C. W. HAWTHORNE.

ROD SWITCHING MECHANISM.

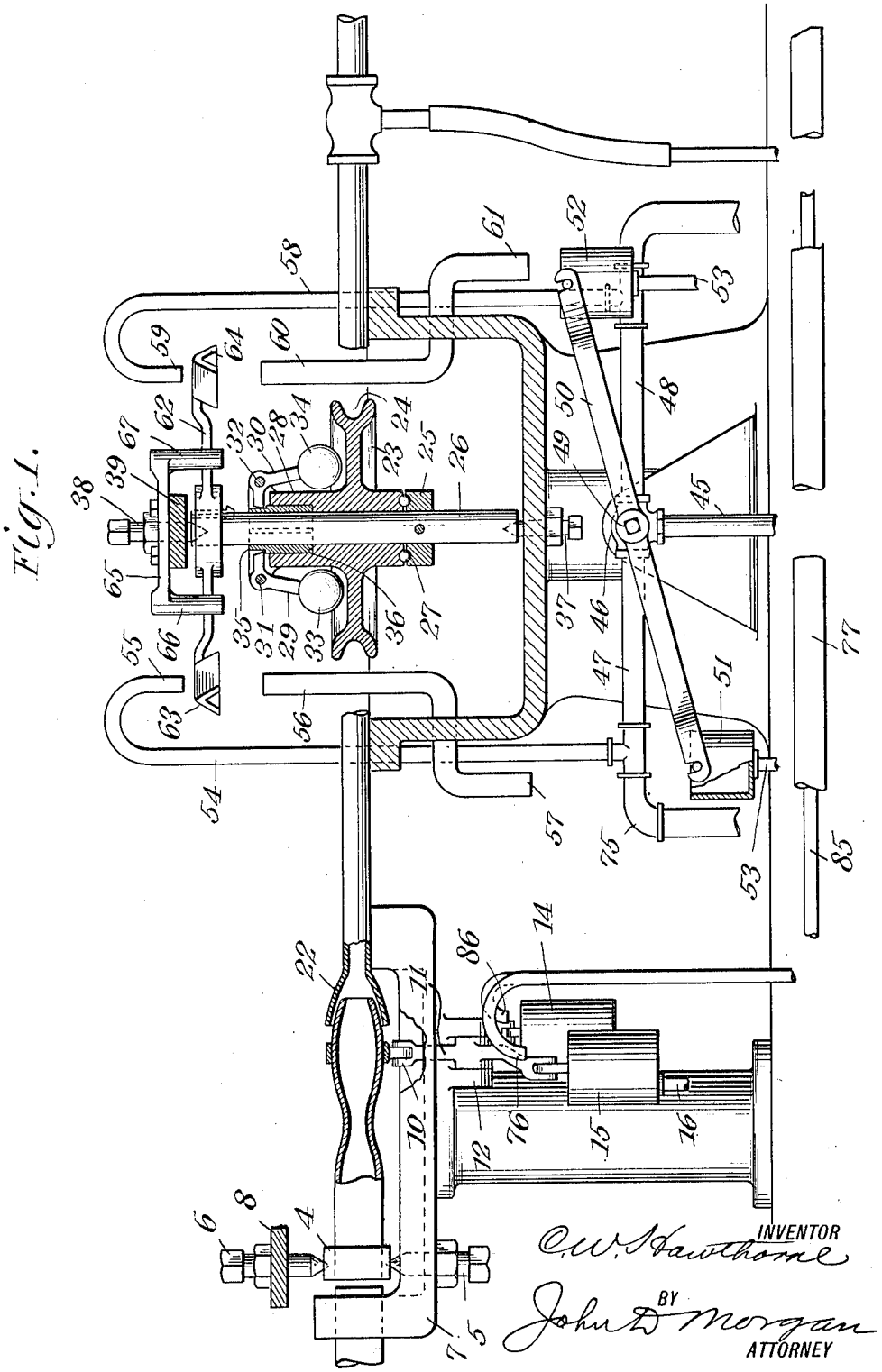
APPLICATION FILED SEPT. 10, 1915.

1,291,868.

Patented Jan. 21, 1919.

3 SHEETS—SHEET 1.

Fig. 1.



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3 SHEETS—SHEET 2.

