

No. 630,892.

Patented Aug. 15, 1899.

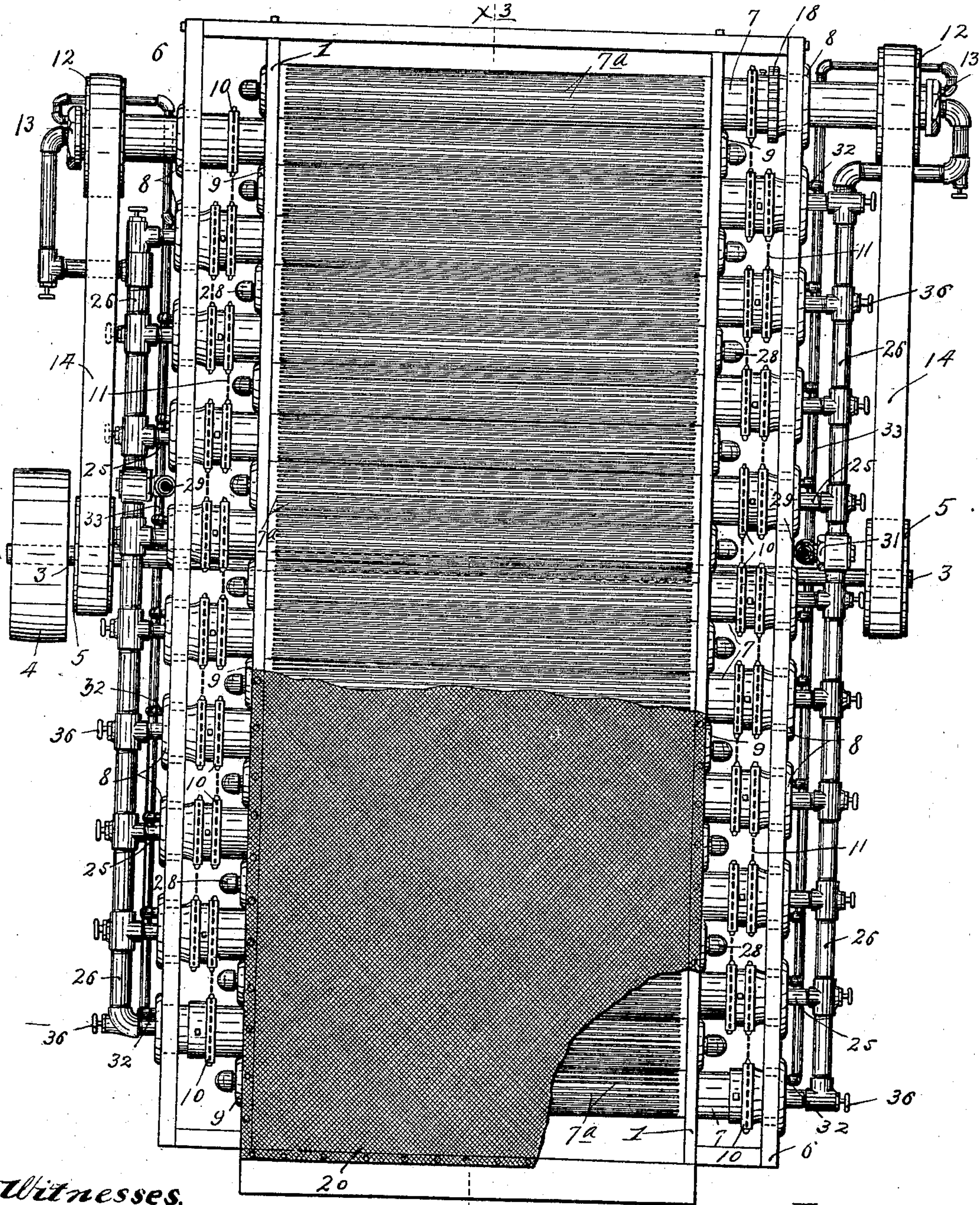
A. JOHNSON.
WHEAT DRIER.

(Application filed Aug. 16, 1897.)

(No Model.)

4 Sheets—Sheet 1.

Fig. 1.



Witnesses,

C. F. Kilgore

R. D. Merchant.

Inventor.

Alfred Johnson
By his Attorney.

Jas. F. Williamson

No. 630,892.

Patented Aug. 15, 1899.

A. JOHNSON.
WHEAT DRIER.

(Application filed Aug. 16, 1897.)

