

903,776.

A. C. RICE.
DRIER FOR PAPER.

APPLICATION FILED MAR. 21, 1907.

Patented Nov. 10, 1908.

5 SHEETS—SHEET 1.

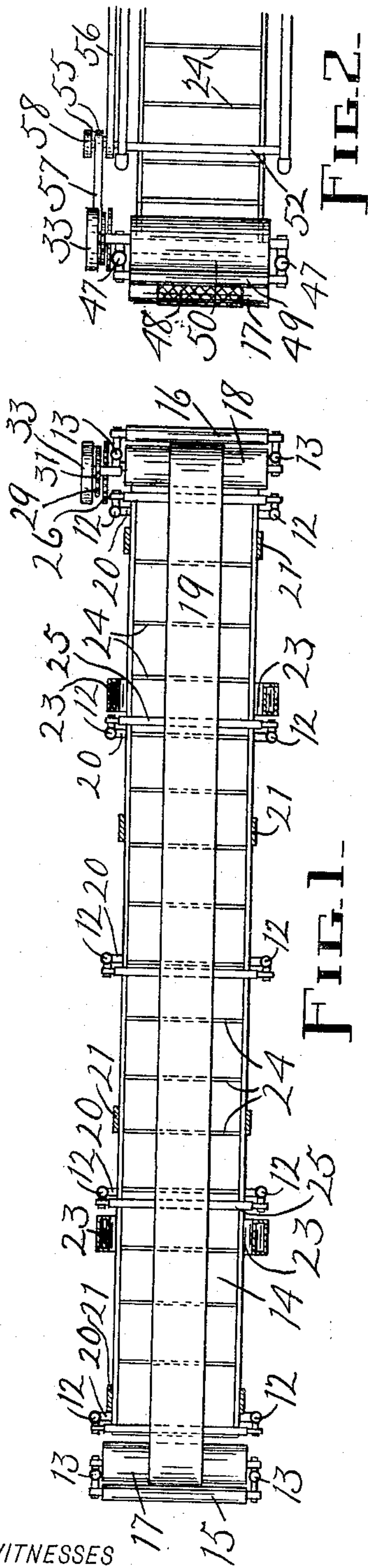


FIG. 1.

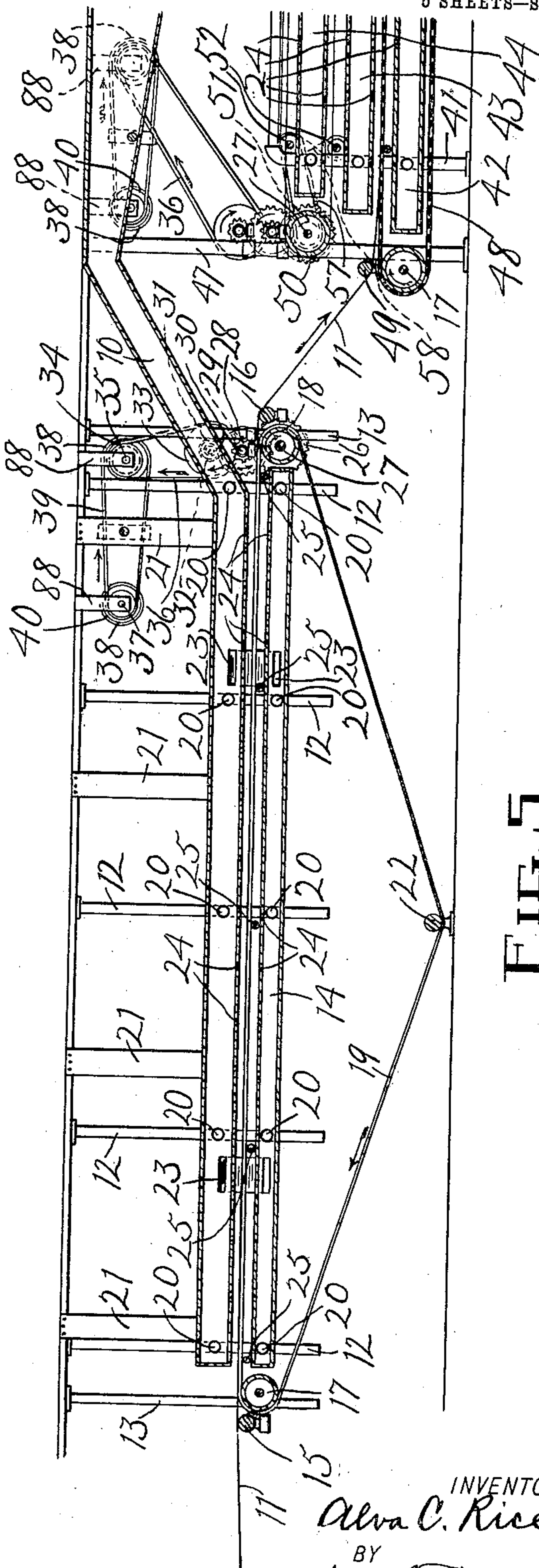


FIG. 2.

FIG. 5.

WITNESSES

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6 SHEETS—SHEET 3.

