

No. 744,429.

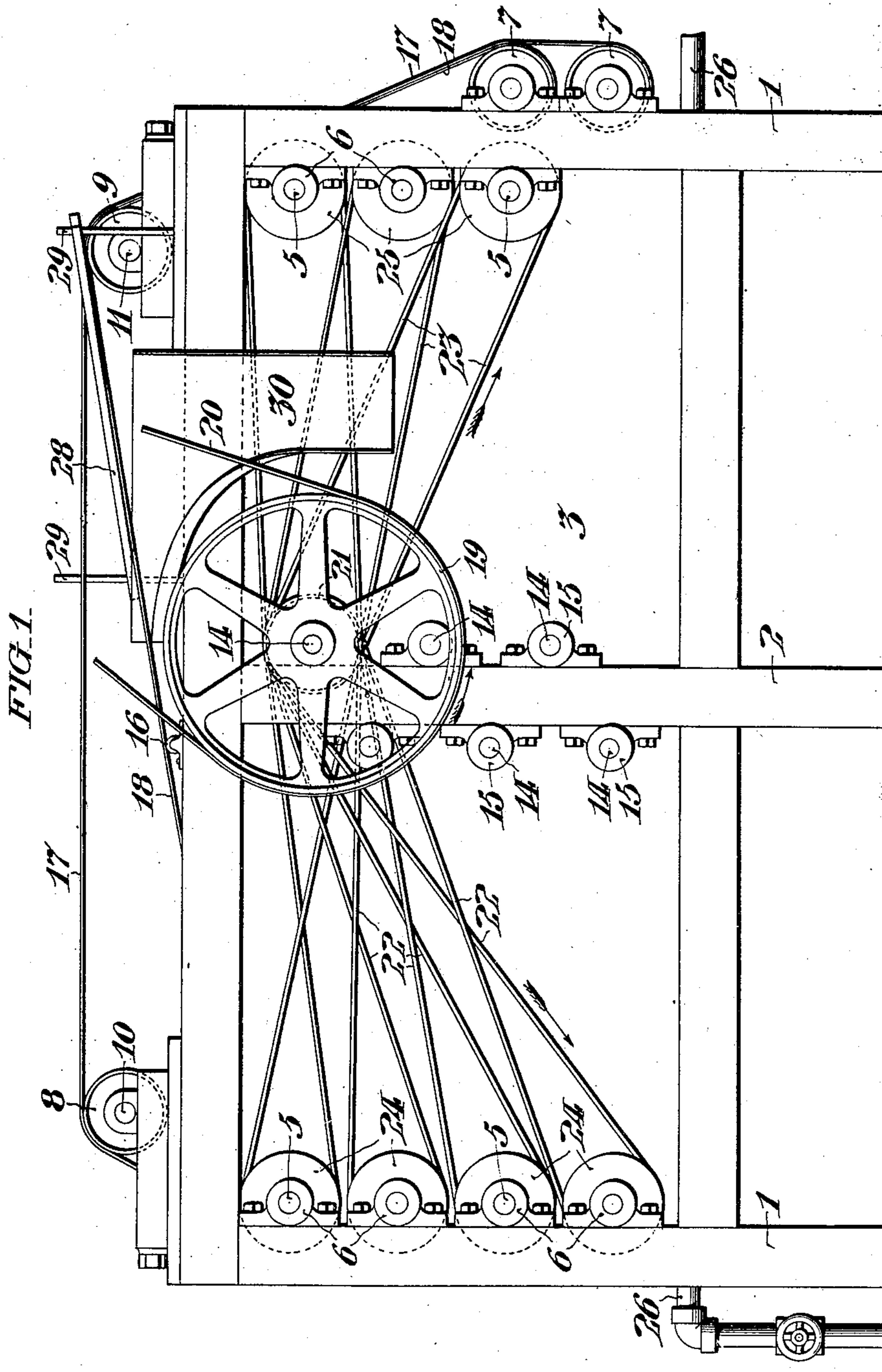
PATENTED NOV. 17, 1903.