(No Model.)

4 Sheets—Sheet 2.

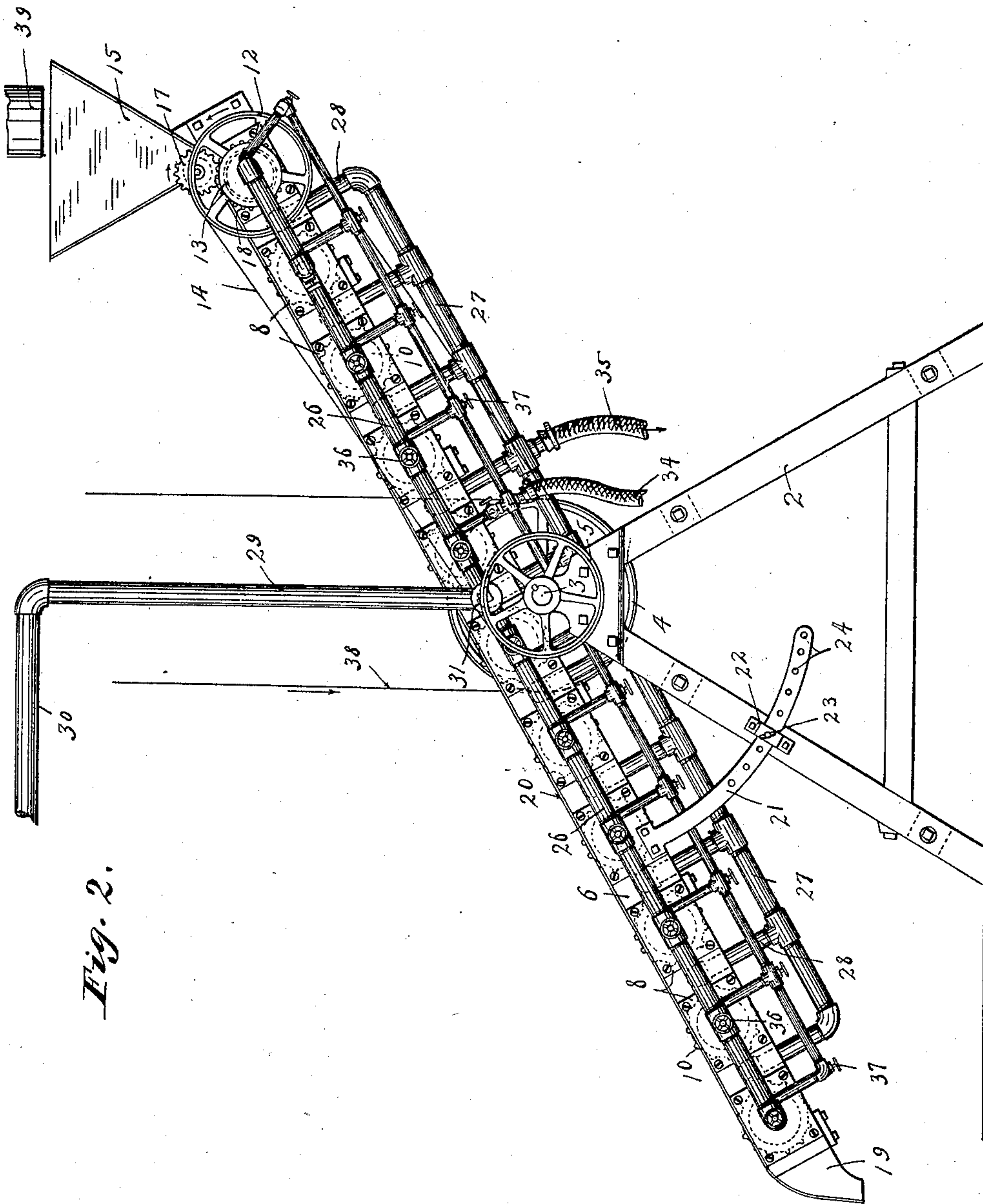


Fig. 2.

Witnesses,

C. F. Kilgore

A. D. Merchant

Inventor:

Alfred Johnson,

By his Attorney,

Jas. F. Williams

No. 630,892.

Patented Aug. 15, 1899.

A. JOHNSON.
WHEAT DRIER.

(Application filed Aug. 16, 1897.)

(No Model.)

