

No. 706,171.

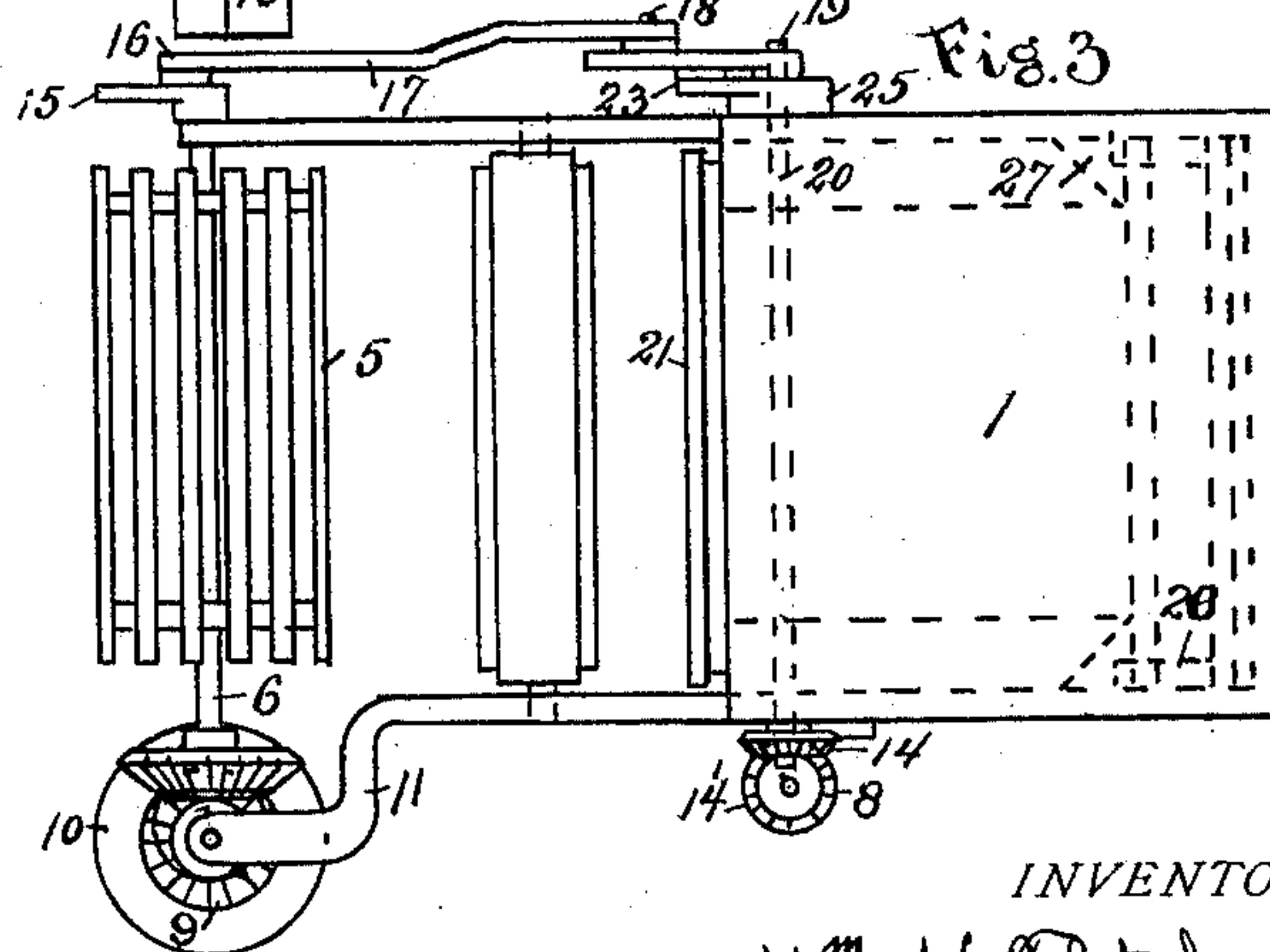