W. STRAW.  
DRYING APPARATUS.

APPLICATION FILED MAY 2, 1903.

NO MODEL.

3 SHEETS—SHEET 1.



WITNESSES:

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Theodore Lancaster

INVENTOR:

Wilfred Straw  
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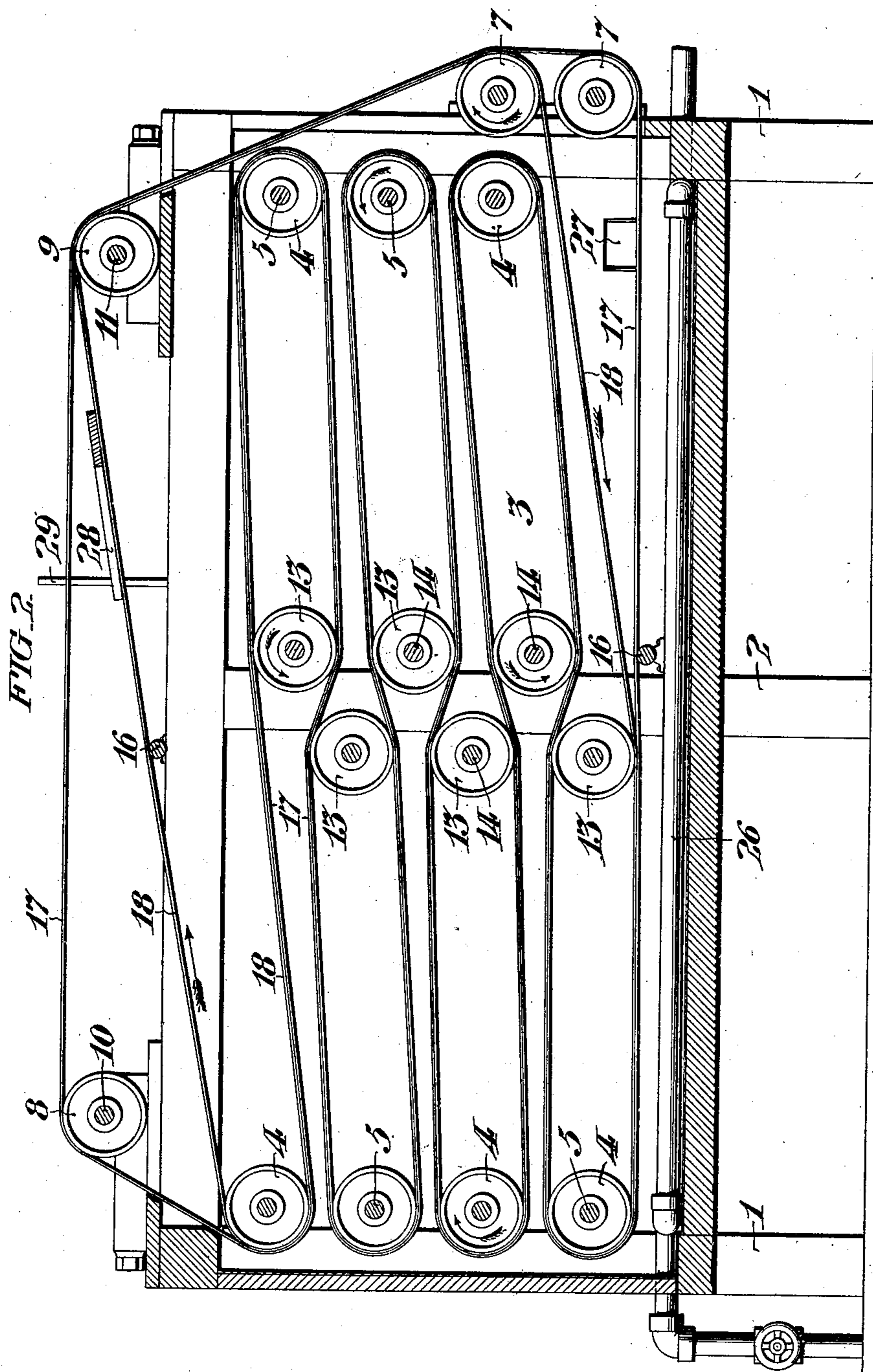
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3 SHEETS--SHEET 2.



