No. 701,546. Patented June 3, 1902.

J. H. DAVIS.

DRYING RACK.

(Application filed Aug. 12, 1901.)

(No Model.) 3 Sheets—Sheet 1.

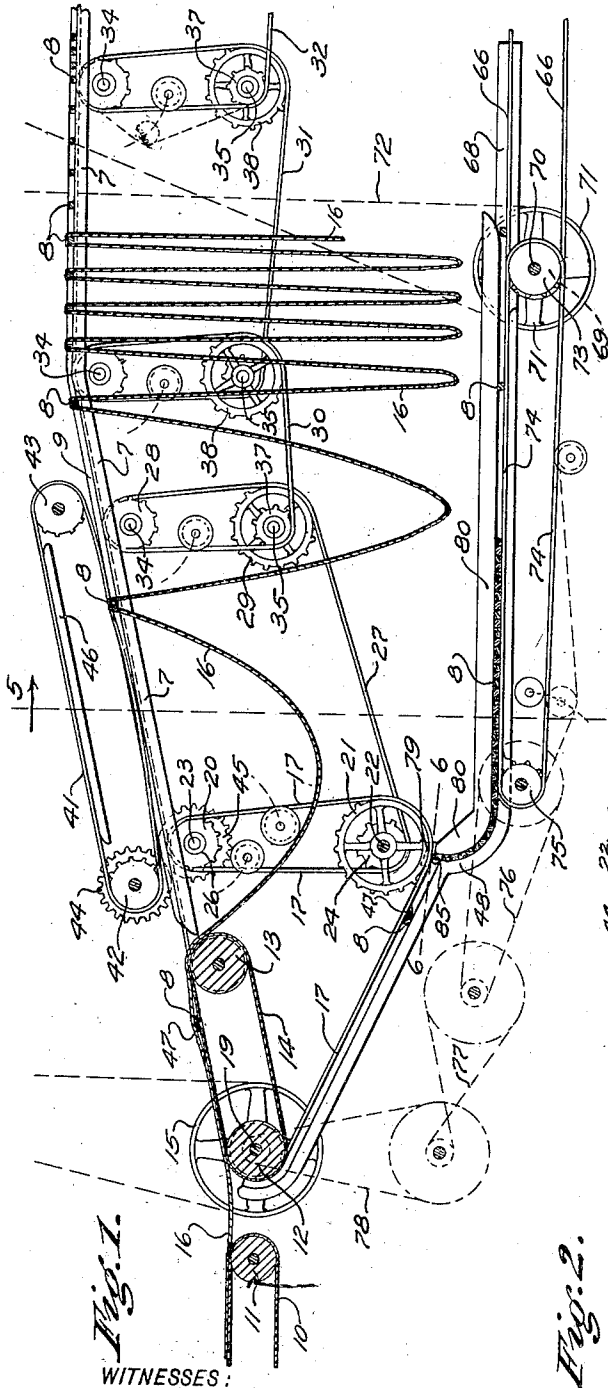


Fig. 1.