Fig. 2.

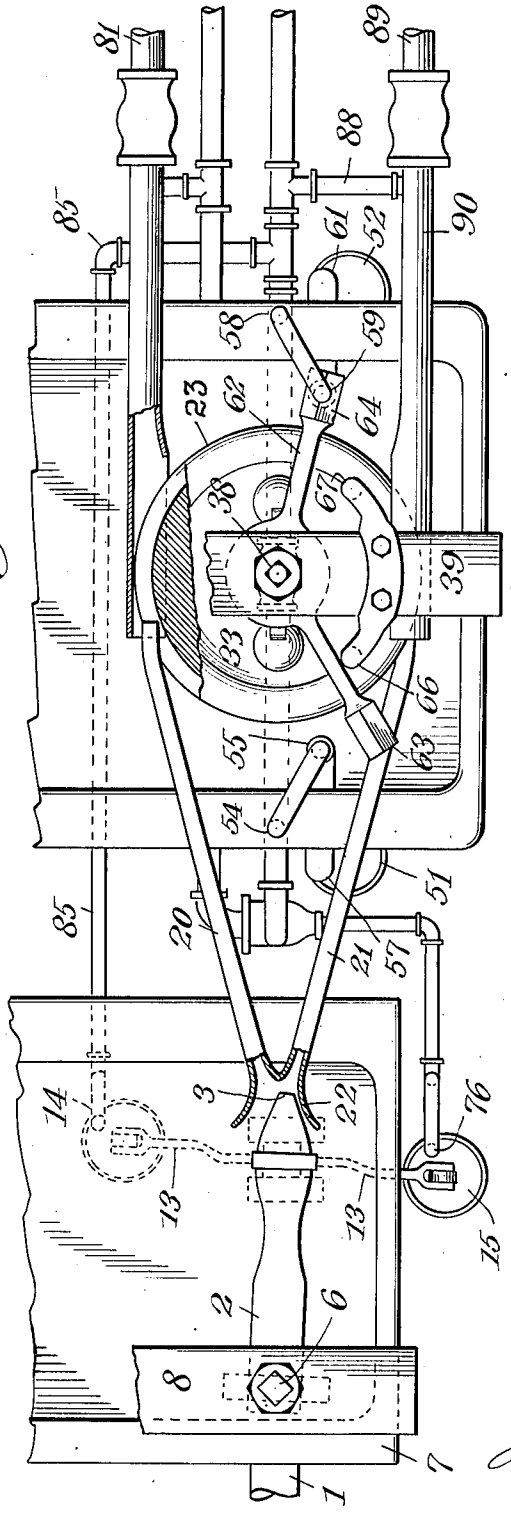
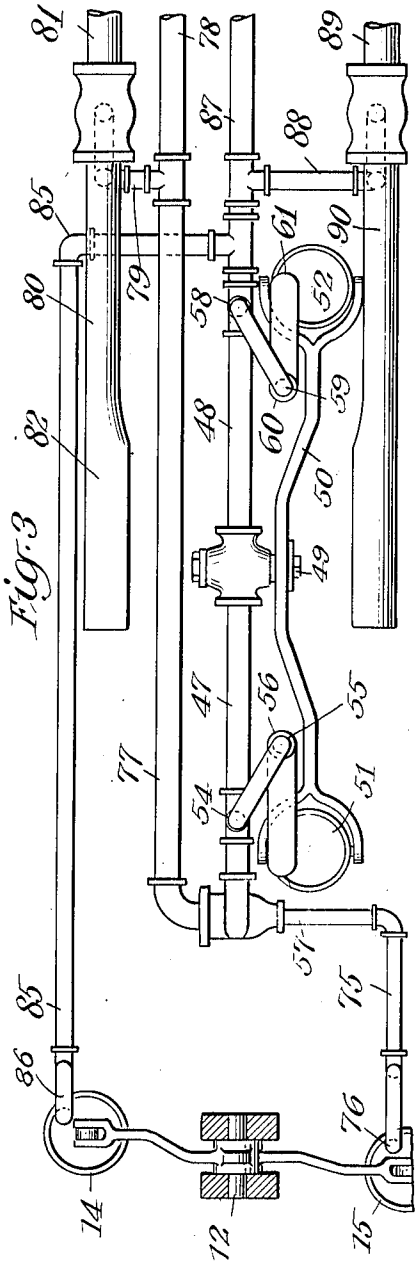