WITNESSES:

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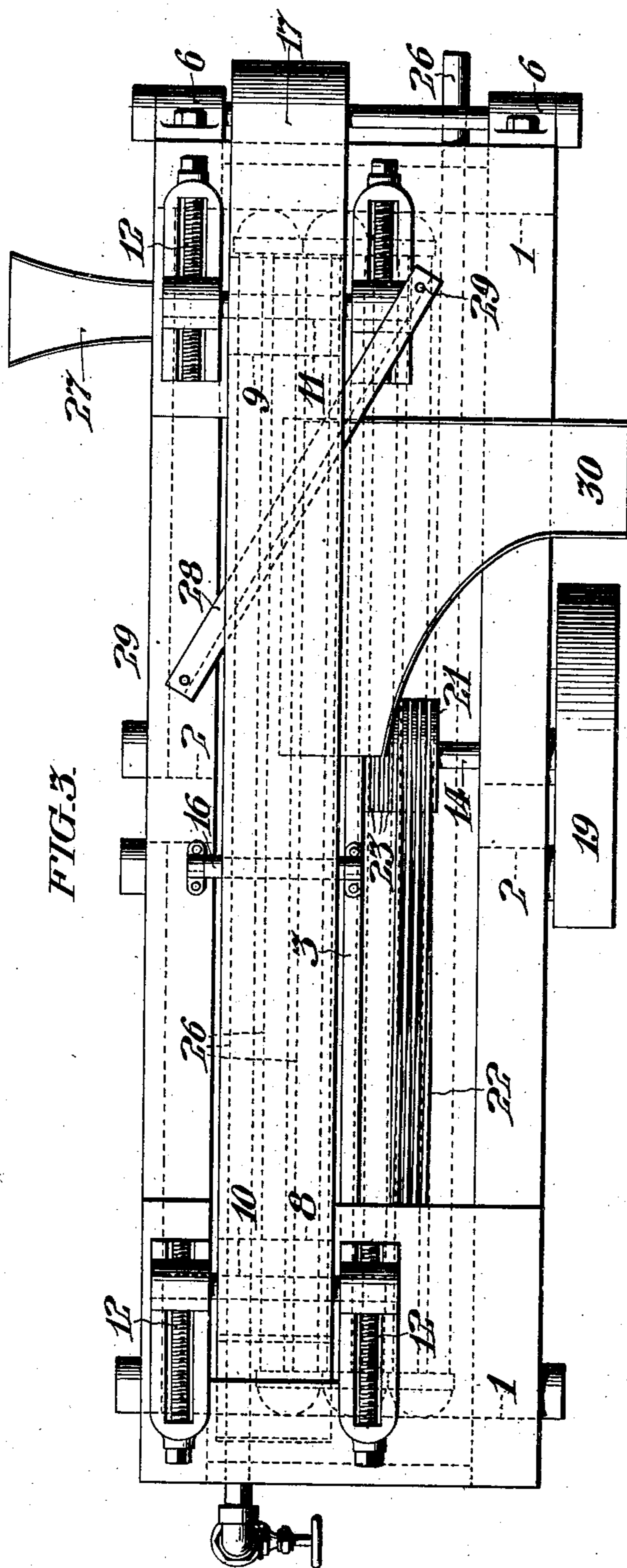
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NO MODEL.

3 SHEETS—SHEET 3.



WITNESSES:

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# UNITED STATES PATENT OFFICE.

WILFRED STRAW, OF PHILADELPHIA, PENNSYLVANIA, ASSIGNOR TO  
THE DE LONG HOOK AND EYE COMPANY, OF PHILADELPHIA, PENN-  
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## DRYING APPARATUS.

**SPECIFICATION** forming part of Letters Patent No. 744,429, dated November 17, 1903.

Application filed May 2, 1903. Serial No. 155,273. (No model.)