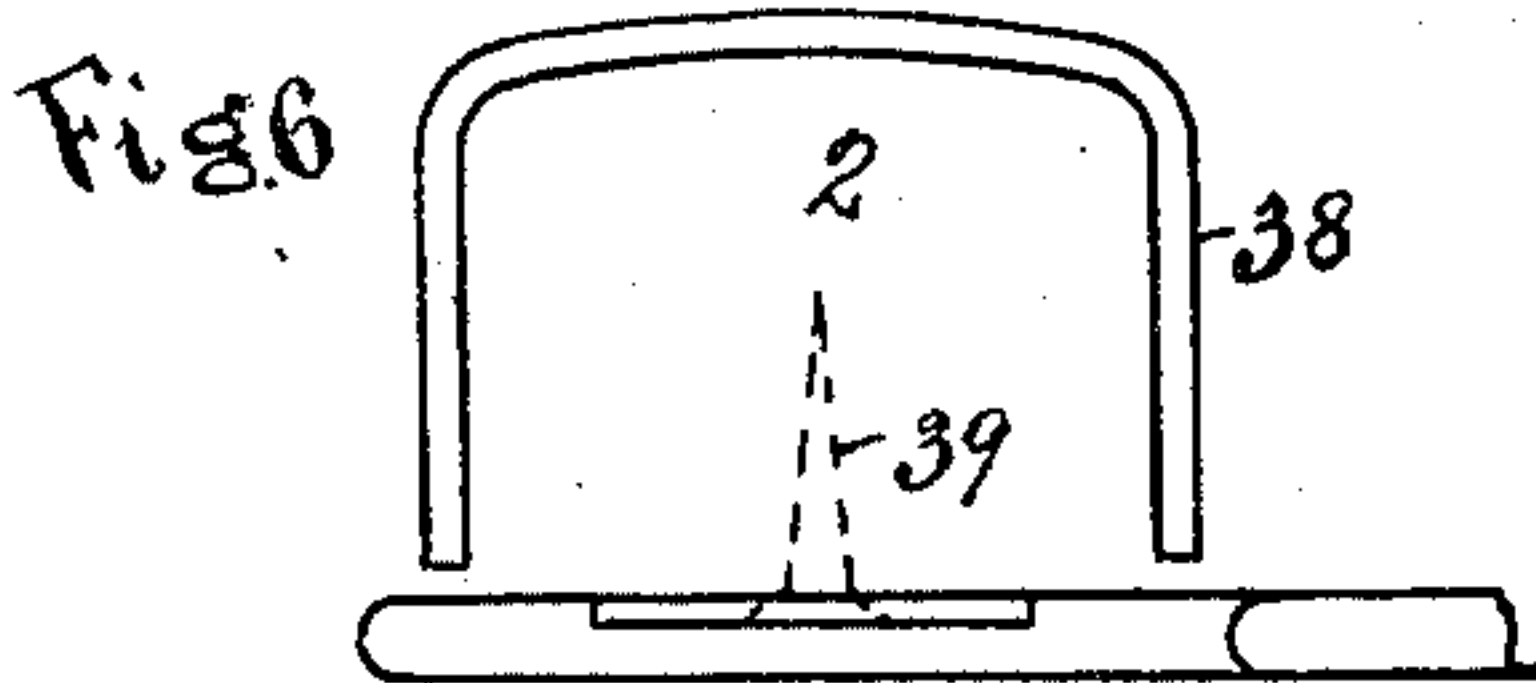
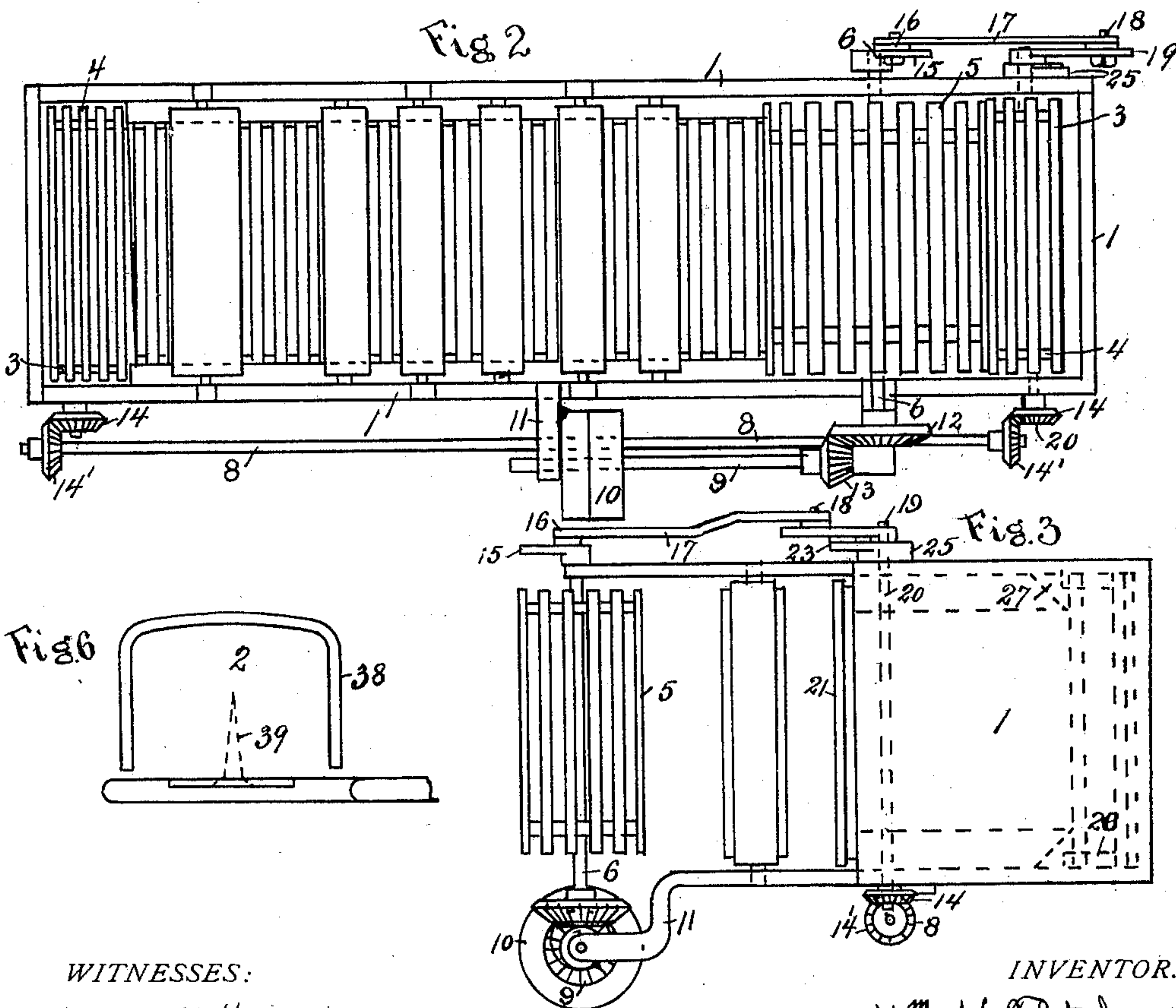