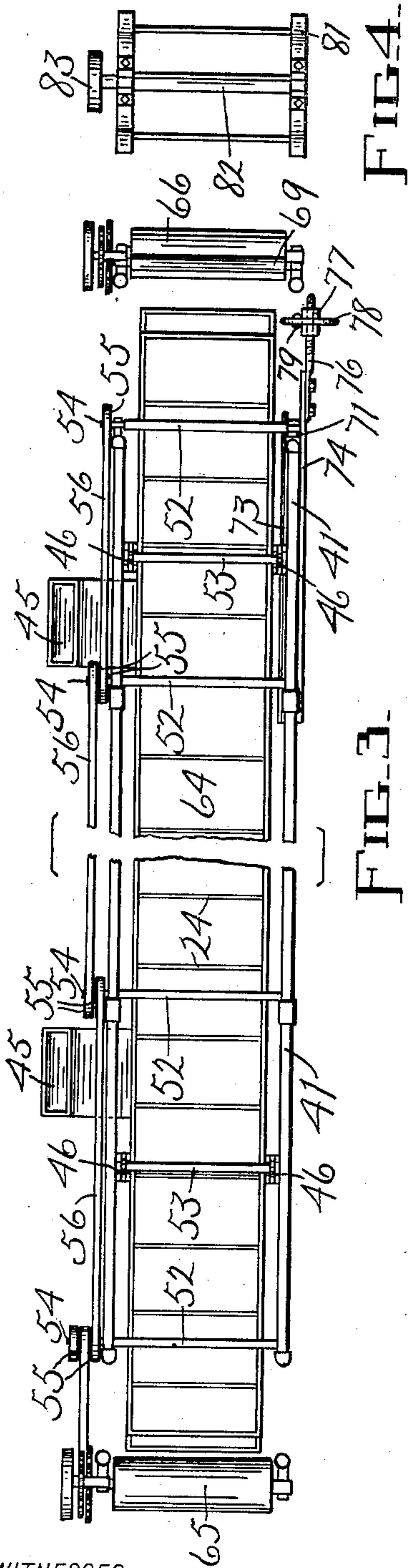


FIG. 3.