*To all whom it may concern:*

Be it known that I, WILFRED STRAW, a citizen of the United States, residing at Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented certain new and useful Improvements in Drying Apparatus, of which the following is a specification.

This invention relates to improvements in drying apparatus and the specific purpose of the apparatus is to dry card packages of hooks and eyes, but, as will be understood, it may be used for the purpose of drying other objects and still be within the scope of my invention.

In the manufacture of hook and eye card packages, the hooks and eyes are first sewed upon a card, after which a strip of paper or other suitable material is pasted upon the back of the card over the stitches formed in the operation of securing the hooks and eyes to the card.

After this has been done, it is necessary to subject the hook and eye packages to a drying process, and the packages should be held or retained in a perfectly flat condition during the time they are being dried.

The object of the present invention is to provide suitable means for drying the hook and eye card packages, and at the same time retain them or hold them in a flattened condition. A convenient form of mechanism for this purpose is described herein and illustrated in the accompanying drawings, forming a part of this specification, and in which,

Figure 1 is a side elevation,

Figure 2 a longitudinal vertical sectional elevation, and

Figure 3 a top plan view of the mechanism employed.

In the drawings,

1 designates supporting standards located at opposite ends of the apparatus, and 2 designates central supporting standards. Upon the said standards a boxing or casing 3 is secured.

Located at opposite ends of the apparatus, and within the boxing or casing 3, are rollers

4 mounted upon shafts 5, rotatably supported in bearings 6.

As depicted in the drawings, the bearings 6 are secured directly to the supporting standards 1. It is to be understood, however, that these rollers may be supported in any suitable and convenient manner directly upon the sides of the boxing or casing 3.

Located upon the outside of the boxing or casing 3, and supported in a manner similar to the rollers 4, are two rollers 7, the upper one of which is in the same horizontal plane as the lowest one of the rollers 4, located at the same end of the boxing or casing 3, while the lower one of the rollers 7 is located below the last-mentioned series of rollers 4 and in the same plane as the lowest roller of the series located at the opposite end of the boxing or casing.

Secured upon the top of the boxing or casing, and within the transverse central vertical planes of the two series of rollers 4, are rollers 8 and 9, the latter rollers being adjustably mounted for a purpose to be hereinafter explained.

As illustrated, the shafts 10 and 11 of the rollers 8 and 9 are mounted in bearings having screw-threaded connection with a horizontally arranged screw-threaded rod 12 adapted to be rotated, and the rotation of which causes a bodily movement of the shaft bearings, as the said rod is held against longitudinal movement.

It is obvious that any other suitable mechanism may be employed for adjusting the rollers 8 and 9.

Centrally located with respect to the apparatus, and with respect to the boxing or casing and the end supporting standards, are guiding and supporting rollers 13 arranged in alternate staggered relation upon opposite sides, respectively, of the centrally disposed supporting standards 2.

As illustrated, the shafts 14 upon which the said rollers are mounted are supported in bearings 15 which are secured to the central standards 2, but it is to be understood that the said shafts may be supported di-

rectly upon the sides of the boxing or casing 3.

16 designates small guide rollers located at the bottom and at the top, respectively, of the boxing or casing 3.

Supported upon the rollers 4, 7, 8, 9 and 13, are conveyer belts 17 and 18, the former of which is designated herein as the outer conveyer belt, and the latter as the inner conveyer belt. The main portions of the conveyer belts are located and travel within the boxing or casing 3, as shown in drawings.

In the operation of the apparatus, it will be found that the belts stretch and become too loose for satisfactory use; or it may happen that one of the belts (either the inner one or the outer one) may stretch more and therefore become looser than the other. To overcome this difficulty and maintain the belts in proper tension, the adjustable rollers 8 and 9 are provided.

It is obvious that if the roller 8 is moved toward the right in Figure 2 of the drawings, the tension of the outer belt 17 would be decreased; or, if on the other hand, the said roller were moved toward the left, the tension of the said belt would be increased.