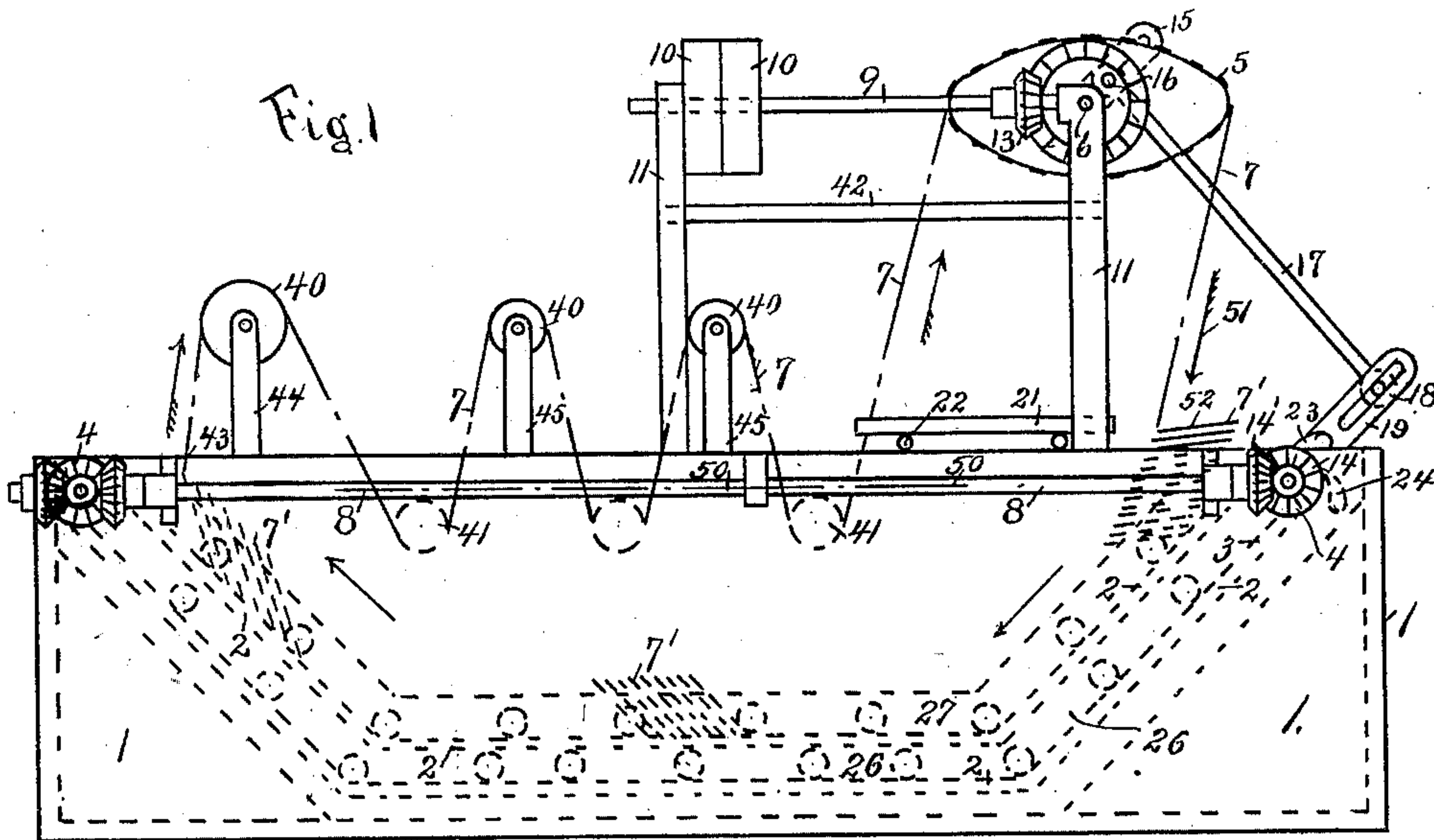
Patented Aug. 5, 1902.