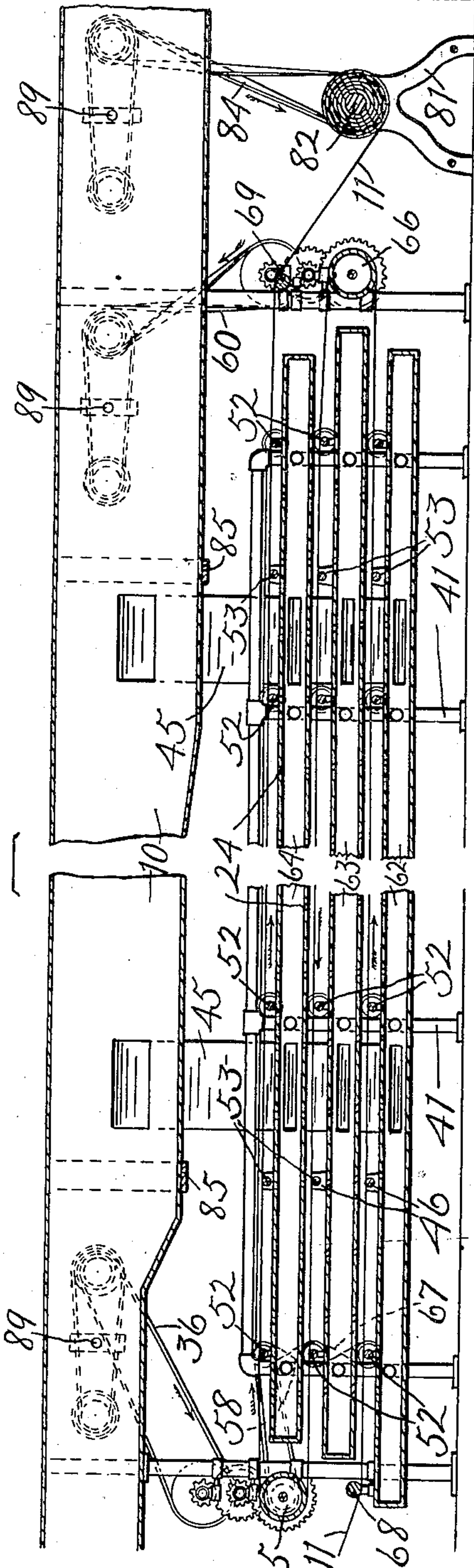


FIG. 5b

WITNESSES

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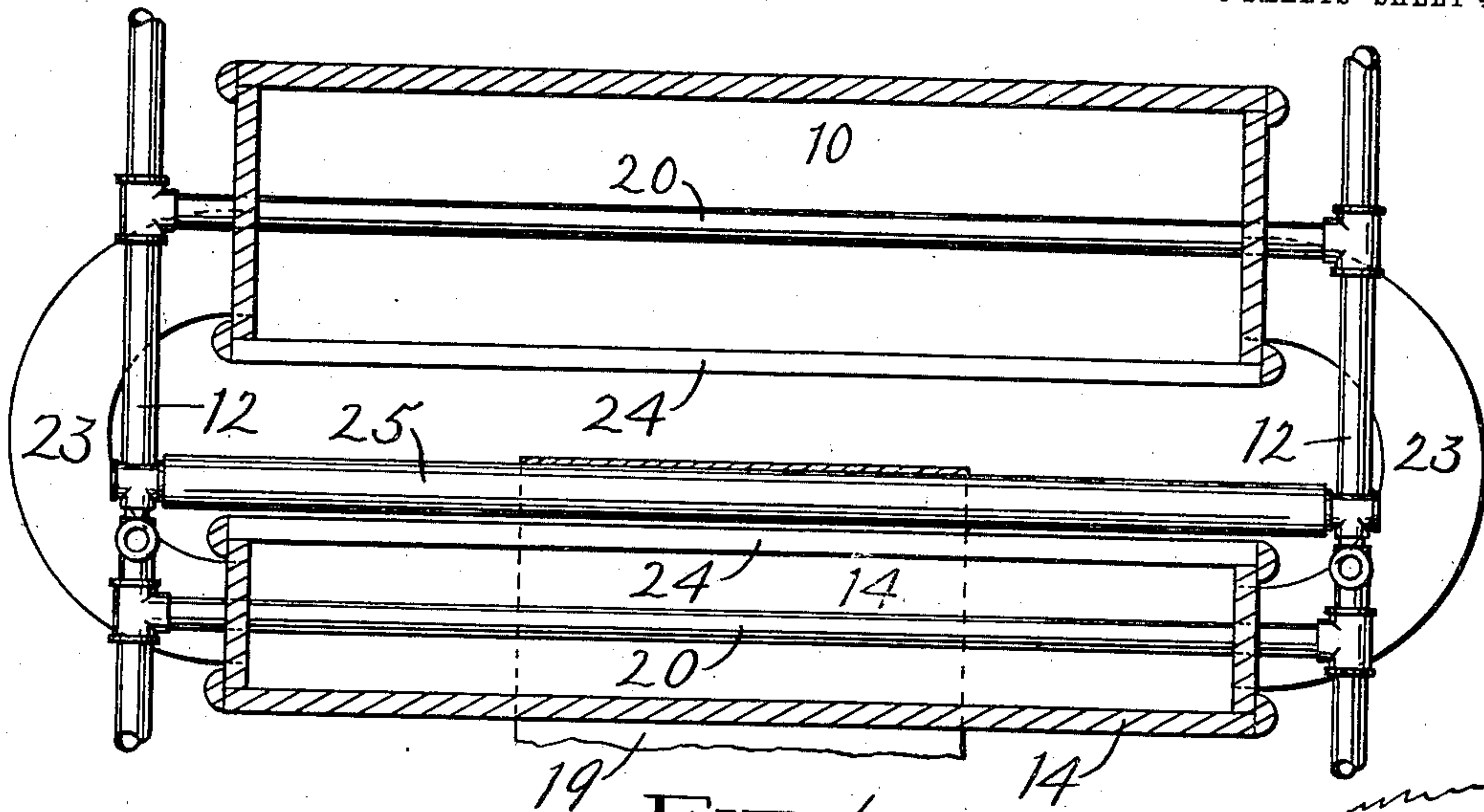


FIG. 6.

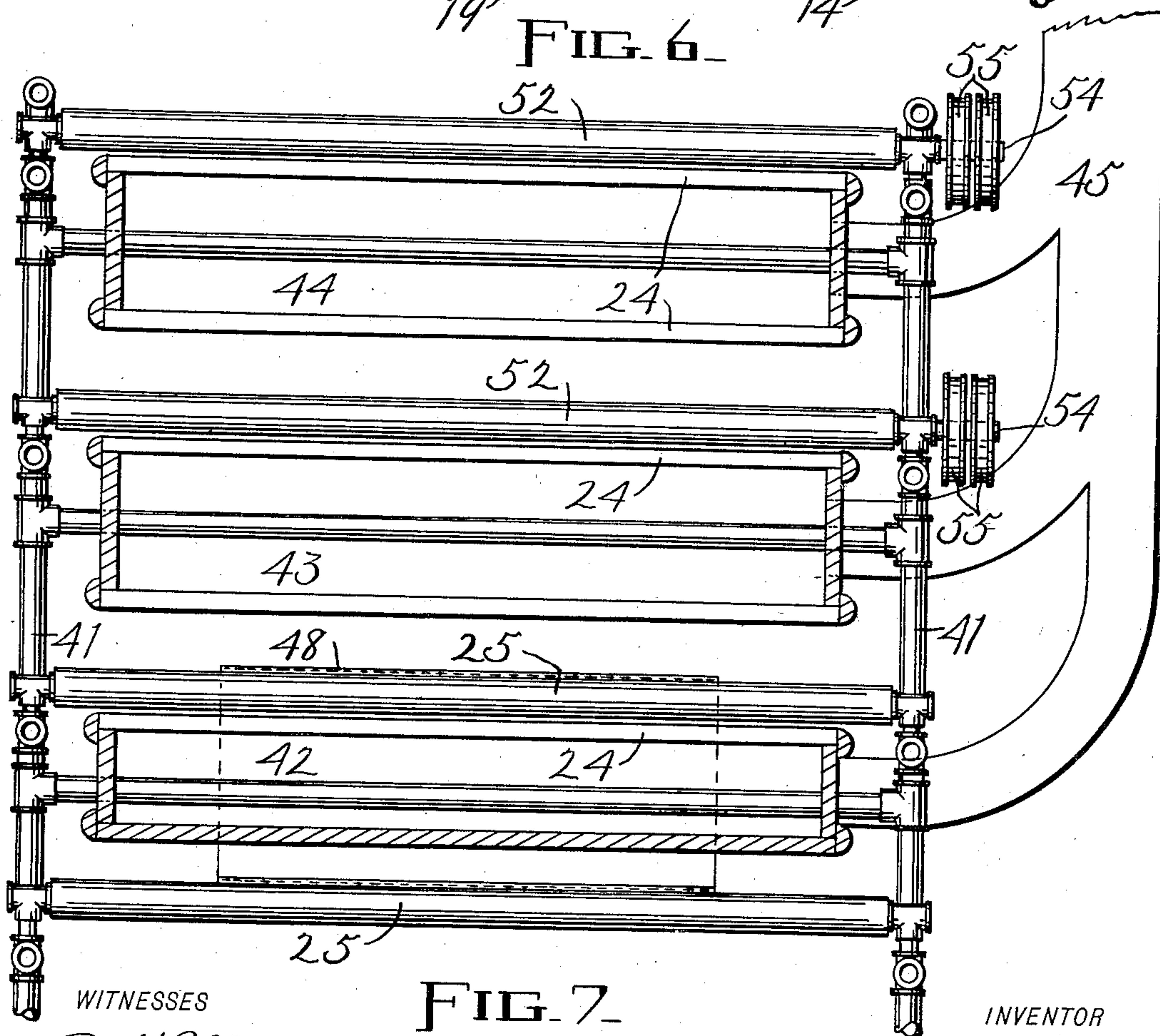


FIG. 7.