4 Sheets—Sheet 3.

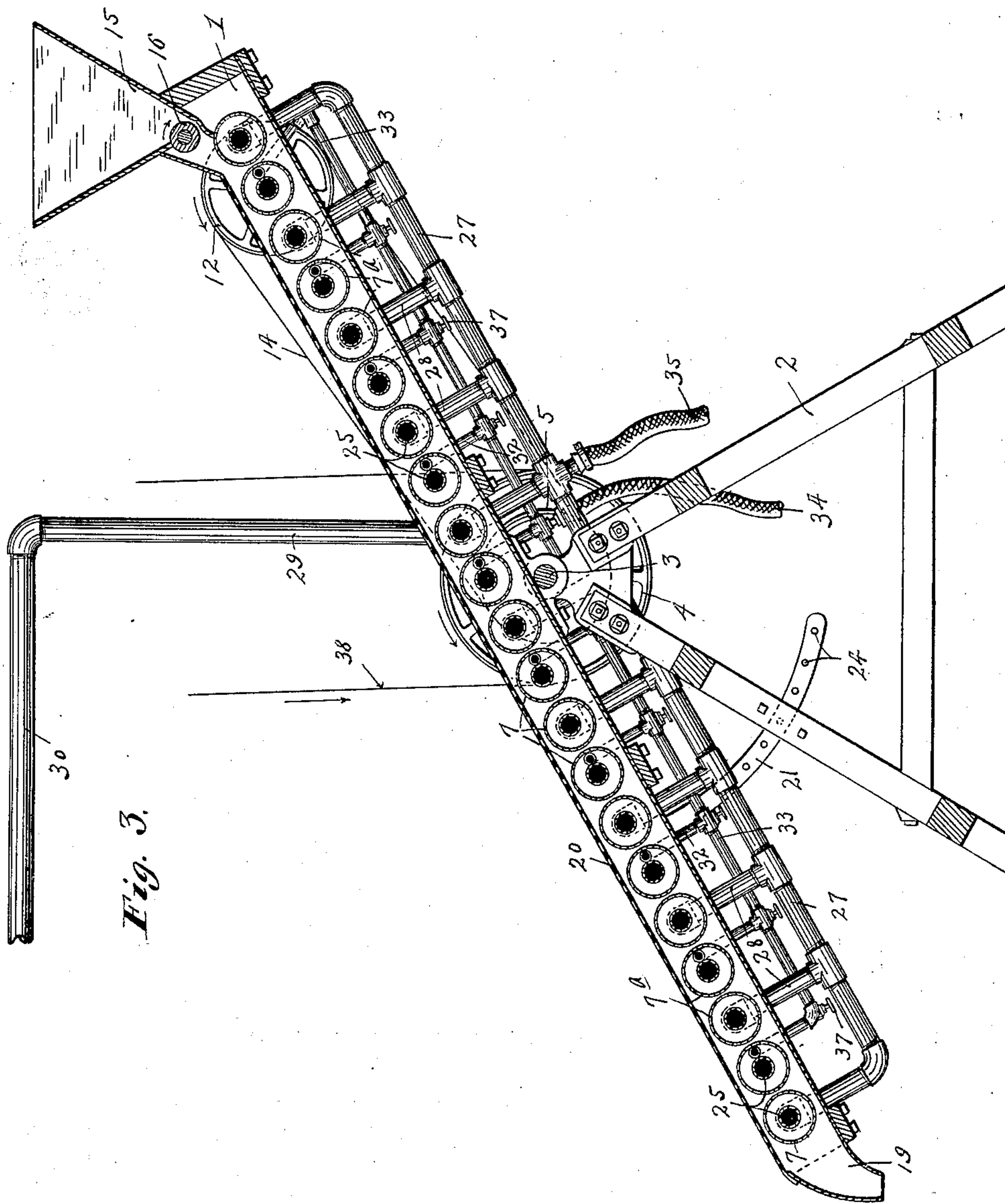


Fig. 3.

Witnesses.

C. F. Kilgore

D. S. Merchant

Inventor.

Alfred Johnson.
By his Attorney.

Jas. F. Williamson

No. 630,892.

Patented Aug. 15, 1899.

A. JOHNSON.
WHEAT DRIER.

(Application filed Aug. 16, 1897.)

(No Model.)

Fig. 4.