W. H. FLETCHER.  
DYEING MACHINE.

(Application filed July 27, 1901.)

(No Model.)

2 Sheets—Sheet 1.



WITNESSES:

Peter N. Venable

William H. Terhune

INVENTOR.

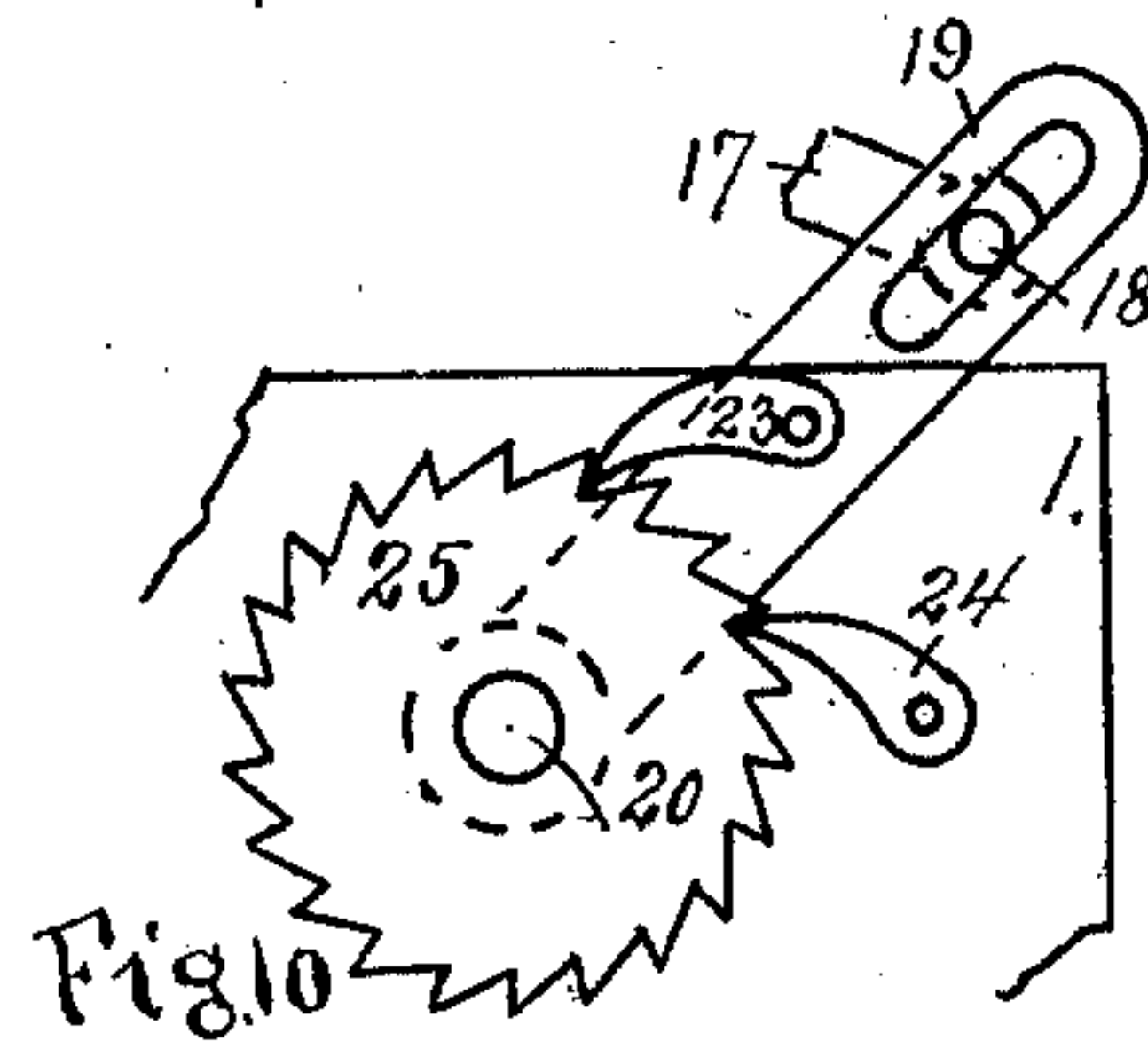
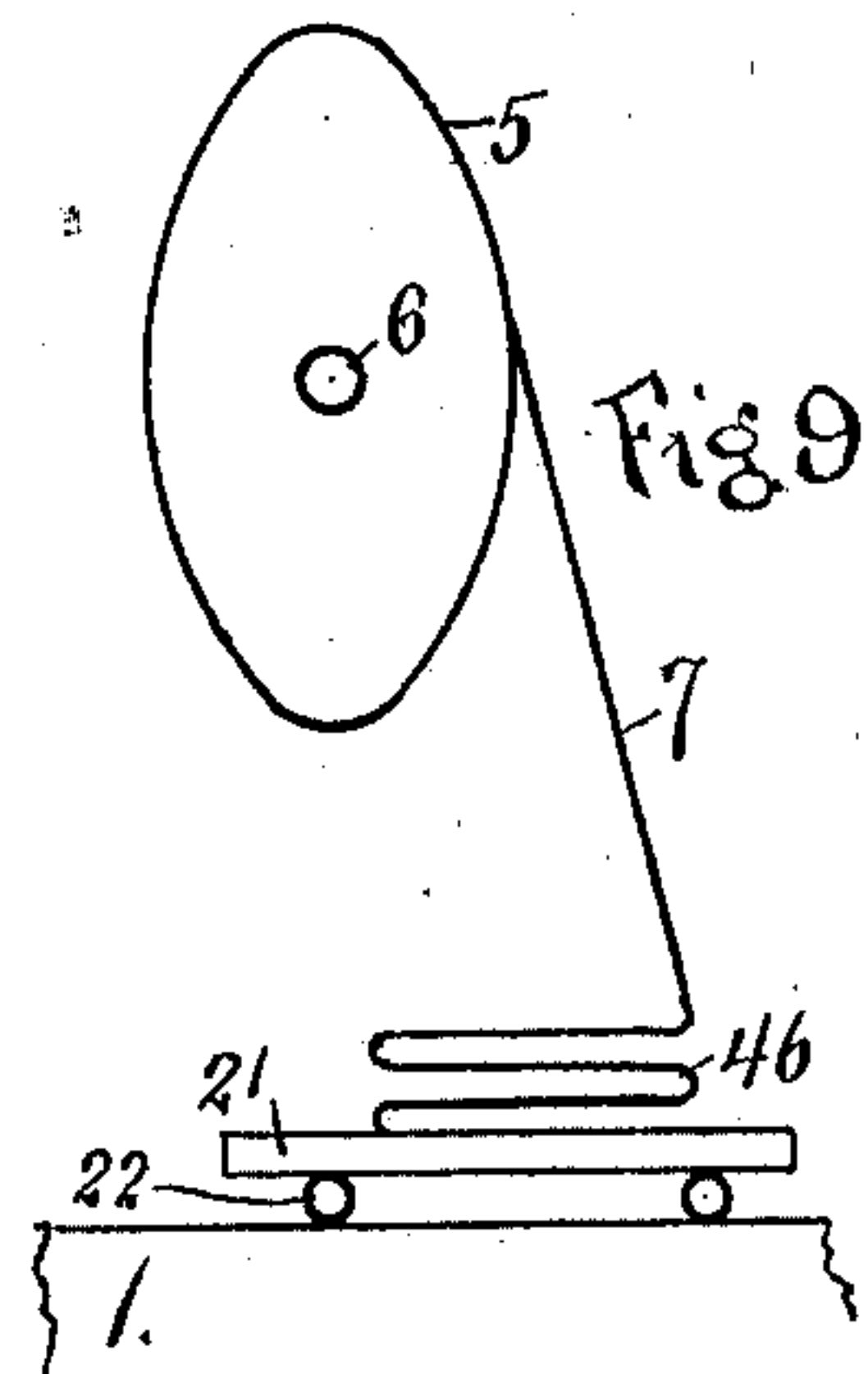
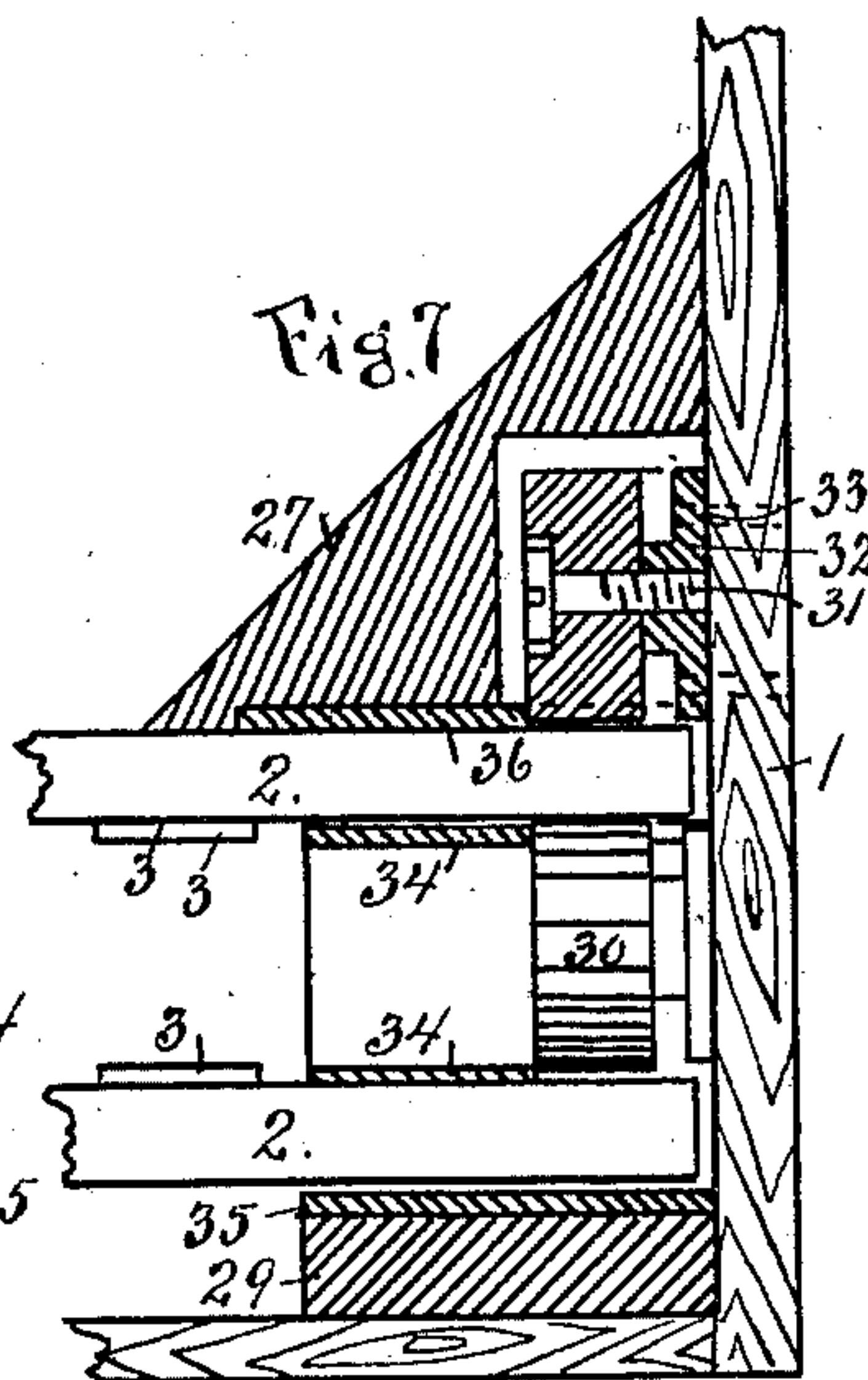