Fig. 3



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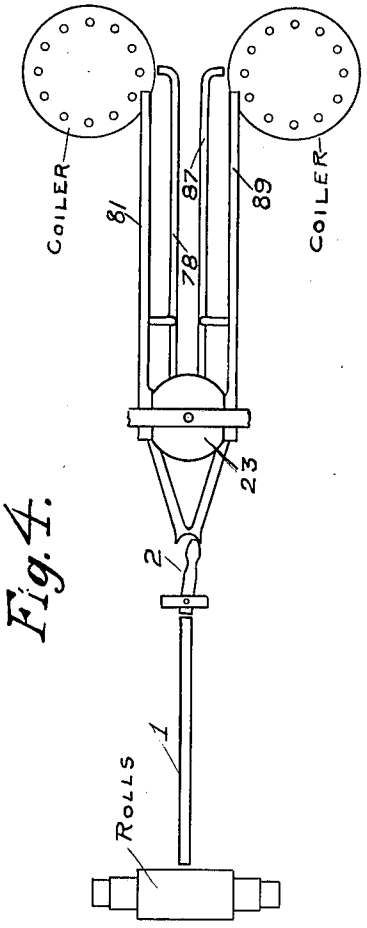


Fig. 4.

WITNESSES:

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ROD-SWITCHING MECHANISM.

1,291,868. Specification of Letters Patent. Patented Jan. 21, 1919.

Application filed September 10, 1915. Serial No. 49,949.

To all whom it may concern:

Be it known that I, CHARLES W. HAWTHORNE, a citizen of the United States, and a resident of Hamilton, Ontario, Canada, have invented new and useful Improvements in Rod-Switching Mechanisms, of which the following is a specification.

The invention relates to an automatic switch for rod or wire reels or coilers for use in connection with rod and wire rolling mills, and in certain of its features the invention relates also to means for directing the flow of cooling water in conformity to the switching of the hot rods or wires from one reel or coiler to another. Further features, objects and advantages of the invention will be set forth hereinafter in part, and in part will be obvious herefrom.

The invention consists in the novel parts, constructions, arrangements, combinations and improvements herein shown and described.

The accompanying drawings, referred to herein and constituting a part hereof, illustrate one embodiment of the invention, and together with the description serve to explain the principles thereof.

Of the drawings:

Figure 1 is an elevation, with front of frame removed and with parts in section, of a machine embodying the invention.

Fig. 2 is a top plan generally corresponding to Fig. 1;

Fig. 3 is a plan of the water circulating system shown in the other views; and

Fig. 4 is a general plan.

Referring by way of example to the accompanying drawings, means are provided whereby a plurality of rod or wire reeling or coiling devices are supplied from a single source of supply, such as the last stand of mill rolls, the successive lengths of rod or wire being alternately switched or directed to the different reels or coilers.

In such embodied form, the rods are run in from the rolls through suitable guiding or supplying means, such as the pipe guide 1. The guide 1 communicates with a guiding switch or directing device 2, which is shown of tubular form, the rear portion thereof being of substantially the same bore as the pipe 1, the tube 2 being contracted in advance of said portion and then being enlarged and having its outlet 3 again contracted. The switch 2 is mounted to swing pivotally about a bearing 4 at or near the rear or receiving end thereof. Said bearing 4 is supported to swing upon pointed supporting screw-bolts 5 and 6, which are threaded, respectively, into the frame members 7 and 8.

In accordance with one feature of the invention, the switch or directing means 2 is actuated and controlled by gravity and in the embodied form this is effected by water flow, said means being actuated and controlled in conjunction and in harmony with the cooling water for the rods and coilers. In the embodied form of switch-actuating and controlling means, the switch 2 is pivotally connected at 10 with an arm 11 extending upwardly from the pivotal bearing 12 of a lever 13. At each end thereof there is suspended from the lever 13 two pails or tanks 14 and 15 provided respectively with discharge openings 16 in their bottoms.