4 Sheets—Sheet 4.

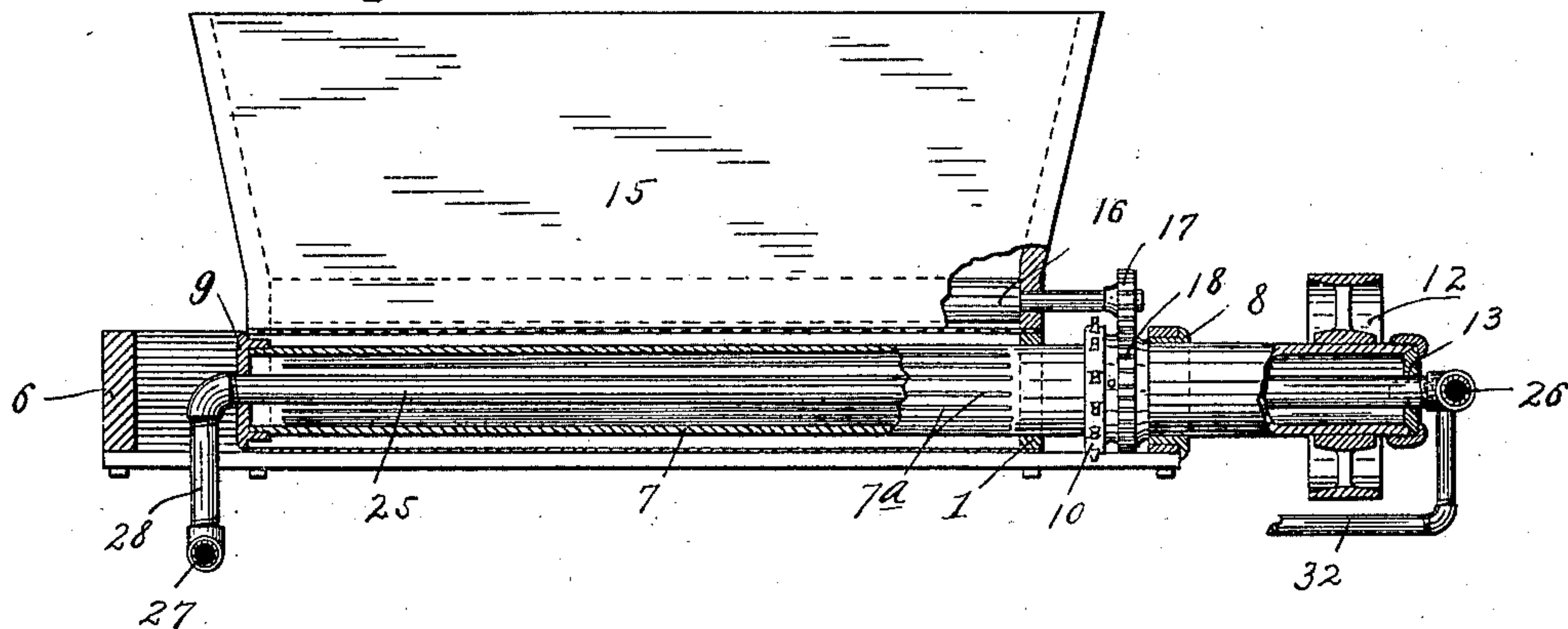


Fig. 5.