WITNESSES

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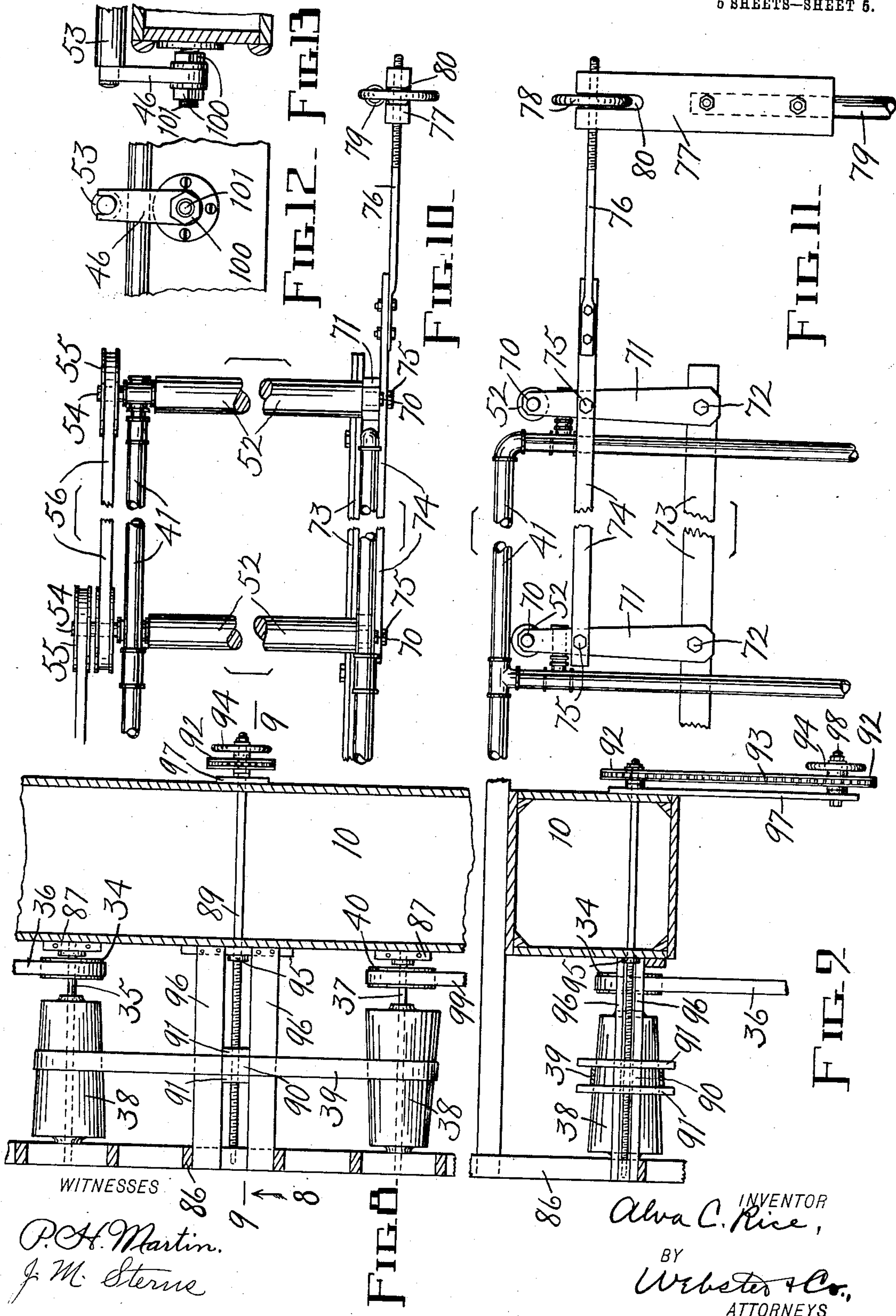
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APPLICATION FILED MAR. 21, 1907.

Patented Nov. 10, 1908.

5 SHEETS—SHEET 5.



UNITED STATES PATENT OFFICE.

ALVA C. RICE, OF WORCESTER, MASSACHUSETTS, ASSIGNOR TO VELLUMOID PAPER COMPANY, OF WORCESTER, MASSACHUSETTS, A CORPORATION OF WEST VIRGINIA.

DRIER FOR PAPER.

No. 903,776.

Specification of Letters Patent.

Patented Nov. 10, 1908.

Application filed March 21, 1907. Serial No. 363,668.

To all whom it may concern:

Be it known that I, ALVA C. RICE, a citizen of the United States of America, residing at Worcester, in the county of Worcester and State of Massachusetts, have invented a new and useful Drier for Paper, of which the following is a specification.

My invention relates to improvements in machines for drying paper and more particularly for drying paper during the treatment of the same to render it waterproof and impervious to grease and acid and to toughen and strengthen it, and after such paper leaves the last solution or impregnating bath; and said invention consists essentially of mechanism, preferably arranged in three sections, which is adapted to receive the wet paper and convey it in the form of a continuous strip, without wrinkling or tearing the same, through properly directed currents of air to a winder at the rear end of the machine or mechanism, together with certain peculiar actuating, regulating and adjusting means, all as hereinafter set forth.

This drier is designed especially for use in the manufacture of what is known as Vellumoid paper or paper made in accordance with United States Letters Patent, No. 804,808, bearing date of November 14th, 1905, but the drier may be employed in the manufacture of other kinds of paper.

The objects of my invention are, first, to provide mechanism for properly, thoroughly, expeditiously and economically drying paper to finish the same after it has been treated with a solution or solutions; second, to furnish such mechanism with adequate means of supplying air to the paper; third, to afford suitable paper-actuating mechanism and proper regulating and adjusting means therefor, and, fourth, to embody in a machine practicable and efficient means for carrying out the objects and securing the advantages sought.