Referring to the other side of the apparatus, it will be seen upon inspection of Figure 2 of the drawings, that if the roller 9 were moved to the left, the tension of each of the belts would be decreased.

If the roller 8 were moved at the same time to the left a corresponding distance, the outer belt would remain at the same tension while the tension of the inner belt would be decreased.

Upon adjusting the said roller 9 toward the right in Figure 2, the tension of each of the belts is increased. If at the same time the roller 8 be adjusted toward the right, in the said figure, a corresponding distance, the tension of the outer conveyer belt 17 would remain the same.

As a means for causing the travel of the conveyer belts, I have provided the driving band wheel 19, which is mounted upon one end of the shaft, upon which the upper one of the centrally located rollers 13 upon the right hand side of the centrally disposed supporting standards 2 is supported.

It is obvious, however, that this driving band wheel may be otherwise supported and in different relation to the other elements of the apparatus.

The said driving wheel is driven by means of a band 20 having connection with suitable power mechanism not shown. Also mounted upon the same shaft as the band wheel is an elongated driving pulley 21, provided with a series of grooves adapted to receive the loops of driving cords 22 and 23, which extend in opposite directions to pulleys 24 and 25, mounted upon the shafts upon which the two series of rollers 4 are mounted. The band wheel, driving cords, and conveyer belts travel

in the direction indicated by the arrows in Figures 1 and 2 of the drawings.

To increase the temperature of the region within the boxing or casing 3, for the purpose of quickly drying the card packages, I have provided the pipes 26 located in the bottom of the said boxing or casing and through which a heated fluid is passed. It will, of course, be understood, that these pipes may be heated by the use of hot water or steam; or that any other suitable means may be employed for this purpose.

It will be observed that the outer and inner conveyer belts are separated from each other near the bottom of the boxing or casing as indicated in Figure 2 of the drawings.

It is at this point that the card packages of hooks and eyes are delivered upon the top of the outer conveyer belt from a delivery chute 27. The cards are carried from this point between belts back and forth through the boxing or casing until they reach the upper portion of the boxing or casing, where the belts are again separated as indicated in Figure 2 of the drawings. The card packages at this point are supported upon the upper side of the inner conveyer belt and carried along until they are knocked off the said belt by means of the knock-off strip 28, which is arranged diagonally across the belt. The weight of the said strip is supported by the said belt and the strip is capable of vertical movement, being guided in its vertical movements by the vertical rods 29 with which it loosely engages. While permitting vertical movement of the strip, the rods 29 prevent the strip from moving laterally, that is to say, in the direction of travel of the conveyer belts. As the cards are removed from the belt by the knock-off device 28, they fall into a discharge chute 30 which directs the cards into a suitable receiving receptacle not shown.

After the strips of paper or other suitable material have been pasted upon the backs of the cards by a suitable mechanism, not shown, and which forms no part of this invention, they are delivered to the delivery chute 27, and from this chute are directed upon the upper side of the outer belt near the bottom of the apparatus, as clearly shown in Figure 2 of the drawings, as above stated; and, as has been already indicated, the cards travel back and forth between the inner and outer belts within the heated region of the boxing or casing 3, until they reach the knock-off device 28, where they are removed from the belts and directed into the discharge chute 30.

Having thus described my invention, I claim—

1. In a drying apparatus, in combination, an endless conveyer, and a knock-off strip supported by the said conveyer, substantially as described.

2. In a drying apparatus, in combination, an endless conveyer, a knock-off strip supported by the said conveyer, and means for

preventing lateral movement of said strip, substantially as described.

3. In a drying apparatus, in combination, an endless conveyer, a knock-off strip supported by the said conveyer, and means for increasing the temperature of the region through which the conveyer travels.

4. In a drying apparatus, in combination, an endless conveyer, vertical rods located on opposite sides of said conveyer, a knock-off strip supported upon and extending across the said conveyer, and the said strip being in engagement with said rods.

5. In a drying apparatus, in combination, an endless conveyer, vertical rods located on opposite sides of said conveyer, a knock-off strip supported by and extending across the said conveyer, the said strip loosely and movably engaging the said rods.