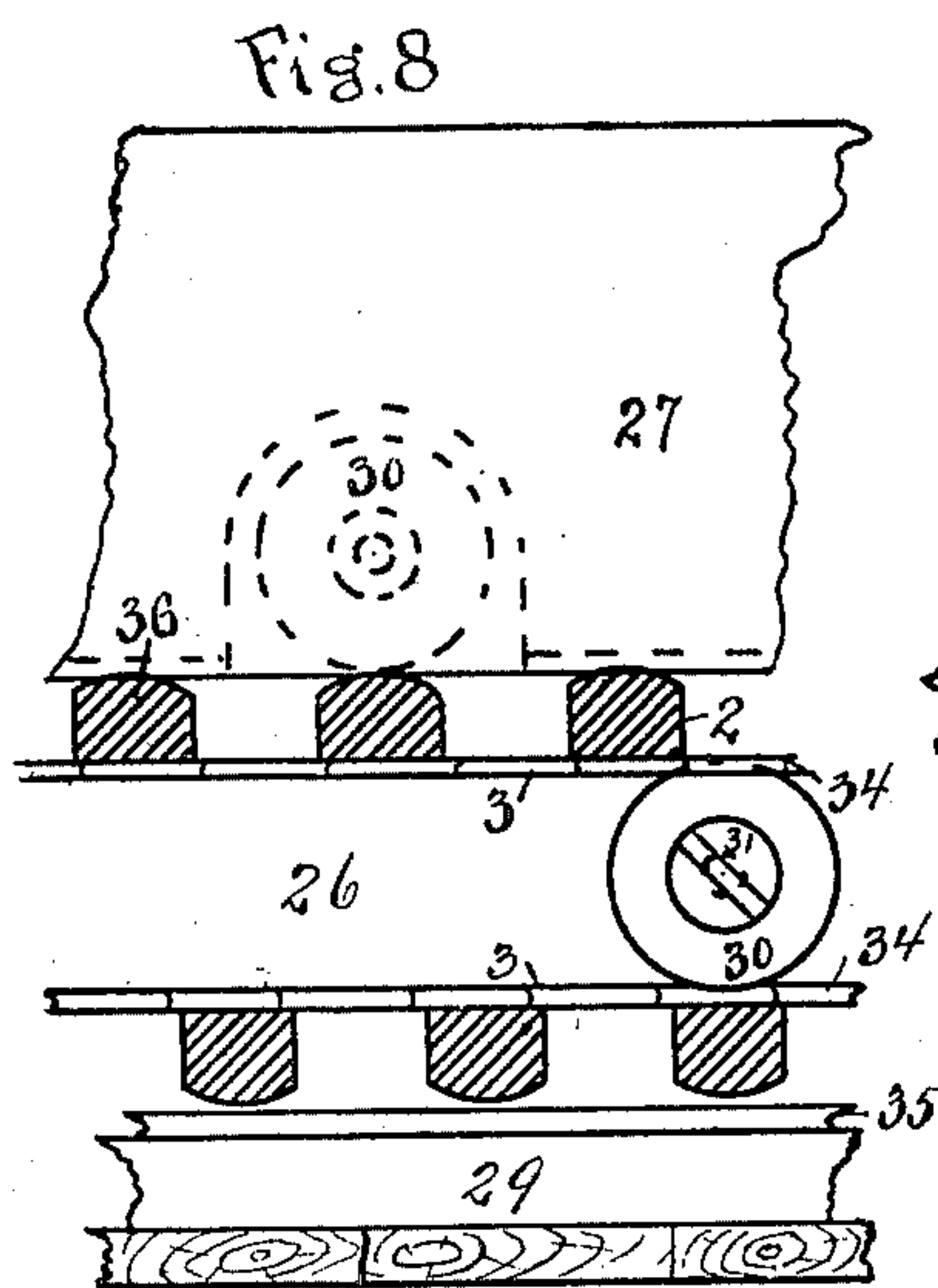
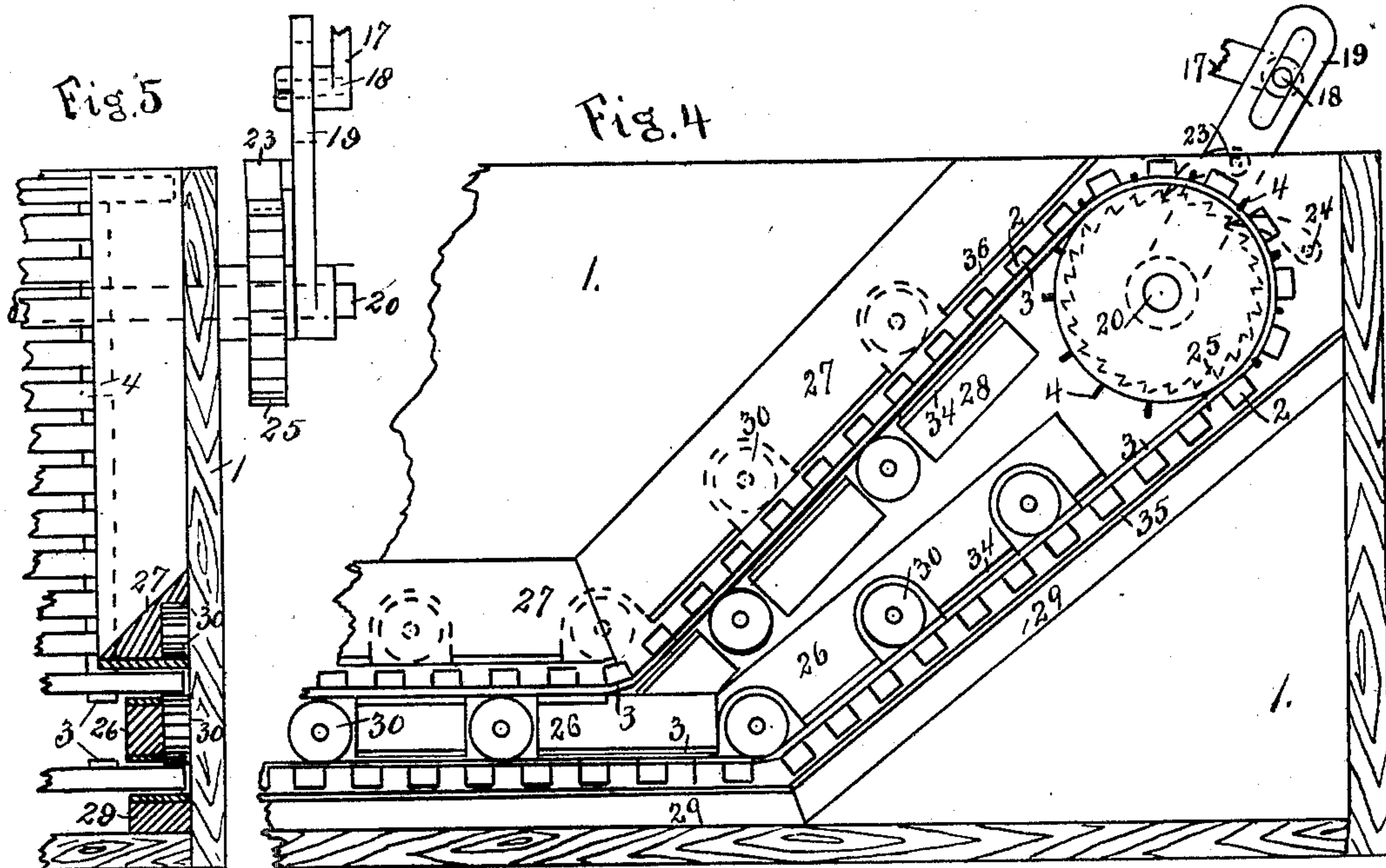
BY W. H. Fletcher  
J. Irving Terhune  
ATTORNEY.