Much difficulty has been experienced in drying paper treated in the manner suggested above, owing to the inadequate provisions made for this purpose, but all such difficulty is obviated by the use of my drier.

I attain these objects by the mechanism illustrated in the accompanying drawings, in which—

Figure 1 is a plan view of the first drier section; Figs. 2 and 2^a are a plan view of the second drier section; Fig. 3 is a plan view of

the third drier section; Fig. 4, a plan view of the winder; Figs. 5, 5^a and 5^b are a longitudinal vertical section of the whole drier including the main air duct; Fig. 6 is an enlarged detail in cross-section of the first drier section, showing the construction of the hanging frame and the air box and one of the rollers for the belt supported by said frame; Fig. 7, an enlarged detail in cross-section of the second drier section, showing the frame, the air boxes, one of the rollers for the Fourdrinier wire, and two of the guide rollers for the paper; Fig. 8, an enlarged plan view of one of the regulators in the driving mechanism of the drier; Fig. 9, an enlarged elevation of the shipper or adjuster for the belt which forms part of the aforesaid regulator, the view being taken on lines 9—9, looking in the direction of the arrow 8, in Fig. 8; Fig. 10, an enlarged plan view of the appliance for adjusting the last two guide rollers for the paper at the top of the machine; Fig. 11, a side elevation of the same; Fig. 12, an enlarged elevation of one of the idler roller supporting and adjusting devices, and, Fig. 13, a view of said device taken at right-angles to the view in Fig. 12. Portions of Figs. 3, 5^b, 10 and 11 are broken out. Except as elsewhere noted herein, arrows indicate the directions of rotary and traveling members. The course of the paper is shown in the sectional view of the drier made up of Figs. 5, 5^a and 5^b.

Similar figures refer to similar parts throughout the several views.

The improved drier herein described consists of three sections, the second and third being very similar to each other except that one is supplied with a Fourdrinier wire, the second, while the other is not. I will describe these sections in order beginning with the one at the left-hand end or the first; but before doing this I desire to call attention to a main air conduit or duct 10 which extends from a blower (not shown) behind the drier forward over the entire top of said drier, diminishing in size at intervals so that the front length, that which is located above the first drier section, is considerably smaller than the length over the back part of the third drier section. This main air duct supplies air to perforated air boxes, which enter into the drier construction, through branches leading from said duct to said boxes. The decrease in the size of the

duct 10 corresponds more or less closely with the decrease in the volume of air, which passes through said duct to supply the drier, consequent upon the escape of air into the branches from the duct, so that there is always a volume of air in each duct section which is approximately uniform, in addition to the amount which passes to the boxes.

The drier section, which first receives the paper 11, in its wet condition, is supported from the ceiling by a plurality of hangers 12 and 13, there being a pair of the latter at each end of the section, and said section consists in part of said hangers, and of the front and smallest length of the air duct 10, an air box 14 below the duct, guide rollers 15 and 16 for the paper, and rolls 17 and 18 connected by a belt 19. Two cross-pieces 20, one below the other between each pair of hangers 12, extend through the sides of the duct 10 and of the box 14 and so support these members. This length of the duct 10 may be further supported from the ceiling by means of hangers 21. The trunnions of the roller 15 and the shaft of the roll 17 are suitably journaled at the front end of the section in bearings carried by the hangers 13 at this end, and the trunnions of the roller 16 and the shaft of the roll 18 are journaled in a similar manner at the opposite end of the section. In addition to passing over the rolls 17 and 18 the belt 19 passes under a smaller roll 22, beneath the center of the section, which roll has its trunnions journaled in suitable bearings on the floor.

Four branches 23 connect the air duct 10 with the air box 14. In the top of the box 14 and in the bottom of the duct 10 above are series of slots 24 extending crosswise of the aforesaid top and bottom members. These slots 24 are inclined in the direction of the movement of the reach of the belt 19 which is between the slotted members, that is to say, the lower slots are directed from below upward to the rear, and the upper slots are directed from above downward to the rear. Thus it will be seen that the paper 11 on the moving belt 19 is subjected to air projected onto both surfaces of the same, except where the paper rests on said belt, in the direction of its travel, quicker and better results being obtained by this method than where the air currents are given a perpendicular direction.

The reach of the belt 19 which receives and carries the paper is supported by and carried on the rolls 17 and 18 and a series of rollers 25 about half way between the box 14 and the duct 10. The trunnions of the rollers 25 are suitably journaled in bearings carried by the hangers 12.

The above described belt conveyer is driven by a train of gears suitably supported at the back end of the section, such train

consisting of a gear 26 on one end of the shaft 27 of the roll 18, a pinion 28 meshing with said gear, a gear 29 on the same stud 30 with said pinion 28, and a pinion 31 meshing with said gear 29. The stud 32 which carries the pinion 31 also carries a pulley 33 which is connected with a pulley 34 on a shaft 35 by a belt 36. In front of the shaft 35 is a shaft 37 and upon these shafts are cone-pulleys 38—38 arranged in the usual manner relative to each other and connected by a belt 39. The shaft 37 also carries a pulley 40 which is connected by a belt 99, Fig. 9, with the main or counter-shaft (not shown), from which power is transmitted to the train of gears through the aforesaid pulleys and belts. The cone-pulleys enter into the regulating mechanism for the paper-actuating mechanism of the drier, and similar pulleys are employed together with the shifting or adjusting appliance for the belt connecting each pair, which will be hereinafter explained in full, with the other sections.