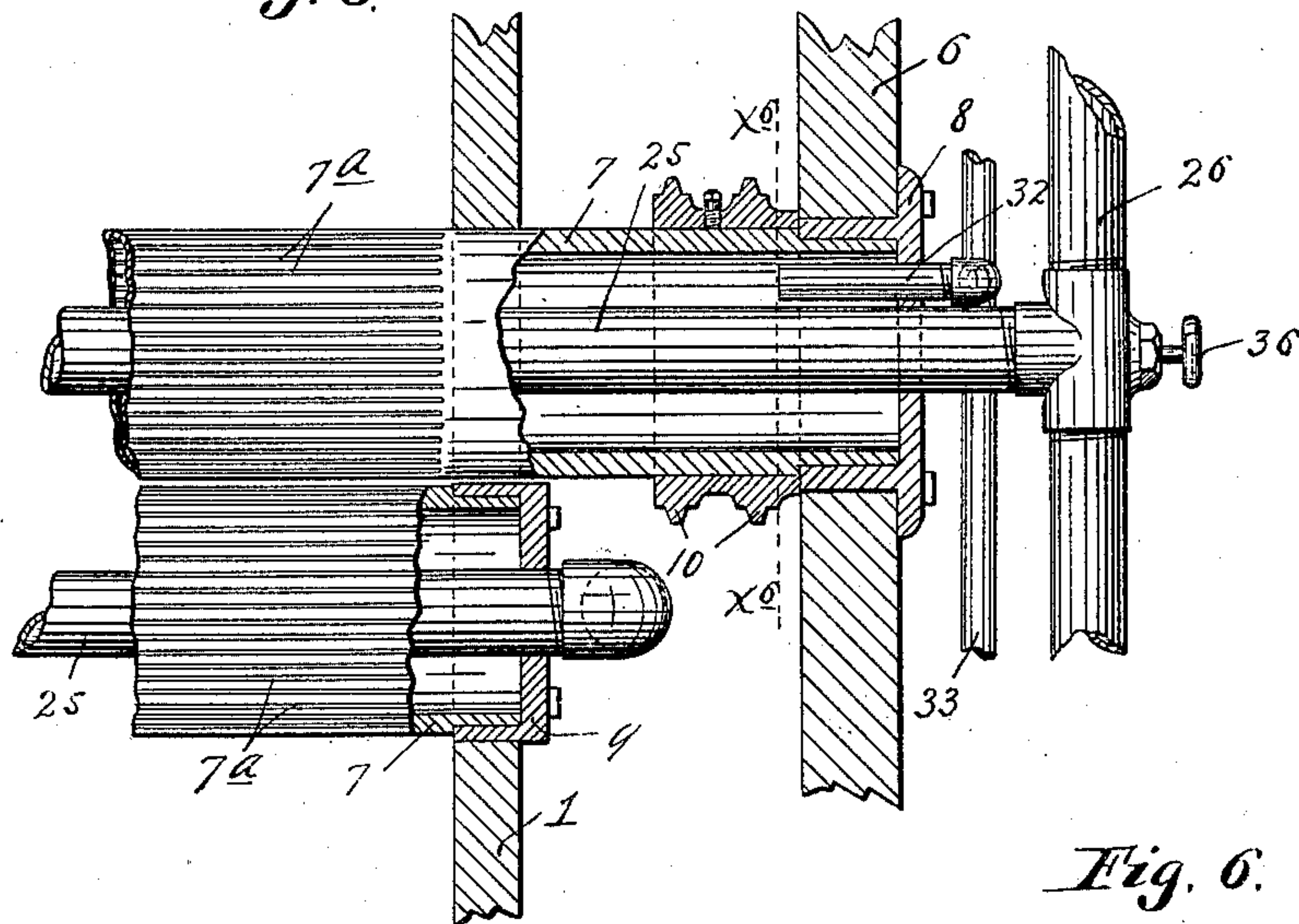
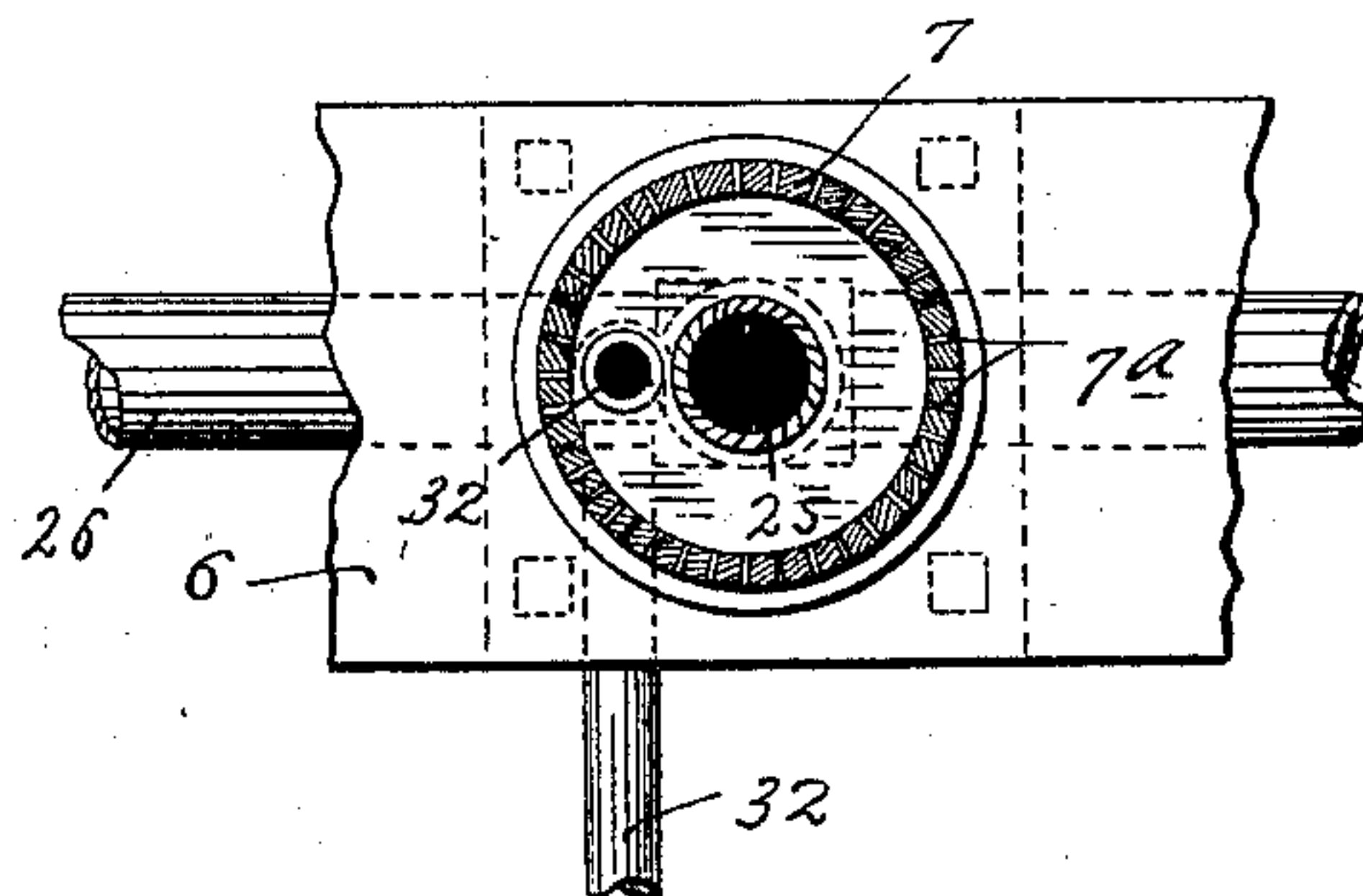


