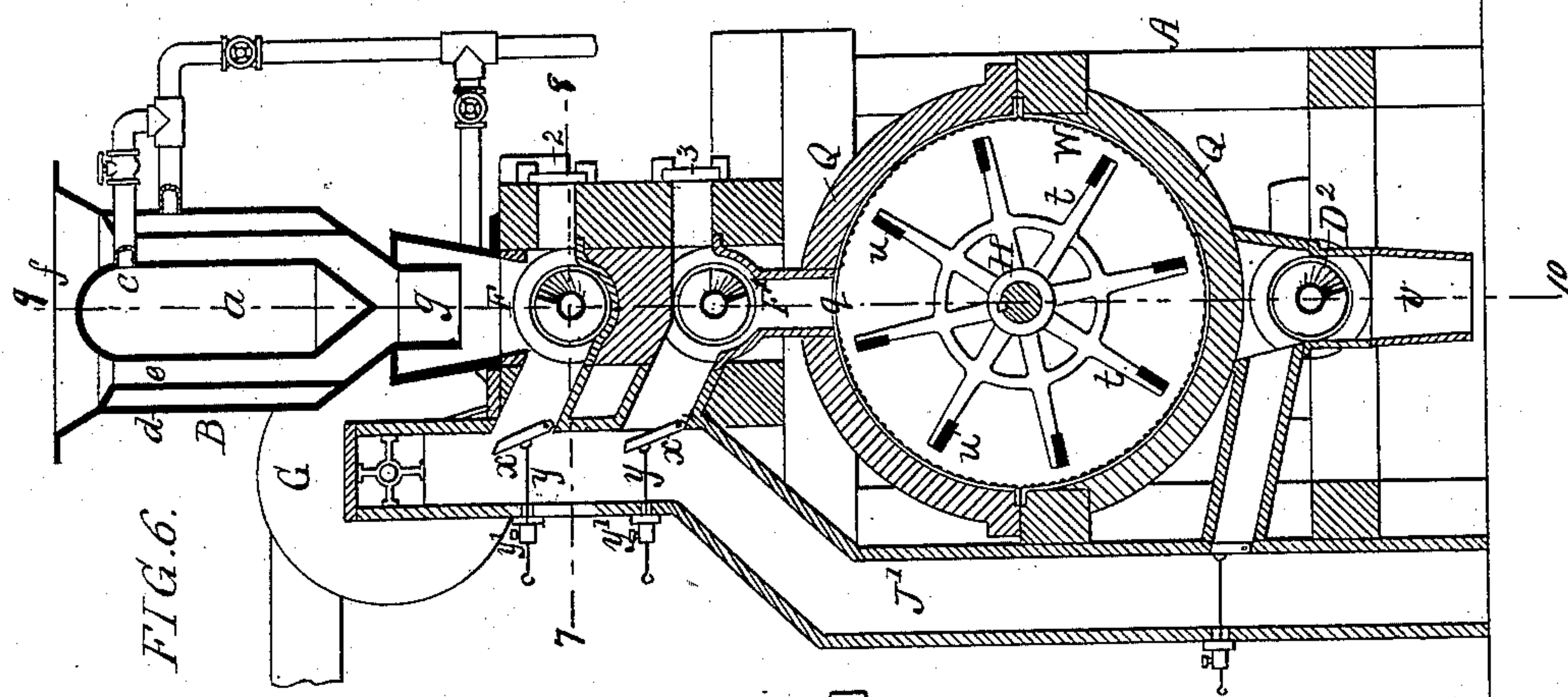
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WITNESSES:

Harry Drury  
Thomas Dugan

*INVENTOR:*

William L. Better  
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Horsman and Son



# UNITED STATES PATENT OFFICE.

WILLIAM L. TETER, OF PHILADELPHIA, PA., ASSIGNOR TO THE ECLIPSE  
IMPROVED WHEAT CLEANING MACHINE COMPANY, OF CAMDEN, N. J.

## MODE OF AND MECHANISM FOR CLEANING GRAIN.

SPECIFICATION forming part of Letters Patent No. 286,744, dated October 16, 1883.

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

*To all whom it may concern:*

Be it known that I, WILLIAM L. TETER, a citizen of the United States, and a resident of Philadelphia, Pennsylvania, have invented a certain Mode of and Mechanism for Cleaning Grain, of which the following is a specification.

My invention relates to mechanism for removing cuticles from the berries of grain; and the main feature of my invention consists in first subjecting grain to dry heat without moisture, and to air-currents during the application of dry heat, and finally to friction, scouring, or attrition, the object of this main feature of my invention being to remove from the grain, prior to its subjection to attrition, the superfluous moisture which has been drawn from the berries themselves to the surface by the application of dry heat.

Further features and objects of my invention will be described hereinafter.