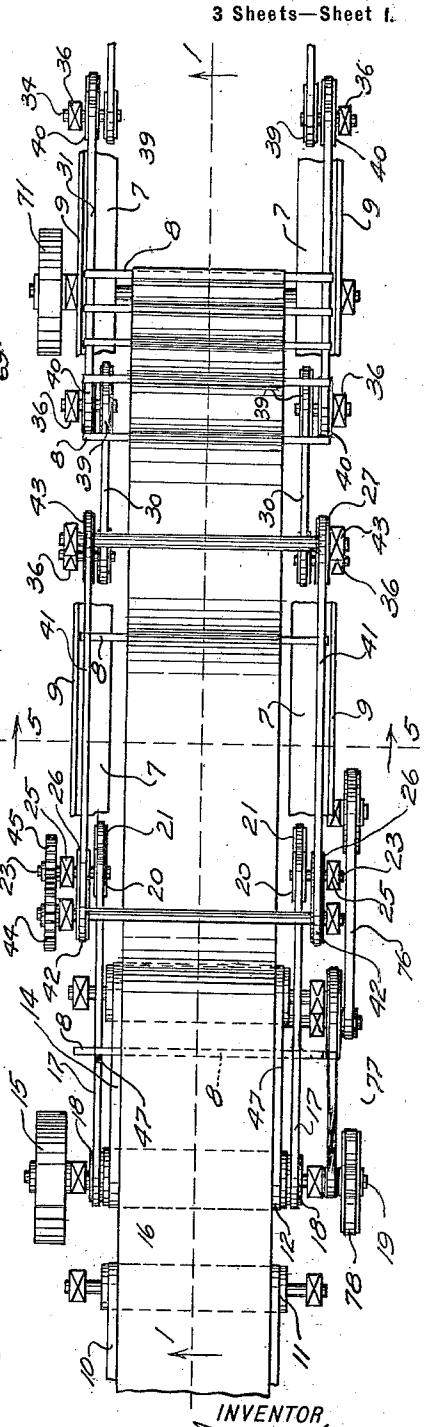


Fig. 2.

WITNESSES:

F. T. Radecke

Glen C. Stephens

INVENTOR,

John H. Davis

BY

Rummler & Rummler

his ATTORNEYS.

No. 701,546. Patented June 3, 1902.

J. H. DAVIS.

DRYING RACK.

(Application filed Aug. 12, 1901.)

(No Model.) 3 Sheets—Sheet 2.

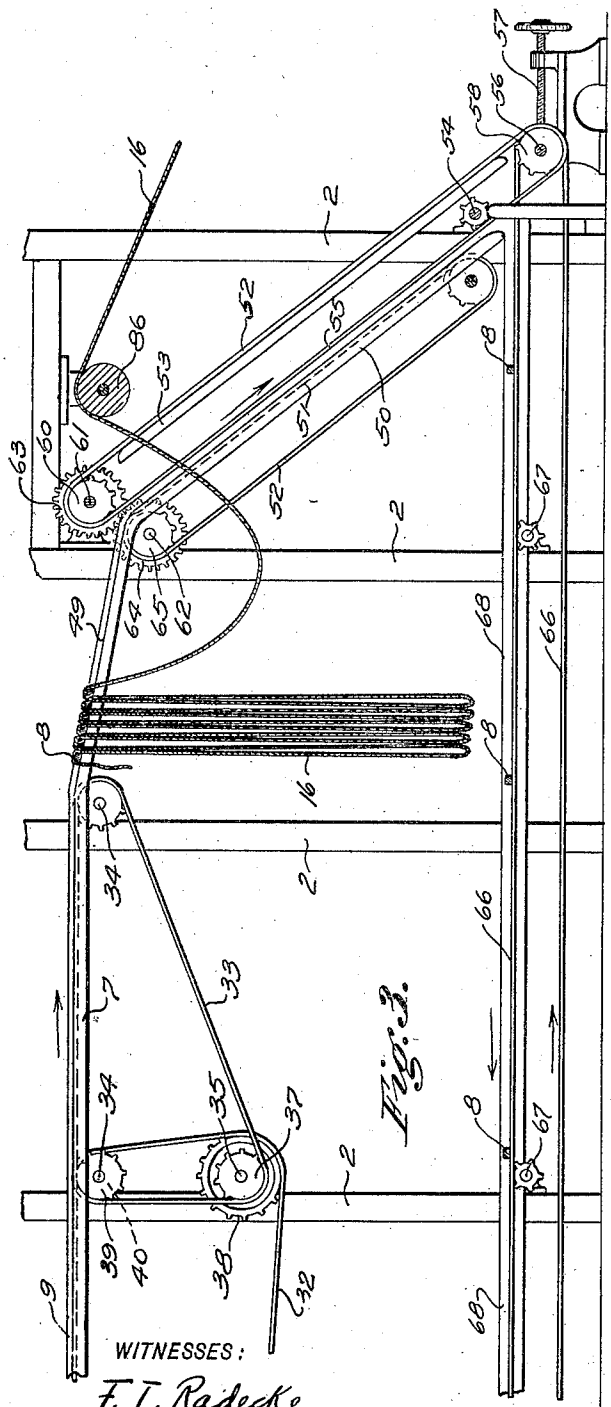


Fig. 3.