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2 Sheets—Sheet 2.



WITNESSES:

Peter H. Venable  
William H. Terhune

INVENTOR.

W. H. Fletcher  
BY J. D. Terhune  
ATTORNEY.



# UNITED STATES PATENT OFFICE.

WILLIAM H. FLETCHER, OF PATERSON, NEW JERSEY.

## DYEING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 706,171, dated August 5, 1902.

Application filed July 27, 1901. Serial No. 69,980. (No model.)

*To all whom it may concern:*

Be it known that I, WILLIAM H. FLETCHER, residing at Twelfth avenue, in the city of Paterson, in the county of Passaic and State of New Jersey, have invented a new and useful Improvement in Dyeing-Machines, of which the following is a specification.

My invention relates to improvements in the manner of dyeing piece goods.

The objects of my improvements are, first, to reduce the amount of the laborious work of the operators; second, to reduce the number of the operators, and thus cheapen the cost of dyeing piece goods; third, to give the goods a more uniform shade by regulating the time the goods are immersed in the dyeing liquor; fourth, to relieve the goods from the strain and pull on them as they are drawn from the bath, and, fifth, the means of piling the goods in the dye-tub without confusion and an easy way of taking the goods from the bath when finished or dyed. I attain these objects by the mechanism illustrated in the accompanying drawings, in which—

Figure 1 is a side elevation of a dye-tub with my invention attached. Fig. 2 is a plan of the same. Fig. 3 is a front view of Fig. 1. Fig. 4 is a detailed view of a portion of the rack and parts in one end of the tub. Fig. 5 is an end view of a part of Fig. 4. Fig. 6 is a detailed view of the end of one of the rack-staves. Fig. 7 is a detailed section of a portion of the rack and its guides. Fig. 8 is the side view of Fig. 7. Fig. 9 represents the goods coming from the elliptic reel and piling on the carriage. Fig. 10 is a detail of the ratchet take-up on the shaft which moves the rack.

Similar numerals of reference indicate corresponding parts throughout the several views.

In the drawings, 1 represents a dye-tub as ordinarily used. In this an endless rack made up of a number of staves 2, secured on endless chains 3, is placed. This rack is held in position and guided in the tub by the pieces 26, 27, and 29 and the guide-rollers 30, which are all secured to the sides of the tub 1. The rack is driven by means of a shaft on which there are chain-gears or sprocket-wheels over which run sprocket-chains, and on these chains are secured lags of staves of metal or

wood. These staves and chains constitute the rack. The chains in this case are located near to each end of the stave 2. The shaft revolving would cause the chain carrying the staves to move through the tub. There is a shaft 20, with sprocket-wheels 4, located at each end of the tub, over each of which the endless rack changes its direction, and these two shafts 20 are connected by a shaft 8 and are operated together by means of the four bevel-gears 14, one on the end of each of the shafts 9, and the other two one on each end of the shaft 8. This shaft connection is to divide the pull of the rack equally between the two ends of the machine. The power is communicated to these shafts 20 by means of the ratchet-wheel 25 and a lever and pawl operating it. The pawl 23 is secured to the lever 19. This pawl 23 ratchets in the teeth of the wheel 25, and the pawl 24 holds said wheel from turning back when the pawl has moved it. The lever 19 has a slot in it in which there is a stud 18. This slot is for the purpose of moving the stud 18 in it when it is desired to make a longer or shorter movement of the lever for the purpose of moving the rack faster or slower. The stud 18 is connected by a rod 17 to another stud 16 in another lever 15, which is similar and has a slot in the lever 19. The lever 15 is secured to a shaft 6 and revolves with it, while the lever 19 is free on the shaft 20 and only moves backward and forward.