In the accompanying drawings, Figure 1, Sheet 1, is a vertical section on the line 9 10, Fig. 6, of my improved machine for cleaning grain; Fig. 2, a perspective view drawn to an enlarged scale of the woven-wire lining of the beating-cylinder; Fig. 3, Sheet 2, an end view of the machine; Fig. 4, a transverse vertical section on the line 1 2, Fig. 1; Fig. 5, Sheet 3, a longitudinal vertical section on the line 3 4, Fig. 4; Fig. 6, a transverse section on the line 5 6, Fig. 1; and Fig. 7, a sectional plan on the line 7 8, Fig. 6.

The frame-work A of the machine need not be minutely described, as it admits of variations in construction without departing from the main features of my invention. Erected above the frame-work in any suitable manner is the preliminary heater B, best observed in the sectional view, Fig. 1, and consisting of a central casing, *a*, forming a steam-chamber, a casing, *e*, and jacket *d*, between which is an annular steam-chamber, a hopper, *f*, and an outlet-pipe, *g*. Steam is introduced to the central chamber through a pipe, *b*, and to the annular chamber through a pipe, *h*, and each chamber has an outlet, *c*, for the escape of the waste steam, which may be directed to any desired point through suitable pipes, both in-

let and outlet pipes being furnished with suitable valves or cocks. The grain introduced into the hopper *f* passes through the annular space between the central and outer steam-heated casings, and will thus receive its preliminary heat without moisture from both chambers.

In the upper part of the machine is a conveyer, consisting of a steam-heated trunk, D, preferably of a cylindrical form, and a shaft, E, passing through the trunk, and provided with the usual spiral conveying-flange. The trunk is composed of an inner casing, *j*, and outer casing or jacket, *k*, and into the space between these casings steam is introduced through a pipe, *m*, and escapes through a suitable outlet, both pipes being furnished with cocks. The trunk is fitted and secured to the frame of the machine, in which frame the shaft E has its bearings. While this shaft may be solid, I prefer to make it tubular, and to introduce steam into it through a pipe, *n*. The grain falls from the preliminary heater B into the receiving-chamber F, whence it is traversed by the screw-conveyer shaft E along the steam-jacketed trunk D, and derives additional dry heat from the latter as well as from the steam-heated shaft.

It should be here explained that the exhaust-pipe of a fan, G, or other exhausting mechanism communicates with the interior of the jacketed trunk D of the conveyer, so as to create a draft through the same, the object of this being to absorb the superfluous moisture emanating from the grain, as more fully explained hereinafter. A single conveyer may be used in the machine, provided it can be made long enough; but in order that the machine may be of moderate length, I use two of these steam-heated conveyers. More than this number may be employed, however; but I have found in practice that two conveyers will suffice. The second conveyer is immediately below the first, and is constructed in precisely the same manner, there being a jacketed steam-heated trunk, D', fitted and secured to the frame of the machine, and a shaft, E', with the usual spiral flange. A chamber, *p*, forms a communication between the two con-



veyer-trunks, so that the grain, after being traversed in one direction by the upper conveyer, is traversed in the opposite direction by the lower conveyer, and finally falls from the latter through an opening, *q*, into the interior of the beater-cylinder *Q*, the outer casing of which is preferably of wood, and extends nearly throughout the entire length of the frame, to which it is firmly secured, the said casing being lined with the closely-woven wire shown in Fig. 2. The beater consists, in the present instance, of a shaft, *H*, having suitable bearings in the frame-work of the machine, any desired number of arms or spiders, *t*, secured to the shaft, and a number of paddles, *u*, secured to the spiders, these paddles being inclined, as shown in Fig. 1, so that as they rotate they will have a tendency to direct the grain to the outlet *q'*. Before the grain is finally discharged from the machine, I prefer to direct it through the steam-heated trunk of a third conveyer, *D*<sup>2</sup>, which is precisely similar to those above, the grain finally escaping through a spout, *v*, in a condition ready for grinding. This final heating of the grain may in many cases be dispensed with; or the conveyer for this purpose may form part of a separate machine.

The main object of my invention, as before remarked, is the absorption of the superfluous moisture drawn by the application of dry heat to the surface of the grain, for if excessive moisture—that is, more than sufficient to loosen the cuticles—be permitted to remain on the grain, it is liable to become sodden and to remain in this condition after it leaves the machine. To obviate this I cause currents of air to pass through the conveyers, so that they may be properly ventilated and the superfluous moisture absorbed. It should be here explained that the spiral flange of a conveyer-shaft does not fit snugly in the interior of the trunk, but is clear of the same to the extent of from one-quarter to three-eighths of an inch. The grain traversed by the conveyer, moreover, does not usually extend as far as the conveyer-shaft; hence there is ample room within the conveyer-trunk for the passage through the same of currents of air. It is immaterial, so far as the main feature of my invention is concerned, how these currents of air are caused, whether by blasts directed from a blower through the conveyer or by an exhaust-fan; but as the latter is required for disposing of the loosened cuticles, I avail myself of this exhaust-fan to create the desired draft through the conveyer in the manner which I will now proceed to describe. The openings in the opposite sides of the exhaust-fan *G* communicate with the main exhaust-trunk *I*, and the latter with the vertical trunks *J* and *J'*, one near each end of the machine, as best observed in Fig. 5, so that there must be a constant tendency of any air admitted to these trunks to pass in the direction of the arrows to the exhaust-fan.