The second or middle section of the drier differs from the first in that its frame 41 rests on the floor and supports three air boxes 42, 43 and 44 which are connected on the back side by branches 45 with the air duct 10 above. The frame 41 has cross-pieces 20 which extend through the boxes 42, 43 and 44 to support them in the same manner that the box 14 and front terminal of the duct 10 are upheld. The top of the box 42 is slotted and the top and bottom of the boxes 43 and 44 are slotted, as shown at 24. At opposite ends of the frame 41 are standards 47 upon which the bearings for certain of the rotary members of this section are mounted. Supported from these standards are two more rolls 17 and 18, but instead of a belt conveyer there is in this case a woven-wire conveyer 48 carried by the rolls, with its upper reach between the boxes 42 and 43. Duplicates of the rollers 25 support the two reaches of the woven-wire conveyer 48 between its rolls 17 and 18, said rollers being supported from the frame 41. The conveyer 48 is driven in the same manner and by the same means as the belt 19, a duplicate train of gears and duplicate pulleys, cone-pulleys and belts being employed to drive the woven-wire conveyer roll 18. Supported from the front pair of standards 47 just above the roll 17 is a roller 49 for the paper.

Between the front end of the box 44 and the adjacent standards 47 and supported from the latter is a roll 50 driven in the same way as are the two rolls 18. On the shaft 27 of the roll 50 is a pulley 51. Between the boxes 43 and 44 and above the latter are two sets of driven rollers 52 and two sets of idler rollers 53 supported from the frame 41 and from the boxes, respectively. Mounted on the trunnion 54 of

each roller 52 at the back side of the section are two pulleys 55. Horizontal belts 56 connect the pulleys 55 which are in line with each other lengthwise of the drier. One of the pulleys associated with the upper front roller 52 is connected by a belt 57 with the pulley 51, and a third pulley also associated with said roller is connected by a crossed belt 58 with one of the pulleys associated with the front roller 52 below. Thus it will be seen that the same mechanism which drives the roll 50 also drives the rollers 52, the upper set in one direction and the lower set in the opposite direction owing to the crossed belt 58. Between the back end of the box 43 and the adjacent standards 47 and supported from the latter is a roll 59 driven like the roll 50 at the opposite end of this section, except that a crossed belt 60 is used to connect the pulleys 33 and 34 which form parts of the driving mechanism for this roll, because it is necessary to revolve the same in the opposite direction to that in which said roll 50 is revolved. Supported from behind the rear standards 47 is a roller 61.

The third or last drier section differs but little from the middle section, it has three boxes 62, 63 and 64 supported, like the boxes 42, 43 and 44, from a second frame 41, and similarly perforated, and additional branches 45 connect these boxes with the duct 10. Front and rear rolls 65 and 66, respectively, are here provided, to correspond with the rolls 50 and 59, and they are driven in the same manner as the last-mentioned rolls. The third section has no woven-wire conveyor, so extra sets of rollers 52 and 53 between the boxes 62 and 63 are furnished, with the other two sets of each. The rollers 52 are driven by the mechanism which drives the roll 65, an additional crossed belt 67 being required to revolve the bottom set of such rollers in the same direction with the top set. At the front end of the section is a roller 68 and at the back end a roller 69.

One or more of the rear end, generally the last two, rollers 52 at the top of the rear section, which are the last, with the exception of the roller 69, that the paper passes over, are arranged so that they can be adjusted laterally from their rear bearings in order to accommodate themselves to the paper. Without some such provision the paper in leaving the drier would have a tendency to twist and thus could not be evenly wound into the customary roll, but the amount of adjustment required is very slight. To obtain the desired adjustment I either provide swivel bearings for the trunnions 54 of the aforesaid rollers or otherwise loosely journal such trunnions, and journal the trunnions 70 on the opposite ends of the rollers in the upper terminals of two rocker arms 71 pivoted at 72—72 to a horizontal rail 73 which is fastened to or forms part of

the frame 41. A horizontal bar 74 is pivotally connected at 75—75 to the arms 71 below the journals for the trunnions 70, and an extension 76 from the rear end of said bar has its rear terminal screw-threaded and received into a bifurcated support 77. A hand-wheel 78, screw-threaded to engage the threaded part of the extension 76, is mounted on such part of the extension between the forks of the support 77. The support may be fastened to a standard 79 resting on the floor, or it may be secured to some part of the drier or of the winder described below. See Figs. 10 and 11. The arrangement is such that the extension 76 with the bar 74 is actuated backward or forward when the hand-wheel 78 is turned, according to the direction given said hand-wheel, owing to the fact that said extension is permitted to reciprocate through the forked end of the support 77, while the hand-wheel, confined as it is between the sides of the slot 80 in said support, has no movement longitudinally of its axis.

From the above it will be readily seen that, if the paper passing over the last two upper rollers 52 have a tendency to draw out of its proper course to the right, such tendency can be cured by turning the hand-wheel 78 in the direction to draw back the bar 74, which action rocks the arms 71 backward and moves the front ends of said rollers or the ends on the working side of the drier in the same direction; and if the paper have a tendency to draw to the left, it is straightened by turning said hand-wheel in the opposite direction to actuate the aforesaid movable parts forward. The requisite movement in either event is very slight. From time to time while the drier is in operation the hand-wheel 78 is turned in one direction or the other as may be required to keep the paper straight.

A winder to receive the paper when it leaves the drier should be provided behind said drier, and I have shown a simple device of this kind consisting of a frame 81 having a winding spindle 82 journaled therein and adapted to be driven by a pulley 83 on one end. The pulley 83 is connected by a crossed belt 84 with the pulley 34 of the regulator or adjuster provided for the winder. The winder may be said to form a part of the drier, although it might be omitted and the paper taken care of when it leaves the drier proper in some other manner than by means of the winder.

In addition to the hangers 21 there are other hangers 85 depending from the ceiling for the duct 10.