The switch 2 is moved about its pivotal bearing 4 to direct the rods running in from the mill into either of the two pipe guideways 20 or 21, one of said guideways going to one reel or coiler and the other of said guideways going to another reel or coiler (see especially Fig. 2). The forward end of the switch 2 swings alternately into alinement with either the guideway 20 or the guideway 21 within the flaring and enlarged end 22, common to both guideways.

The automatic switch actuating and controlling mechanism is governed by the rods running through the machine, and in accordance with certain features of the invention, said means includes a rotating member frictionally engaged by the running rod, said rotating member controlling the gravity switch-actuating means. As heretofore indicated, said rotating member is employed likewise for controlling the flow of the cooling water upon a running rod and its reel or coiler, a portion of the water being used as gravity means for controlling and actuating the switch. In certain aspects of the invention, it will be understood, certain of these means or devices may be used without the others.

Referring in detail to the illustrated embodiment, a wheel 23 having in its periphery a groove 24 is loosely mounted on a shaft 26 and is supported to rotate freely upon a col-

lar 25 fixed to the shaft 26. To this end a ball race 27 is provided by the opposing surfaces of wheel 23 and collar 25, for the reception of anti-friction ball bearings, as shown. The wheel 23 has integral therewith an upwardly extending hub or portion 28, upon which is mounted a means for clutching or engaging the shaft 26, so that said shaft may be caused to turn with the wheel 23, when said wheel is rotated by frictional engagement with the running rod.

The embodied form of such clutching or engaging means comprises a momentum device including two angled levers 29 and 30, pivoted respectively at 31 and 32 upon the part 28 which part is fixed to or integral with the wheel 23. Upon the outer ends, respectively, of the levers 29 and 30 are weights 33 and 34. The inner ends of the bent levers 29 and 30 are contiguous to and engageable with a split spring collar 35, encircling loosely the shaft 26 and resting loosely in a seat 36 within the upwardly extending part 28 of the wheel 23. The shaft 26 is pivotally mounted upon a pointed screw-bolt 37 carried in the machine frame, and its upper end is engaged by a similar pointed screw-bolt 38 carried in the frame piece 39. Thus, when the wheel 23 begins to rotate, and as it gains speed, the levers 29 and 30 rotate therewith and the weights 33 and 34 move outwardly, owing to momentum or centrifugal action, and the inner ends of the levers 29 and 30 thereby being pressed inwardly against the spring collar 35. The collar thus clutches the shaft 26, causing the shaft to rotate.

As heretofore indicated, the rod-directing means and the directing means for the cooling water, in accordance with one feature of the invention, are controlled by one device. In the embodiment of this feature of the invention, the main water supply is through a pipe 45 provided at 46 with a two-way valve, said valve discharging in one position into the pipe 47 and in its other position into the pipe 48. Fixed to the stem 49 of valve 46 is a lever 50, the valve-stem 49 acting as a pivot for the lever, and the lever operating the valve. At either end of the lever 50 are pails or tanks 51 and 52 provided respectively with discharge openings 53 in their bottoms. The proportion of the water supply to the discharge openings of the various tanks is such that when water is supplied the tanks fill and remain full, but empty quickly when the supply is cut off.

Extending upwardly from the pipe 47 is pipe 54, its end 55 being in vertical alinement with a pipe 56, the lower end 57 thereof being in alinement with the pail 51. Similarly, a pipe 58 extends upwardly from the pipe 48, its end 59 being in vertical alinement with the pipe 60, the lower end 61 of which is in vertical alinement with the pail 52.

Fixed intermediately upon shaft 26 is an arm or lever 62, said arm having at either end thereof valves or deflectors 63 and 64, respectively. The valve 63 passes alternately into and out of alinement with the pipes 55 and 56, thus preventing or permitting the flow of water into the pail 51. Likewise the deflector 64 passes into and out of alinement with the pipes 59 and 60, thereby preventing or permitting the flow of water into the pail 52. Carried by the machine frame is an arm 65 provided at either end with downwardly projecting stops 66 and 67, thus limiting the swinging movement of the arms of the lever 62, and serving also to aline the valves or deflectors 63 and 64 with their respective pipes.