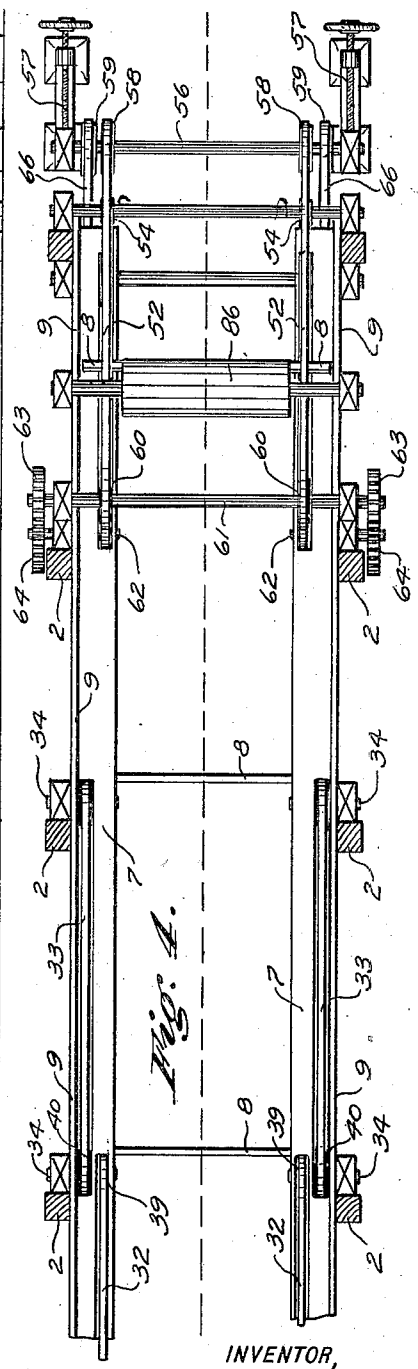


Fig. 4.

WITNESSES:

F. T. Raidecke

Glen C. Stephens

INVENTOR,

John H. Davis

BY

Rummler & Rummler

his ATTORNEYS.

No. 701,546. Patented June 3, 1902.

J. H. DAVIS.

DRYING RACK.

(Application filed Aug. 12, 1901.)

(No Model.) 3 Sheets—Sheet 3.

Fig. 5.

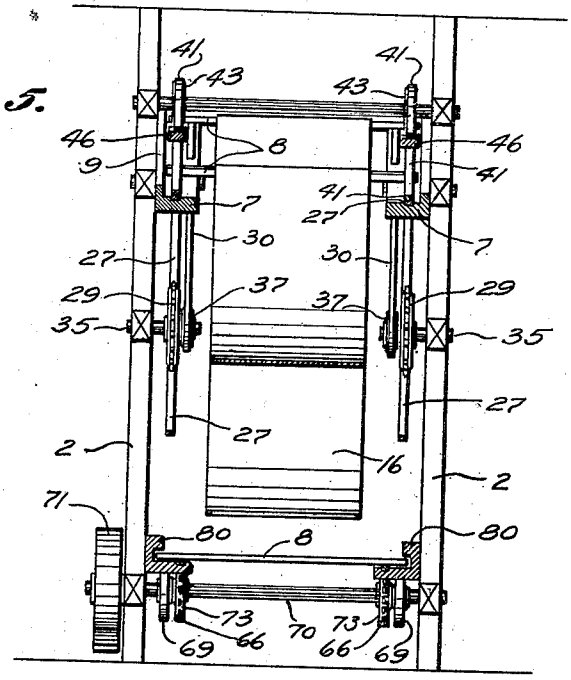


Fig. 6.