The regulator which is introduced into the driving mechanism for each of the rotary paper-actuating members of which there are seven, including the one for the winder, will next be described, particular reference being

had to Figs. 8 and 9. Before describing one of these regulators in detail, and be it remembered that they are all alike, I will first state that all of the shafts 35 and 37 for the cone-pulleys 38 which enter into the regulators are journaled in the studding 86 and in bearing blocks 87 on the back side of the duct 10, except the shafts in the front regulator over the front drier section which are journaled in said studding and in hangers 88—88 depending from the ceiling, the duct here being too low to serve as a support for these shafts (see Fig. 5). Considering now any one of the regulators it will be observed that the same comprises, besides the several members already noted, a horizontal spindle 89 having a screw-threaded portion, a nut 90 mounted on the threaded portion of such spindle, vertical shipper bars 91—91 fastened on the ends of said nut and extending above and below the two reaches of the belt 39, which reaches run between said bars, sprocket-wheels 92—92 connected by a sprocket-chain 93, and a hand-wheel 94. The spindle 89 is journaled in the studding 86 and in either the duct 10 or in the rear pair of hangers 21, and is held against longitudinal movement by a collar 95 behind the duct 10 or behind the hanger 21 which is next to said studding and by the upper sprocket-wheel 92 on the front end of said spindle in front of said duct or in front of the other hanger. The nut 90 and its bars 91 are prevented from rotating with the spindle 89 by means of two pairs of horizontal pieces 96 spaced apart to receive said bars and to serve as guides therefor. These guide pieces or guides 96 are securely held in place between the studding and either the duct or the hanger 21 through which the spindle 89 passes and which is adjacent to the studding. It should be stated in passing perhaps that the axes of the shafts 35 and 37 and the spindle 89 are in the same horizontal plane and that said spindle is half way between said shafts. A hanger 97 suspended from the front side of the duct, or else from the rear hanger 21 for the front of the duct, if the duct itself is not at the right height for the purpose, serves as a support for the stud 98 of the lower sprocket-wheel 92 and its hand-wheel 94.

To operate the regulator so as to decrease the speed of the pulley 34 and the mechanism driven thereby, which receives its rotary motion from the pulley 40 through the medium of the cone-pulleys 38 and belt 39, turn the spindle 89 by means of the hand-wheel 94 and intervening sprocket-wheels 92 and chain 93 in the proper direction to actuate the nut 90 with its shipper bars 91 toward the studding 86. The shipper bars act on the belt 39 and force it toward the studding, thus causing the driven cone-pulley to revolve slower than before, the reason for this

being so well known as not to require an explanation here. The speed of the pulley 34 is increased by manipulating the rotary parts of the regulator adjuster in the opposite direction and so causing the belt 39 to be moved farther away from the studding. By means of these regulators the rotary paper-actuating members can be readily brought into correspondence to the end that an even and uniform drawing tension is imparted to the paper and all liability of unduly straining or tearing the same avoided. From time to time while the drier is in operation the different hand-wheels 94 are turned in one direction or the other as may be required to change the speeds of the actuating members for the paper and so accommodate such members to each other and to the paper.

When the drier is set in motion, after being adjusted, the wet paper 11 passes in at the front end over the idler roller 15 onto the conveyer belt 19 which carries it between the duct 10 and the box 14 through the slanting slots 24 of which air is projected against both sides of the paper and the drying process begins. The belt 19 is comparatively narrow and does not materially interfere with the drying process at this stage. The rollers 25 assist the belt in supporting the paper until it arrives at the idler roller 16 at which point the paper leaves the first section.

Running from the top of the roller 16 the paper passes downward and backward under the idler roller 57 at the front end of the second section onto the woven-wire 48 which conveys it between the slotted boxes 42 and 43 and through the air projected therefrom to the rear end of said second section. By this time the paper is sufficiently dry to finish its course without a continuous support like the belt and the wire-conveyer. From this point the paper if light takes a different course from that of paper which is heavy, the former running from the wire-conveyer to the third section while the latter is carried from the wire-conveyer up over the roll 59 at the rear end of the second section, through the blasts of air from the boxes 43 and 44, up over the roll 50 at the front end of the second section, and back again, over the top of the box 44, to the idler roller 61, being supported meanwhile between the ends of the section by the driven rollers 52 and the idler rollers 53. The paper thus actuated and carried is twice subjected to air currents on both sides and once more to the forced draft against the under side.

The paper passes from the wire-conveyer or from the top of the roller 61, as the case may be, through to the idler roller 68 or to the roll 65 at the front end of the third section, according to the weight of the paper and the further amount of drying which it needs; if to the roller 68, then the paper passes back between the slotted top and bot-

tom of the air boxes 62 and 63 to the roll 66 at the rear end of the drier, up over said roll and forward between the slotted top and bottom of the air boxes 63 and 64 to said roll 65 at the front end of the section, and finally back over the slotted top of said box 64 to the idler roller 69; if the paper runs to the roll 65, then it goes directly over the box 64 like the last lap in the other case. The paper is supported by such of the driven rollers 52 and the idler rollers 53 as it passes over, the same as before. The paper receives its air bath from the third section just as it does from the other sections or substantially so.

From the top of the roller 69 the paper, now thoroughly dry, runs off of the third section onto the winder where it is wound in the form of a roll on the spindle 82.

The value of the paper-actuating mechanism regulators and the imperative need of such appliances will be appreciated when it is remembered that the paper is very wet at the start and dry at the finish with numerous lesser degrees of wetness and dampness between.