6. In a drying apparatus, in combination, an endless conveyer, vertical rods located on opposite sides of said conveyer, a knock-off strip supported by and extending across the said conveyer, the said strip being in engagement with the said rods, and means for increasing the temperature of the region through which the conveyer travels.

7. In a drying apparatus for card packages of hooks and eyes, in combination, an endless conveyer belt, a second endless conveyer belt traveling in contact with the first named belt and adapted to hold a card package in flattened condition, and a device supported by one of the said belts, and adapted to remove said card package therefrom, substantially as described.

8. In a drying apparatus, in combination, an endless conveyer belt, a second endless conveyer belt traveling in contact with the first named belt, and a vertically movable device located in contact with one of the said belts, substantially as described.

9. In a drying apparatus, for card packages of hooks and eyes, in combination, an endless conveyer belt, a second endless conveyer belt traveling in contact with the first named belt, and a knock-off strip extending across and being supported by one of said belts, substantially as described.

10. In a drying apparatus, in combination, an endless conveyer belt, a second endless conveyer belt traveling in contact with the first named belt, and a knock-off strip extending diagonally across and being supported by one of the said belts, substantially as described.

11. In a drying apparatus for card packages of hooks and eyes, in combination, an endless conveyer belt, a second endless conveyer belt traveling in contact with the first named belt and adapted to hold a card package in flattened condition, a knock-off device supported by one of said belts and adapted to occasion the removal of the card package therefrom, and means for increasing the temperature of the region through which the conveyer belts travel.

12. In a drying apparatus for card packages of hooks and eyes, in combination, an endless conveyer belt, a second endless conveyer belt traveling in contact with the first named belt and adapted to hold a card package in flattened condition, vertical rods located on opposite sides of the conveyer belts, and a vertically movable knock-off strip in engagement with said rods and extending across the said conveyer belts to occasion the removal of the said card package therefrom.

13. In a drying apparatus for card packages of hooks and eyes, in combination, endless conveyer belts, a delivery chute adapted to deliver a card package between said belts, a discharge chute adapted to receive said package from said conveyer belts, and a knock-off strip extending across said belts to direct the said package from the conveyer belts to the said discharge chute, substantially as described.

14. In a drying apparatus for card packages of hooks and eyes, in combination, endless conveyer belts, a delivery chute adapted to deliver a card package between said belts, a discharge chute, and means for removing cards from the said belts and guiding them into the said discharge chute, substantially as described.

15. In a drying apparatus for card packages of hooks and eyes, in combination, endless conveyer belts, a delivery chute adapted to deliver a card package between said belts, a discharge chute, and means for removing cards laterally from the said belts and guiding them into the said discharge chute, substantially as described.

16. In a drying apparatus for card packages of hooks and eyes, an endless conveyer belt, a second endless conveyer belt, means at opposite ends of the apparatus for supporting the belts, means for separating the said belts near the bottom of the apparatus so that packages may be placed upon one belt and beneath the other, means for separating the belts near the top of the apparatus to permit the removal of the packages from the belts, and means intermediate the opposite ends of the apparatus for causing the intermediate portions of the belts to travel in contact, substantially as described.

17. In a drying apparatus for card packages of hooks and eyes, an endless conveyer belt, a second endless conveyer belt, means for separating the said belts near the bottom of the apparatus so that packages may be placed upon one belt and beneath the other, means for separating the belts near the top of the apparatus, a knock-off device extending between said belts for removing the said packages from the belts, and means for causing the intermediate portion of the belts to travel in contact, substantially as described.

18. In a drying apparatus, a supporting frame, a casing secured to said supporting frame, rollers mounted at the opposite ends of said frame, two sets of intermediate roll-

ers which are supported in staggered relation, conveyer belts supported upon said rollers and traveling in contact through the said casing.