Referring more particularly to the arrangement of piping for the water flow for controlling the switch 2 and for cooling the running rod and the reels or coilers from the pipe 47, a pipe 75, connecting with pipe 47, has its discharge end 76 above the pail or tank 15. From the pipe 47 also a pipe 77 runs to the water connections 78 for one of the reels or coilers and has a connection 79 to the guides 80 and 81, which direct the rod to said reel or coiler. The guide 80 is formed at 82 to receive the periphery of the wheel 23.

In the corresponding arrangement of pipes from the pipe 48, the pipe 85, connecting with pipe 48, has its discharge end 86 above the pail or tank 14. From the pipe 48 also a pipe 87 extends to the water connection for the other coiler or reel. A cross-pipe 88 connects also to the guides 89 and 90, which direct or conduct the rods to such second coiler or reel. The guide member 90, like the guide 82, is shaped to receive the periphery of the wheel 23, as is best shown in Fig. 2.

The manner of operation of the herein described mechanism is substantially as follows:

The directing device 2 may be regarded as being alined with the pipe-guide 21, as shown in Fig. 2, at the moment after the end of one rod has just passed and the end of the next succeeding rod is coming up. The rod runs through the guide 21 and frictionally engages the periphery of the wheel 23 in the grooves 24. The wheel 23 begins rotating, and as it is at this time free on the shaft 26, it rapidly comes up to speed without in any wise interfering with the running rod. As the speed of the wheel 23 increases the weights 33 and 34 move outwardly, and the inner ends of the members 29 and 30 press against the spring-sleeve or collar 35, clutching the shaft 26 which begins to rotate. The wheel 23 is rotating in a counter-clockwise direction, (Fig. 2), and

when the shaft 26 begins to rotate, deflector or valve 63 is moved out of line between pipes 55 and 56, and lever 62 is brought to rest against stop 66.

During the run of the preceding rod through guideway 20, the water has been running through pipe 47, and through pipe 77 supplying cooling water to the guides 81, etc., and to the cooling system 78 and filling the tank 15. This tended to throw the switch guide 2 from its position or alinement with the guide 20 into alinement with the guide 21, but so long as the rod was running through the guide 20, it prevented the switch from moving. Immediately that the rear end of the rod passed the forward end of the switch guide 2, the switch guide, owing to the action of gravity on the tank 15, moved into alinement with the guide 21, as shown in Fig. 2. The forward end of the new rod running in, passed into the guideway 21, and the action of the wheel 23 and the associated parts as described took place.

Prior to the running in of the forward end of the second rod in the guide 21, the water was discharging from the pipe 55, but the valve or deflector 63 was in position to prevent the water from running through pipe 56 and filling tank 51, which tank was then in the elevated position (that is, the reverse of the position shown in Fig. 1) and pipe 45 was discharging into pipe 47. When the forward end of the rod running through guideway 21 rotated wheel 23 as already described the valve or deflector 63 was swung into the position shown in Fig. 2. The water from pipe 55 was thus allowed to pass through pipe 56 and to fill tank 51, which then moved downwardly to the position shown in Fig. 1, moving valve 46, and pipe 45 discharged into pipe 48. The cooling water passes from pipe 48 to cool the guides 89 and 90 and into the cooling system 87 for the second coiler. The water is now also flowing through pipe 59, but the valve 64 prevents its filling tank 52 and thereby actuating the valve 46 until the forward end of the next rod engages the wheel 23, rotating it in the other or clockwise direction, when the various operations already described take place, but in the reverse direction.

It will be understood that when either arm of lever 62 contacts with one of the stops 66 or 67, thus holding shaft 26 against rotation, the frictional spring clutching device 35 will slip between said shaft and the rotating wheel 23; any drag thus produced, causing a slowing down of the wheel, will obviously result in the inward movement of weights 33 and 34 and thus completely disengage the shaft 26 from said wheel.

From all the foregoing it will be understood that a mechanism has been provided embodying the features and objects of invention and the advantages herein set forth, together with other objects and advantages. It will be further understood that changes may be made from the mechanism shown and described within the scope of the accompanying claims without departing from the principles of invention, and without sacrificing its chief advantages.

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

1. A rod coiling machine including in combination a source of rod supply, a plurality of coilers, and means operated by the rod for directing different rods to the different coilers.

2. A rod coiling machine including in combination a source of rod supply, a plurality of coilers, and means operated by the running rod for directing different rods to the different coilers.