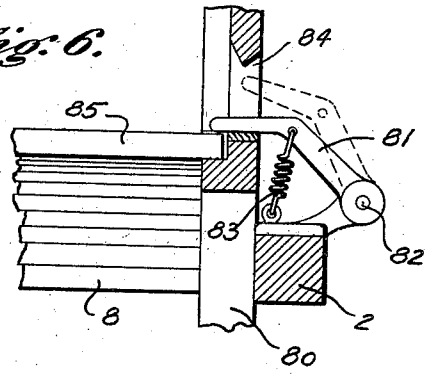


Fig. 7.

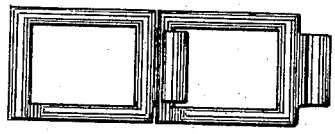
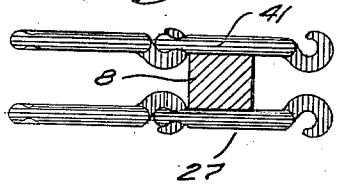


Fig. 8.



WITNESSES:

F. T. Radecke

Glen C. Stephens

INVENTOR,

John H. Davis

BY

Rummler & Rummler

his ATTORNEYS.

UNITED STATES PATENT OFFICE.

JOHN H. DAVIS, OF CHICAGO, ILLINOIS.

DRYING-RACK.

SPECIFICATION forming part of Letters Patent No. 701,546, dated June 3, 1902.

Application filed August 12, 1901. Serial No. 71,762. (No model.)

To all whom it may concern:

Be it known that I, JOHN H. DAVIS, a citizen of the United States of America, and a resident of Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Drying-Racks, of which the following is a specification.

My invention relates to the class of drying-racks which are particularly adapted for drying wall-paper during the process of printing or after printing and preparatory to rolling same.

The main objects of my invention are to provide for forming uniform loops of the paper along the rack, to avoid wrinkling or kinking of the paper during the formation of the loops, to provide improved means for a continuous feed of the rods from which the loops are suspended, and to avoid uneven shifting of the rods and maintain their parallel relation along the rack. I accomplish these objects by the mechanism illustrated in the accompanying drawings, in which—

Figure 1 is a longitudinal vertical section on the line 1 1 of Fig. 2 of the loop-forming end of a drying-rack constructed according to my invention. Fig. 2 is a top plan view of the same part of the rack which is shown in Fig. 1. Fig. 3 is a longitudinal vertical section of the delivery end of said rack, being a continuation of Fig. 1. Fig. 4 is a corresponding continuation of Fig. 2. Fig. 5 is a transverse vertical section along the line 5 5 of Figs. 1 and 2. Fig. 6 is a section, partly broken away, along the line 6 6 of Fig. 1, showing the means for retaining the rods in storage until they are taken up by the lugs on the pick-up. Fig. 7 is a plan view of the links of a chain suitable to be used as a belt in the conveyers used in said rack. Fig. 8 is a side elevation of a portion of two of such chains, showing one of the rack-rods between same.

In Figs. 1 and 2 the supporting-framework, which consists of a series of upright posts, as indicated in Figs. 3 and 4, has been omitted for the sake of clearness. The system of belting shown at the lower side of Fig. 2 is indicated by dotted lines in Fig. 1.

The device shown is a drying-rack adapted for drying wall-paper after it has left the printer. It consists of a device for gathering the paper into loops and hanging it upon a series of rods 8 and means for conveying these rods and their suspended loops of paper and delivering same to dead-racks, upon which they are stored prior to the delivery of the paper to other printers or to a winding-machine, where it is formed into rolls.

The rod-carrier, which consists of two parallel horizontal guides 7, extends throughout the entire length of the drying-rack. For a considerable distance at the end next to the printer—that is, the loop-forming end—the guides 7 are inclined downwardly. At the delivery end these guides are again slightly inclined for a considerable distance, forming the dead-racks. The guides 7 serve the purpose of supporting and guiding the rods. They are provided with an upwardly-projecting flange 9, extending throughout their entire length and serving to prevent the rods from shifting in a direction transverse to the length of the racks. The rods are carried along the guides 7 by means of a number of conveyers, each conveyer consisting of a pair of link belts, each on opposite sides of the rack and passing over a system of sprocket-wheels. These conveyers pass along grooves in the rod-carriers 7 and are so seated that their upper surfaces project above the upper surface of the carriers 7 and support the rods.