On reference to Figs. 1 and 6, it will be seen

that the trunk of the upper conveyer, *D*, terminates at one end in a chamber, *F*, the trunk of the lower conveyer terminating in a chamber, *F'*. At the opposite end of the machine both conveyer-shafts terminate in a chamber, *p*, which, as before remarked, forms a communication between the trunks of the two conveyers. Air can be admitted to the chamber *F*, Fig. 6, or excluded therefrom, by the adjustment of a sliding door, 2, and air can be admitted to or excluded from the chamber *F'* by the adjustment of a door, 3, and each of these chambers has an outlet communicating with the exhaust-trunk *J'*, each outlet being provided with a hinged valve or door, *x*, to which is connected a rod, *y*, passing through the exhaust-trunk, and provided with an adjustable collar, *y'*, by which the valve may be retained in any position to which it may be adjusted. Air may also be admitted to or excluded from the chamber *p* at the opposite end of the machine by the adjustment of a door, 4, and by opening one of the valves *x'*, similar to those above described, the said chamber *p* can be made to communicate with the trunk *J*. If there is no lower conveyer, *D*<sup>2</sup>, the grain may pass from the cylinder *Q* directly through the outlet *q'*, which communicates with the exhaust-trunk *J*, so that, air being admitted through a doorway, 5, there will be a constant current of air through the cylinder in the direction of the arrows, and the loosened cuticles of grain will pass through the trunk *J*, and thence to the exhaust-fan; but if the conveyer *D*<sup>2</sup> be used both grain and cuticles will be traversed through the conveyer-trunk, the grain passing off through the outlet *v* and the cuticles being exhausted through the trunk *J'*. If the doors 2 and 3, Fig. 6, be opened, the valves *x x* of the chambers *F F'* closed, the door 4 closed, and the valves *x' x'* of the chamber *p* opened, currents of fresh air must necessarily pass through both conveyers, and the force of these currents may be diminished by closing the valves *x' x'* of the chamber *p*. As before remarked, however, I do not restrict myself to this specific plan of causing currents of air to pass through the trunks. The beater-shaft *H* is rotated by a belt passing round a pulley, 6, the upper conveyer-shaft by a chain, 7, passing round a wheel on the shaft *H* and round a wheel on the said conveyer-shaft, which is geared by wheels 8 to the conveyer-shaft below, the lowest conveyer-shaft being driven by a chain, 9, from the shaft of the conveyer *D'*, and the shaft of the exhaust-fan being driven by a belt, 11, from the beater-shaft *H*. Referring to the cylinder *Q* and its wire-gauze lining *W*, a portion of which is shown in Fig. 2, it will be observed that it is composed of round wire woven closely, and that it presents a series of curved ribs, which have a scouring effect on the grain thrown violently against it by the paddles of the beater, the cuticles being thereby removed from the grain without cutting the latter or the cuti-



cles. This lining is secured directly to the inside of the cylinder, for it should be understood that the spaces between the wires are not sufficiently large for the passage either of the cuticles or the grain, and that the woven wire is used for attrition or scouring purposes only. It may be remarked here that the conveyers should be horizontal, or nearly so, so that the layer of grain traversed through the trunk may be nearly uniform in thickness and uniformly subjected to the action of the air-currents, the grain being more or less agitated or turned over by the action of the spiral flanges of the conveyer-shaft. The angular receptacles *i* and *i'*, communicating with the main exhaust-trunk, are for receiving particles of such gravity as cannot be disposed of by the exhaust-fan, the heaviest of these particles, which generally consist of light grains, falling into the receptacles *i*, while the lighter particles fall into the receptacles *i'*, and each of the receptacles having an outlet provided with a light hinged door, *j'*, which is maintained in a closed condition by the exhaust-fan until the particles have accumulated to such an extent that their weight will open the door, when they will be at once discharged into suitable trunks and directed by the latter to any desired points, the door closing as soon as the

contents of the receptacles have been disposed of.

So far as the main feature of my invention is concerned, other well-known attrition devices may be substituted for the beater and beater-cylinder Q.

I claim as my invention—

1. The mode herein described of treating grain, the said mode consisting in first subjecting the grain to dry heat without moisture, and to air-currents during the application of the dry heat, and then subjecting it to friction, scouring, or attrition to remove the cuticles, substantially as set forth.

2. The combination, in a machine for treating grain, of the following elements, namely: a horizontal or nearly horizontal steam-heated conveyer or conveyers, mechanism for causing currents of air to pass through the same, and a device for subjecting the grain traversed through the conveyer or conveyers to friction, attrition, or scouring, substantially as set forth.

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

WILLIAM L. TETER.

Witnesses:

THOMAS DUGAN,  
HARRY SMITH.