3. A rod coiling machine including in combination a source of rod supply, a plurality of coilers, and means operated by the running rod for directing different rods to the different coilers, said directing means including a frictionally operated device with which the rod engages.

4. A rod coiling machine including in combination a source of rod supply, a plurality of coilers, and means operated by the running rod for directing different rods to the different coilers, said directing means including a momentum device operated by the rod.

5. A rod coiling machine including in combination a source of rod supply, a plurality of coilers, and means operated by the rod for directing different rods to the different coilers, said directing means including a gravity operated device controlled by the rod.

6. A rod coiling machine including in combination a source of rod supply, a plurality of coilers, and means operated by the running rod for directing different rods to the different coilers, said directing means including a momentum device and a gravity operated device controlled by the momentum device.

7. A rod coiling machine including in combination a source of rod supply, a plurality of coilers, and means operated by the running rod for directing different rods to the different coilers, said directing means including a device frictionally operated by the running rod and a momentum device.

8. A rod coiling machine including in combination a source of rod supply, a plurality of coilers, and means operated by the running rod for directing different rods to the different coilers, said directing means including a device frictionally operated by the running rod and a momentum device and a gravity operated device controlled by the momentum device.

9. A rod coiling machine including in combination a source of rod supply, a plu-

rality of coilers, and means operated by the running rod for directing different rods to the different coilers, said directing means including a device frictionally operated by the running rod and a gravity operated device controlled by the frictionally operated device.

10. A rod coiling machine including in combination, a source of rod supply, a plurality of coilers, means for directing rods to the different coilers, and means for operating the directing means, including a rotating device engaged by the running rod.

11. A rod coiling machine including in combination, a source of rod supply, a plurality of coilers, means for directing rods to the different coilers, a rotating member, and means for operating said rod directing means including the frictional engagement of the rods with said rotating member.

12. A rod coiling machine including in combination a source of rod supply, a plurality of coilers and fluid controlled means for directing different rods to the different coilers.

13. A rod coiling machine including in combination a source of rod supply, a plurality of coilers and fluid controlled means operated by the rods for directing different rods to the different coilers.

14. A rod coiling machine including in combination a source of rod supply, a plurality of coilers, cooling means for the respective coilers and means controlled by the running rods for directing a cooling fluid into the cooling means of the different coilers successively.

15. In a rod coiling machine, a switch for the rods, a fluid control system therefor, and a valve in said system actuated by the running rod.

16. In a rod coiling machine, a switch for the rods, and a fluid control system therefor comprising a wheel rotated by the running rod and a valve controlled by the wheel.

17. In a rod coiling machine, a switch for the rods, and a fluid control system therefor comprising a device movable by the running rod and a valve controlled by said movable device.

18. In a rod coiling machine, a switch for the rods, and a switch controlling device including a valve actuated by the running rod and a water controlled gravity device for moving the switch.

19. In a rod coiling machine, a switch for the rods, and a switch controlling device including a wheel rotated by the running rod and a valve controlled by the wheel and a water controlled gravity device for moving the switch.

20. In a rod coiling machine, a switch for the rods, and a switch controlling device including a device movable by the running rod and a valve controlled by said movable device and a water controlled gravity device for moving the switch.

21. In apparatus of the class described, the combination with means for advancing consecutive rods, of a plurality of rod receiving devices, and means for automatically directing successive rods alternately to said receiving devices.

22. In apparatus of the class described, the combination with means for advancing successive rods in a single path, of a plurality of receiving devices for said rods, and means operable by the movement of a rod through one of said receiving devices for directing the next succeeding rod into another of said receiving devices.

23. In apparatus of the class described, the combination with means for advancing successive rods in a common path, of a plurality of rod guiding devices branching from said common path, means for automatically directing successive rods alternately to said guiding devices, and means for alternately supplying cooling fluid to said guiding devices.

24. In apparatus of the class described, the combination with a plurality of rod guiding devices, of a source of cooling fluid supply, automatic means for directing successive rods alternately to said guiding devices, and automatic means for directing said cooling fluid supply alternately to said guiding devices.

In testimony whereof, I have signed my name to this specification, in the presence of two subscribing witnesses.

CHARLES W. HAWTHORNE.

Witnesses:
HENRY A. CLARK,
G. WALTON.