The belt 10 and the drum 11 represent parts of the printer. The drums 12 and 13 are connected by an endless canvas belt 14, slightly wider than the strip of paper 16 that is to be dried, and are driven by means of the pulley 15 at the same speed as that at which the paper 16 is delivered from the belt 10. At each side of the belt 14 is a conveyer-chain 17. These chains pass over the sprocket-wheels 18, which are of the same diameter as the drum 12 and which are rigidly secured to the shaft 19. The conveyer-chains 17 also engage the sprocket-wheels 20 and 21. The shaft 22 is journaled in the bearings at each side of the machine and has rigidly secured thereto the sprocket-wheels 21 and 24. The shafts 23 are loosely journaled in line with each other at the bearings 25. The sprocket-wheels 20 and 26 are secured to the shafts 23. A second pair of conveyer-chains 27 connects the sprocket-wheels 26, 28, 29, and 24. It

will be seen that the chains 17 drive the shaft 22 by means of the sprocket-wheels 21. The sprocket-wheels 24, being also rigidly secured to the shaft 22, drive the chains 27 at a slower speed than that of the chains 17. Similarly a reduction of speed is effected at each of the successive conveyer-chains 30, 31, 32, and 33. The shafts 34 and 35 are not continuous across the rack, but consist of pairs of shafts, the members of each pair being in alinement and being secured against rotation at the hangers 36. The sprocket-wheels 37 and 38 are rigidly secured to each other and run loosely upon the shafts 35. The pulleys 39 and 40 are independent of each other and run loosely on the shafts 34. A pair of conveyer-chains 41, each in the same plane with one of the chains 27, is disposed above the inclined part of the carriers 7. The chains 41 connect the sprocket-wheels 42 and 43. The sprocket-wheels 42 and 26 are driven with equal velocity and in opposite directions by the gears 44 and 45. The upper parts of the belts 41 are supported by the slippers 46, thereby preventing sagging at these parts and causing the slack in the belts 41 to rest upon the upper part of the belts 27. Each of the chains 17 is provided with projecting lugs 47, those on one chain being directly opposite those on the other. These lugs serve to pick up the rods 8 from their place of storage at 48 and deliver them one at a time to the loop-forming mechanism and at a distance apart equal to the desired length of the loops. The distance between these lugs measured along the perimeter of the chain belt determines the length of such loops. The successive reductions in speed of the belts 27 and 30, 31, 32, and 33 cause the paper to be gathered into loops upon the rods 8 and gradually bring these rods closer together until they come into contact on the dead-rack 49. The carriers at the dead-racks 49 are not provided with conveyers, so that each loop is pushed along such dead-racks by the accumulating loops behind or is drawn along by the withdrawal of the paper ahead. The dead-racks are given a slight incline, so that the weight of paper upon the rods will not cause these to be retarded and strain the paper as it is leaving. The carriers 7 beyond the dead-racks 49 have a sharp incline 50 and are provided with the conveyer-belts 51 and 52. The belts 52 have their upper sides supported by the slippers 53, and idlers 54 are provided, so that the lower part 55 of the belt 52 will not change its direction when the shaft 56 is shifted by the adjusting-screws 57. The sprocket-wheels 58 and 59 are rigid on the shaft 56. The sprocket-wheels 60 are rigid on the shaft 61. The shafts 62 are driven by the shaft 61 by means of the gears 63 and 64 and through the sprocket-wheels 65 drive the chain belts 51. The gears 63 and 64 are of equal diameter, so that the belts 51 and 52 will move with equal velocity.