Fig. 6.



Witnesses.

C. F. Kellogg

A. D. Merchant

Inventor.

Alfred Johnson.

By his Attorney.

Jas. F. Williamson

UNITED STATES PATENT OFFICE.

ALFRED JOHNSON, OF MINNEAPOLIS, MINNESOTA.

WHEAT-DRIER.

SPECIFICATION forming part of Letters Patent No. 630,892, dated August 15, 1899.

Application filed August 16, 1897. Serial No. 648,351. (No model.)

To all whom it may concern:

Be it known that I, ALFRED JOHNSON, a citizen of the United States, residing at Minneapolis, in the county of Hennepin and State of Minnesota, have invented certain new and useful Improvements in Wheat-Driers; and I do hereby 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.

My invention has for its object to provide an improved wheat-drier; and to this end it consists of the novel devices and combinations of devices hereinafter described, and defined in the claims.

Broadly stated, my invention involves a series of drying-rollers which are mounted in close proximity to each other, so as to form a table or apron over which the wheat or material to be dried is fed in a thin sheet or stream. Preferably these drying-rollers are perforated or formed with peripheral openings and are provided with pipe connections, which serve to convey the drying medium—to wit, either steam or air, or both—thereto; also, said rollers are in the preferred form of my device carried by a framework which is mounted so that it may be tilted or adjusted to different angles or inclines to effect variations in the speed of travel of the wheat or material to be dried.

The preferred form of my invention is illustrated in the accompanying drawings, wherein like characters indicate like parts throughout the several views.

Figure 1 is a plan view of the device with some parts of the same broken away. Fig. 2 is a side elevation of the said device. Fig. 3 is a longitudinal vertical section taken on the line $x^3 x^3$ of Fig. 1. Fig. 4 is a detail view of the feed-hopper and upper end of the table or apron, said parts being shown partly in rear end elevation and partly in vertical transverse section. Fig. 5 is a detail view showing the ends of a pair of the driving-rollers and their mountings, said parts being shown partly in plan and partly in horizontal section; and Fig. 6 is a vertical section taken approximately on the line $x^6 x^6$ of Fig. 5.