The adjustable bearings, best illustrated in the last two views, which I prefer to employ for the idler rollers 53 in order to afford a delicate adjustment for such rollers to the end that the course of the paper shall be kept true in its passage through the sections in which said rollers are employed, comprise arms 46, for the trunnions of each roller, so mounted that their positions can be changed, as will be clearly seen from the following description. The base of each arm 46 is mounted between two nuts 100 on a screw-threaded stud or support 101 fastened to and projecting from the front or back side of one of the air boxes with which the rollers 53 are associated. The upper end of each arm 46 is arranged to afford a bearing for a roller trunnion. The adjustment of a roller at either end is brought about by loosening the outer nut 100, swinging the arm 46 on the support 101 in the direction and to the extent required, and retightening said nut, on the side of the drier which corresponds with the end of the roller requiring adjustment. A fragment of an air box is shown in Figs. 12 and 13, which may represent any one of the boxes 43, 44, 62, 63 or 64.

The slots 24 are substantially the same in all of the air boxes, and the results obtained by the use of boxes thus perforated are eminently satisfactory. Although other forms or kinds of perforations might be substituted for the slanting slots, with some measure of success, such good all-round results could not be obtained by such substitution.

The various hanging and supporting parts may be changed to suit different conditions and meet different requirements, and the same is true in regard to the driving mechanisms, that is, gearings, pulleys and belts;

in other words, any mechanical equivalents for the frames and other supporting parts and for the driving mechanisms herein shown and described, that are adaptable and applicable, may be substituted. And such other changes in construction and arrangement as justly fall within the scope of my claims can be made without departing from the nature of my invention.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. The combination, in a drier for paper, with the air boxes, of an air duct extending forward over said boxes and diminishing in size at intervals, and branches leading from said duct to the boxes, the smallest section of the duct having perforations in the side adjacent to the corresponding air box.

2. The combination, in a drier for paper, with three sets of perforated air boxes, of an air duct extending forward over said boxes, branches leading from said duct to the boxes, the front length of the duct having a perforated bottom like the perforated top of the box below.

3. The combination, in a drier for paper, of an air duct, a plurality of air boxes, suitable supporting means for said boxes and for the front length of said duct, such means including cross-pieces which pass transversely through the boxes and such length of the duct.

4. The combination, in a drier for paper, with suitably supported rolls, an endless belt carried by said rolls and adapted to carry paper, such belt being of less width than the paper carried thereby, and rollers suitably supported beneath the reach of said belt which is adapted to receive the paper, such rollers being longer than the belt is wide, of means to project air on both sides of the aforesaid paper-receiving reach of the belt, such means comprising air conductors or boxes arranged on both sides of said reach of belt and having their sides which are adjacent to said reach slotted crosswise at intervals throughout their entire lengths.

5. The combination, in a drier for paper, with suitably supported paper-actuating rolls, and power-driven paper-supporting and idler paper-supporting rollers between such rolls, of means to project air into the course of the paper actuated and supported by said rolls and rollers.

6. The combination, in a drier for paper, with suitably supported rolls, and a wire conveyer carried by said rolls and adapted to carry paper, of means to project air on both sides of the reach of said conveyer which is adapted to receive the paper at intervals throughout the entire length of such reach.

7. The combination, in a drier for paper, with suitably supported rolls, a wire conveyer carried by said rolls and adapted to

- carry paper, and suitably supported paper-actuating rolls and suitably supported paper-supporting rollers arranged above and in substantially horizontal parallel planes
- 5 with the paper-receiving reach of said wire conveyer, of means to project air at intervals into the entire course of the paper actuated and supported by the conveyer, rolls and rollers.
- 10 8. The combination, in a drier for paper, of a belt conveyer at the front end of said drier, a wire conveyer behind said belt conveyer, and means to project air on both sides of the paper-receiving reaches of said conveyer members.
- 15 9. The combination, in a drier for paper, of a belt conveyer at the front end of said drier, paper-actuating rolls and paper-supporting rollers at the back end of the drier, and a wire conveyer between.
- 20 10. The combination, in a drier for paper, of a belt conveyer at the front end of said drier, a wire conveyer behind said belt conveyer, paper-actuating rolls and paper-supporting rollers behind said wire conveyer at the back end of the drier, and means to project air into the course of the paper actuated and supported by the actuating or conveying and supporting parts.
- 25 11. A drier, for paper, consisting, first, of a section provided with a continuous supporting member for paper, second, of a section provided both with a continuous supporting member for paper and with supporting members for paper which are not continuous, and, third, of a section provided only with non-continuous supporting members for paper.
- 30 12. The combination, in a drier for paper, with a suitable frame or support, of one or more paper-supporting rollers loosely journaled at one end in bearings supported by said frame, oscillating arms pivotally connected with the frame and forming bearings
- 35 for said rollers at the opposite end, and reciprocating means to actuate said arms and
- 40
- 45

so change the angular relation of the rollers to the course of the paper.

13. The combination, in a drier for paper, with a suitable frame or support, of one or more paper-supporting rollers loosely journaled at one end in bearings supported by said frame, oscillating arms pivotally connected with the frame and forming bearings for said rollers at the opposite end, a bar attached to said arms and provided with a screw-threaded extension, a hand-wheel mounted on the threaded part of such extension, and means to hold said hand-wheel against endwise movement.

14. The combination, in a drier for paper, of three air conducting members two of which have inclined slots in the top and bottom thereof and one of which has inclined slots in the bottom, and supporting members for paper between and above said air conducting members, the inclinations of said slots being in the direction in which the paper travels.

15. The combination, in a drier for paper, with suitably supported paper-actuating rolls, intermediate power-driven paper-supporting rollers, intermediate idler paper-supporting rollers, and means of adjustment for said last-mentioned rollers, of means to project air into the course of the paper actuated and supported by said rolls and rollers.

16. In a drier for paper, a paper-supporting roller, and an adjustable bearing therefor, such bearing comprising a supporting member, an arm mounted on such member, such arm affording a direct bearing for one end of said roll, and means also mounted on said supporting member adapted to engage and release said arm whereby the latter may be swung on the supporting member for adjustment.

ALVA C. RICE.

Witnesses:

ALLEN WEBSTER,
EDWARD J. SAVAGE.