The return of the rods to the loop end of the machine is effected by means of the belts 66, which are supported at convenient intervals by the idlers 67. Shifting of the rods transversely to the length of the rack is prevented by means of the guides 68. The belts 66 are driven by the sprocket-wheels 69, which are rigid on the shaft 70 and receive their power from the pulley 71 and the belt 72. The belt 72 is driven by line-shafting, which is not shown. The sprocket-wheels 73 are loosely journaled on the shaft 70 and carry the chain belts 74, which are driven by the sprockets 75, which receive power from the shaft 19, this power being transmitted by the belts 76, 77, and 78 and the system of pulleys and counter-shafts connected therewith. The rods are retarded at 48 by the stop 79, the foremost rod 85 being held against the guide 80 by means of the lever 81, which is pivoted at 82 and held in contact with the rods by the spring 83. The stop 79 prevents the rods from coming in contact with the chain 17 until removed from said stop by the pick-up lugs 47, the lever 81 being pushed into the recess 84 as the rod is removed and snapping back to retain a succeeding rod until same is removed by the next pair of lugs 47.

The operation of my device is as follows: The paper 16 is delivered to the racks at a uniform velocity by means of the canvas belt 10. The belt 14 moves with the same velocity as the paper, as does also the conveyer 17. The lugs 47 on the conveyer 17 remove the rods one at a time from the storage 48 and deliver them along the belt 14, together with the paper. The conveyer 27 receives the rods from the conveyer 17 and carries them at a slower velocity, thereby causing the paper, which is delivered at uniform velocity, to form into a loop, the length of which is regulated by the distance between the rods 8 on the conveyer 17. Each of the succeeding conveyers 30, 31, 32, and 33 moves at a slower velocity than the one preceding. Thus the rods are gradually brought closer together until delivered by the conveyers 33 to the dead-racks 49, where there is no conveyer and where the rods are allowed to accumulate. The belt 14 and the conveyer 17, moving at the same velocity, form a carrier which delivers the rods along the plane of the paper and at the same speed with the paper. The rods are then simultaneously lifted and retarded by the conveyer 27, while the paper, which is delivered at a uniform velocity, is gathered into loops.

In the loop-former it will be seen that the loop is formed at the same time as the rods are being lifted to the level of the racks. The chains 41 are held in contact with the rods 8 by gravity, and the rods being confined between the two belts, as shown in Fig. 8, are secured against any unequal shifting of their ends. This is considered a very important feature, as it is at this point in the old form of racks in common use that kinks and wrinkles are formed in the paper, which ultimately result in tearing and in a large percentage of

loss as the paper progresses along the racks. The delivery of the rods at about the same speed as the paper along the belt 14 prevents the paper from slipping over the rod and insures that the paper is gradually picked up by the rod, thus insuring uniformity of the length of the loops, preventing sudden jerks and tearing of the paper at this point. In leaving the racks the paper 15 passes over the drum 86 and is then led to the next succeeding machine, the rods being taken up by the belts 51 and 52 and being thereby quickly removed from contact with the paper. In the old form of rack, where the rods are allowed to drop at this point, it often happens that one end of the rod drops first and the retarded end tears the paper. In my device the rods are removed in parallel relation, thus avoiding this fault. The conveyer 51 delivers the rods to the conveyer 66, which carries them forward and delivers them to the conveyer 74 in the rod-storage, where they accumulate and are held in position by the friction of the conveyer 74 slipping along them.

It will be noticed that the conveyers 74, 17, 27, 30, 31, 32, and 33 operate as one system, each dependent upon the others, while the conveyers 51 and 66 form an independent system, the former operating while paper is being delivered to the racks, the latter operating when it is being removed from the dead-racks. Both systems will usually be operated at the same time.

It will be seen that numerous details of the device shown may be altered without departing from the spirit of my invention. I therefore do not confine myself to such details except as hereinafter limited in the claims.

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

1. A drying-rack comprising a rod-carrier, a series of rods supported by said carrier and arranged to have the material to be dried suspended in loops below and from said rods, a feeder adapted to supply said material to said rods and to carry and support same together with one of said rods for a considerable distance immediately before reaching the point at which the loops begin to form; said feeder being adapted to carry and support said material independently of the support afforded by the rod carried therewith.

2. A drying-rack comprising a rod-carrier, a series of rods supported by said carrier and arranged to have the material to be dried suspended in loops below and from said rods, a feeder adapted to supply said material to said rods and to carry same together with one of said rods, in a substantially horizontally disposed plane, for a considerable distance immediately before reaching the point at which the loops begin to form; said feeder being adapted to carry and support said material independently of the support afforded by the rod carried therewith.