1 indicates a broad trough-like support,

which is pivotally mounted at its intermediate portion to the upper portions of a pair of trusses or frames 2 by means of a transversely-extended shaft 3. This shaft 3, it will be later noted, serves as a driving-shaft for transmitting motion to the drying-rollers, and for this purpose is provided at one end with a pulley 4 and at each end with other pulleys 5. By reference particularly to Figs. 1 and 5 it will be noted that the trough or support 1 is provided with side beams 6, which extend parallel to its sides proper, but are spaced apart outward therefrom.

The drying-rollers 7, which in my preferred construction are hollow and are provided with longitudinally-extended slits 7^a, cut through their peripheries, are loosely mounted in the side walls and timbers 6 of the frame. In order to bring the working faces of the rollers 7 close together and at the same time leave the same with projecting ends, to which the driving devices may be applied, I so mount the said rollers that the ends of adjacent members will project at the opposite sides of the trough or support. The projecting ends of said rollers 7 are loosely journaled in cap-plates 8, fixed to the side timbers 6, while the short ends of said rollers are in a similar manner loosely mounted in caps 9, fixed to the side walls proper of the trough 1. The projecting ends of the rollers 7 are provided with sprocket-wheels 10, which are connected up in zigzag order by short sprocket-chains 11. In this manner the said drying-rollers 7 are all connected for rotary movement in a common direction.

The projecting ends of the upper members or pair of rollers 7 project farther out than the other members and are provided each with a pulley 12, and their extended ends instead of being closed by a cap 8, as in the case of the other rollers, are closed by fixed caps or plugs 13, which are held as herein after described. Belts 14, which work over the coöperating pairs of pulleys 5 and 12, serve to transmit motion from the driving-shaft 3 to the upper pair of driving members of the drying-rollers 7.

The wheat, or other material to be dried, is delivered to the head or receiving end of the table or apron formed by the drying-rollers and the frame, through a hopper 15 secured

to the frame 1 and provided in its bottom, preferably, with a feed-roller 16. The shaft of this roller 16 projects and is provided with a pinion 17, which is in mesh with the spur-gear 18, carried by the uppermost drying-roller 7. This positively-driven feed-roller 16 serves to give a graduated forced feed and to deliver the wheat to the drying-rollers in a thin wide sheet.

At its lower or delivery end the trough-like frame 1 is shown as provided with a wide discharge section or spout 19, and preferably the top of said trough 1 is covered by a sheet of wire screen or similar material 20.

The frame or table is adapted to be held in whatever position it is set by means of a segmental strap 21, which is secured to said frame at one end, works through a keeper 22 on one of the trusses 2, and is locked by a pin 23, which works through said keeper and engages one of a series of perforations 24 in said strap 21.

Steam-pipes 25 extend axially through each drying-roller 7. At their receiving ends these steam-pipes 25 are in communication with longitudinally-extended steam-pipes 26, one on each side of the machine, and at their exhaust or short ends they are in communication with a common exhaust-pipe 27 through branch pipes 28. The steam-pipes 26 are each connected to a branch 29 of a steam-supply pipe 30 by means of swiveled joints or connections 31, which are located but a short distance from the pivotal center of the table or frame 1. Hence the slight rise and fall of the pipe-sections 29 caused by the pivotal movement of the table or frame 1 are readily permitted by the spring of the pipe-section 30.

Air-blast pipes or sections 32 open into each drying-roller 7 through the fixed caps 8. The said pipe-sections 32, which are on the same side of the machine, are connected to a common pipe 33. As shown, flexible pipe or hose sections 34 are connected one to each pipe 33. These hose-sections 34 are connected to some suitable source of air-supply, such as a fan or air-pump. 35 indicates a flexible pipe or hose section which extends from the drip-pipe 27 to some suitable point of exhaust. Preferably I provide valves 36, which are constructed so that they will cut off or open up the axial pipe-sections 25 without interfering with the passage through the pipe-section 26. In a similar manner I also preferably provide valves 37, which are arranged to open up or cut off the air-pipe branches or sections 32 without interfering with the passage through the sections 33. In Figs. 2 and 3, 38 indicates a driving-belt which runs over the pulley 4 on the shaft 3 to impart motion to the same, and 39 indicates the end of a supply-spout which delivers the wheat or other material to be dried to the hopper 15.