5 19. In a drying apparatus, a supporting frame, a casing secured to said supporting frame, rollers mounted at the opposite ends of said frame, conveyer belts supported upon said rollers, additional rollers located inter-  
10 mediate the first named rollers, and each of said additional rollers being adapted to guide and hold each of the said conveyer belts in such a position that they travel in contact.

15 20. In a drying apparatus, a supporting frame, a casing secured to said supporting frame, rollers mounted at the opposite ends of said frame, conveyer belts supported upon said rollers, additional rollers located inter-  
20 mediate the first named rollers, the said additional rollers being arranged in alternate staggered relation, and adapted to guide and hold the conveyer belts in contact, and also to maintain portions of the belts upon oppo-  
25 site sides thereof in different planes.

25 21. In a drying apparatus, a main frame or support, a series of rollers located at opposite ends of said frame, a couple of rollers located outside the central vertical plane of said rollers, and mainly below one series thereof, a  
30 roller located at each end of the casing above and within the respective central vertical planes of said series of rollers, and endless conveyer belts supported and guided upon said rollers.

35 22. A main frame or support, a series of rollers located at the opposite ends of said frame, a couple of rollers located outside the central vertical plane and mainly below one series of said rollers, a roller located at each  
40 end of the said casing above and within the respective central vertical planes of said series of rollers, an additional series of rollers located intermediate the first named series of rollers, and endless conveyer belts supported  
45 and guided upon the said rollers, substantially as described.

23. In a drying apparatus, a supporting frame, a series of rollers located at opposite ends of said frame, a couple of rollers located  
50 outside the central vertical plane and mainly below one series of said rollers, a roller located at each end of said frame above and within the respective central vertical planes of said series of rollers, an additional series  
55 of rollers located intermediate the first named series and arranged in alternate staggered relation, an endless conveyer belt supported and guided upon said rollers, substantially as described.

60 24. In a drying apparatus, a supporting frame, a series of rollers located at opposite ends of said frame, a couple of rollers located

outside the central vertical plane and mainly below one series of said rollers, a roller lo-  
cated at each end of said frame above and within the respective central vertical planes  
65 of said series of rollers, an additional series of rollers located intermediate the first named series and arranged in alternate staggered relation, an endless conveyer belt supported  
70 and guided upon said rollers, the said belts having the portions thereof located upon the opposite sides of the staggered rollers arranged in different planes, substantially as described.

75 25. In a drying apparatus, a main frame or support, shafts or axles supported at the opposite ends of said frame, rollers and pulleys mounted upon said shafts, a driving band wheel intermediate the said rollers and pul-  
80 leys, an elongated pulley mounted upon the axle or shaft of said band wheel, and driving cords extending in opposite directions from the said pulley to the first named pulleys, for the purpose of causing the travel of conveyer  
85 belts about the said rollers, substantially as described.

26. In a drying apparatus, a series of verti-  
cally arranged rollers located at opposite ends of the said apparatus, a couple of rollers lo-  
90 cated outside the plane of one series of said rollers, one of which couple of rollers is located in the same horizontal plane as the lower roller of the adjacent series of rollers, the other roller of the couple being located in the  
95 same horizontal plane as the lowermost roller of the series of rollers at the opposite end of said apparatus, substantially as described.

27. In a drying apparatus, a series of verti-  
cally arranged rollers located at opposite ends  
100 of said apparatus, two series of vertically arranged rollers arranged in staggered relation intermediate the said first named series of rollers, a couple of rollers located outside the central vertical plane of one set of the first  
105 named series of rollers, an adjustable roller located at each end of the drying apparatus above and within the central vertical planes of the first named series of rollers, and conveyer belts supported and guided upon the  
110 said rollers, substantially as described.

28. In a drying apparatus, in combination, an endless conveyer and a knock-off strip in contact with said conveyer and adapted to move freely in a plane transverse to the di-  
115 rection of travel of the said conveyer, substantially as described.

In testimony that I claim the foregoing as my invention I have hereunto signed my name this 30th day of April, A. D. 1903.

WILFRED STRAW.

Witnesses:

THOS. K. LANCASTER,  
LAURA KLEINFELDER.