3. A drying-rack comprising a rod-carrier, a series of rods supported by said carrier and arranged to have the material to be dried suspended in loops below and from said rods, a feeder for said material arranged to carry and support same along with one of said rods to a point at which the loops begin to form, and means in advance of and adjoining said feeder for depressing the rods upon the carrier and preventing their dragging or shifting out of parallel relation during the formation of the loop.

4. A drying-rack comprising a rod-carrier, a series of rods supported by said carrier and arranged to have the material to be dried suspended in loops below and from said rods, a feeder for carrying said material to the rods, and means in advance of and adjoining said feeder for depressing the rods upon the carrier and preventing their dragging or shifting out of parallel relation.

5. A drying-rack comprising a rod-carrier, a series of rods supported by said carrier and arranged to have the material to be dried suspended in loops below and from said rods, a feeder for carrying said material to the rods, and a belt traveling with the carrier in advance of and adjoining said feeder for depressing the rods upon the carrier and preventing their dragging or shifting out of parallel relation.

6. A drying-rack comprising a frame having an open space extending longitudinally of same through which the material to be dried may be passed in suspended loops; a conveyer extending along each side of said spaces at the upper part; a series of rods supported and carried by said conveyers and arranged to support said loops; a conveyer below said spaces adapted to receive said rods after they have traversed the upper conveyer, and to return same in parallel relation toward the end of said racks at which said material is received on said upper conveyer; a rod-storage extending along and curving upwardly beyond the forward end of said lower conveyer; a stop for said rods at the forward end of said rod-storage; said lower conveyer being arranged to advance relatively to the rods held in said storage and to crowd said rods against each other and into said upwardly-curved part, toward said stop; and a pick-up intersecting the upwardly-curved end of said rod-storage and adapted to engage the rods in said storage, one at a time, and deposit same in parallel relation upon the upper conveyers; and means for feeding said material upon the rods near the upper part of said pick-up.

7. A drying-rack comprising a rod-carrier; a series of rods supported by said carrier and arranged to have the material to be dried suspended in loops below and from said rods; a pair of opposed conveyer-belts passing downwardly near each side of the discharge end of said carrier and adapted to engage said rods and prevent same from tilting or shifting out of parallel relation at the time of their dis-

charge from said carrier; a lower conveyer adapted to receive said rods from said conveyer-belts and return same toward the receiving end of said carrier, and a pick-up adapted to receive the rods from said lower conveyer and deposit same in parallel relation upon the receiving end of said carrier.

8. A drying-rack comprising a rod-carrier; a series of rods supported by said carrier and arranged to have the material to be dried suspended in loops below and from said rods; a pair of opposed conveyer-belts passing downwardly near each side of the discharge end of said carrier and adapted to engage said rods and prevent same from tilting or shifting out of parallel relation at the time of their discharge from said carrier.

9. A drying-rack comprising a rod-carrier; a series of rods supported by said carrier and arranged to have the material to be dried suspended in loops below and from said rods; means for supporting the material independently of said rods at the discharge end of said carrier; and a pair of opposed conveyer-belts located toward each side of the discharge end of said carrier adapted to engage said rods and prevent same from tilting or shifting out of parallel relation at the time of their discharge from said carrier and until the rods are free from contact with said material.

10. A drying-rack comprising a rod-carrier; a series of rods supported by said carrier and arranged to have the material to be dried suspended in loops below and from said rods; means for supporting the material independently of said rods at the discharge end of said carrier; a conveyer-belt adapted to receive the rods at the time of their discharge from the carrier; and means for urging the rods against said conveyer-belt to prevent same from tilting or shifting out of parallel relation at the time of their discharge from said carrier and until the rods are free from contact with said material.

Signed at Chicago this 8th day of August, 1901.

JOHN H. DAVIS.

Witnesses:
EUGENE A. RUMMLER,
WM. R. RUMMLER.