This drier, while capable of a more general use, was especially designed to meet the requirements which are demanded in the proper treatment or drying of wheat. As is well un-

derstood by all persons familiar with this subject, wheat in the process of proper preparation for grinding is first washed to clean the same and by this step is necessarily made too moist for grinding, and hence must be again dried. In this drying action the wheat must not be too highly heated, for if overheated its outside hull will be damaged. Furthermore, the wheat after leaving the washer must be very quickly dried in order to prevent the moisture from penetrating too deeply into the grain. These requirements are thoroughly performed in my improved drier. The grain or wheat is positively fed by the drying-rollers in a thin sheet or stream, and the particles which make up the stream are continually turned or rolled over as the grain is fed onward by a series of short cascades or waves produced by the undulating upper surfaces of the drying-rollers.

The air, which is introduced into the rollers through the pipe-sections 32, is heated by the steam-pipe sections 25 and is forced outward through the slits 7^a, and it is thus caused to thoroughly permeate or mix with the grain or wheat which is being fed over the drying-rollers. By the proper manipulation of the valves 36 and 37 the supply of steam and air may be so regulated as to properly temper the grain. It is of course evident that if the steam is shut off and the air alone turned onto any particular roller or rollers the cool air driven through the grain will reduce the temperature of the same, but will nevertheless continue the drying action thereof. By giving the frame or table more or less pitch or incline the flow of the grain over the rollers may be accelerated or retarded, as may be desired.

The longitudinal slits 7^a, cut through the peripheries of the drying-rollers 7, give the said rollers corrugated surfaces, so that they will more readily carry the wheat. The said slits should of course be so narrow that the grains of wheat cannot drop therethrough.

It will of course be understood that the specific details of construction above described may be varied in many respects and that many of the same may be entirely omitted without departing from the broad principles involved in my said invention.

It will of course be understood and it is obvious from the foregoing description that the drier above described is perfectly adapted for use in drying various materials—such, for example, as tobacco and other leafy material.

What I claim, and desire to secure by Letters Patent of the United States, is as follows:

1. A drier, involving a series of hollow rollers mounted to form a table or apron, over which the material to be dried is fed, and pipe connections leading to said rollers, for conveying the drying medium—steam or air—to said rollers, substantially as described.

2. A drier, involving a series of hollow rollers mounted to form a table or apron over

which the material to be dried is fed and provided with peripheral perforations or passages, through which the drying medium may pass and pipe connections leading to said rollers for conveying the drying medium to said rollers, substantially as described.

3. A drier involving a series of hollow rollers provided with peripheral perforations or passages, non-rotary caps closing the ends of said rollers, and two classes of pipes leading to said rollers and opening through said caps, one pipe being closed therefrom and serving to convey steam and the other pipe being open and conveying air, substantially as described.

4. A drier, involving a series of hollow rollers, provided with peripheral perforations or passages, and imperforate steam-pipes passing through said rollers, substantially as described.

5. A drier, involving a series of hollow rollers, provided with peripheral perforations or passages, imperforate steam-pipe branches passing through said rollers and connected up in a series, valves in each branch, air-pipe branches opening into said rollers and connected in a series, and valves in said latter branches, substantially as described.

6. In a drier of the class described, the combination with a tilting or pivoted frame, of a series of drying-rollers mounted in said frame and constituting a table or apron over which the material to be dried is passed, substantially as described.

7. In a drier of the class described, the combination with a tilting frame, of a series of drying-rollers, mounted in said frame and constituting a table or apron over which the

material to be dried is fed, a hopper at the upper end of said table or apron, a forced feed in the bottom of said hopper, and means for driving said drying-rollers in a common direction, substantially as described.

8. In a drier of the class described, the combination with a tilting frame, of the series of hollow drying-rollers with peripheral passages, mounted in said frame and constituting a table or apron over which the material to be dried is fed, and pipe connections leading to said rollers, for conveying the drying medium—steam or air—thereto, substantially as described.

9. An apparatus for treating grain, tobacco, &c., comprising a series of perforated cylinders or hollow rollers, rotatively mounted, and adapted to receive, support and carry a stratum of grain or tobacco, which passes thereover, means for rotating said cylinders or rollers, and means for forcing currents of air through said cylinders or rollers, substantially as described.

10. An apparatus for treating grain, tobacco, &c., comprising a series of perforated cylinders, rotatably mounted and adapted to receive, support and carry a stratum of grain or tobacco, which passes thereover, means for rotating said cylinders, air-chambers in communication with said cylinders, and means for forcing air or steam into said cylinders, through said air-chambers.

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

ALFRED JOHNSON.

Witnesses:

ALFRED ARON,
F. D. MERCHANT.