On the shaft 6, which is supported by two uprights 11, there is an elliptical reel 5, over which the goods 7 pass, and on the end of the shaft 6 there is a bevel-gear 12, which is driven by the bevel-gear 13 on a shaft 9, which is supported by one of the same uprights 11 as the shaft 6 is, and a third upright with the same numeral. These two uprights are braced by the bar 42. The whole machine is driven by the pulleys 10 on the above-named shaft 9.

The guides for the rack are placed in the tub near the bottom. The guides 27 are made sloping, so as to give the goods a tendency to keep away from the sides of the tub, and for the purpose of lessening the friction and thus protecting the said goods the under portion of these guides 27 may be lined with a strip of metal 36 to assist in lessening friction on the rack when moving, and at short distances apart rolls 30, incased and protected



by the guides 27, are placed. These rolls are secured by the screws 31 and the flanges 32 and small screws 33 to the sides of the tub.

When the staves 2 are made of wood, they float 5 when the tub is filled with liquor, and in that case there is considerable friction on the under part of the guides, hence the rolls and the metal strips. The guide 26 between the upper and the lower portions of the endless 10 rack have metal strips 34 on both the top and the bottom of the said guide and have rolls 30 placed at intervals, same as the guide 27, and at or near the bottom of the tub there is another guide 29, with strips 35 for the same 15 purposes as the other guides, and if found necessary rolls can be placed at intervals the same as in the other guides.

The height of the liquor in the tub is shown by the dotted line 50.

20 Along above the top of the tub there are a number of rollers 40 and 40', supported by uprights 45 and 44, and in the tub, under the liquor, there is a succession of rollers 41. The goods pass under and over these rollers for 25 the purpose of immersing and exposing alternately, so that the oxygen of the air may act on the goods between the baths.

On the top of the tub there is a flat tray or carriage 21 with small rollers 22. On this 30 tray the goods are placed, and from this they pass over the elliptic reel 5 in the direction 6 of the arrow 51 in Fig. 1 when threading up or putting the goods on the machine. The reel is elliptical in shape for the purpose of 35 giving a folding piling of the goods. While the reel revolves, the alternate short and long radius of the reel gives the swinging motion to the goods which causes it to pile up, as shown at 52.

40 The machine is operated as follows: The driving-shaft 9, with the pulleys 10, causes the reel to revolve, and the lever 6 operates the lever 19 and by means of the pawl 23 moves the rack in short movements and pauses al- 45 ternately, and as the goods passing over the reel 5 pile up on the rack at 52 the rack also moves. Thus each lap of the goods is as much behind the previous lap as the rack has moved forward. The goods are thus immersed uni- 50 formly and lay somewhat in the positions shown by the dotted lines 53 and 54. The goods leave the rack again at the point 43, as indicated by the arrow, and pass up and down over and under the rolls 40 and 41 and then 55 to the reel 5 again. The speed of the machine is regulated to suit the fabric, and it can be seen that it insures uniformity of shade in dyeing, and by being carried on the rack the full length of the tub before there 60 is any pull on the goods in drawing the said goods from the liquid it can thus be seen that the fabric is free from strain and tangles, while in the old way the goods are forced down in the liquid with sticks and are in a

confused mass, and thus at times damaging 65 the goods in drawing them from the tub. The only tension on the goods in my invention comes from the weight of the liquid and the little caused by the rolls 40 and 41.

To take the goods from the machine, all that 70 is required is to roll the carriage or tray 21 forward, as shown in Fig. 9, and receive the goods piled on the said carriage 21 from the reel 5. This is also a great improvement over the old way of lifting the goods from the liq- 75 uid by hand, which is both laborious and expensive as compared with my invention.

Either wood can be used for lags or staves of metal, or the wooden staves can have metal coverings, as shown in Fig. 6, indicated by 80 38. This is to prevent the lags 2 from becoming stained from the dye, and thus marking the goods.

Having thus described my invention, what I claim, and desire to secure by Letters Pat- 85 ent, is—

1. In a dyeing-machine the combination between a dyeing-box an endless sliding rack, operated by sprockets and an actuating device of ratchet-wheels and levers, said racks 90 sloping at each end of the box for the purpose of immersing and raising the goods, and the guides and guide-rollers for the rack, for the purpose of controlling said rack, and in connection with a succession of rollers for 95 airing and drawing the goods from the liquid after being raised into position by the said sloping rack as set forth and described.

2. In a dyeing-machine the combination between the driving mechanism, consisting of 100 the shaft 9, pulleys 10, the bevel-gearing 13 and 12 and the uprights 11 supporting the same and the reel, and a dye-box, endless rack, guides for the same actuated from the shaft on which the reel is, and the shaft 8 105 and gears 14 and 14' for operating the rack at the two ends of the tub as set forth and described.

3. In a dyeing-machine the combination between a shaft 9, a shaft 6 with an elliptic reel 110 operated by said shaft 9, a lever 15 with a slot for lengthening and shortening the stroke, the rod 17 connecting the levers 15 and 19, the lever 19 also with a slot for the same purpose as that in lever 15, pawl 23, for operat- 115 ing the ratchet-wheel 25, pawl 24 for holding the same, the ratchet-wheel 25 secured to the shaft 20, the shaft 20 and the wheels on the same for moving the rack, the endless rack, guides and guide-rollers, and rollers 40 and 120 41 for oxidizing as set forth and described.

Signed at Paterson, in the county of Passaic and State of New Jersey, this 2d day of July, A. D. 1901.

WM. H. FLETCHER.

Witnesses:

WILLIAM A. ARNOLD,  
PETER N. VENABLE.