Dec. 14, 1954 H. SCOTT 2,696,823

MOVABLE WATER SPRAY SYSTEM FOR ROLLING MILL RUN-OUT TABLES

Filed March 31, 1952

FIG. 1.

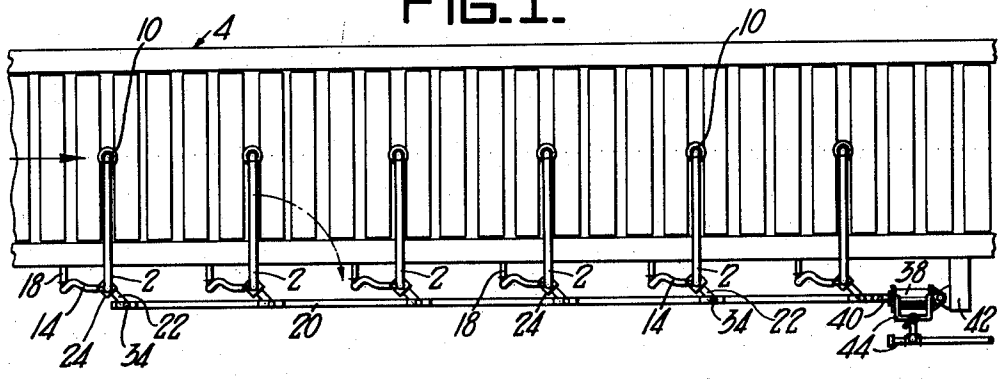


FIG. 3.

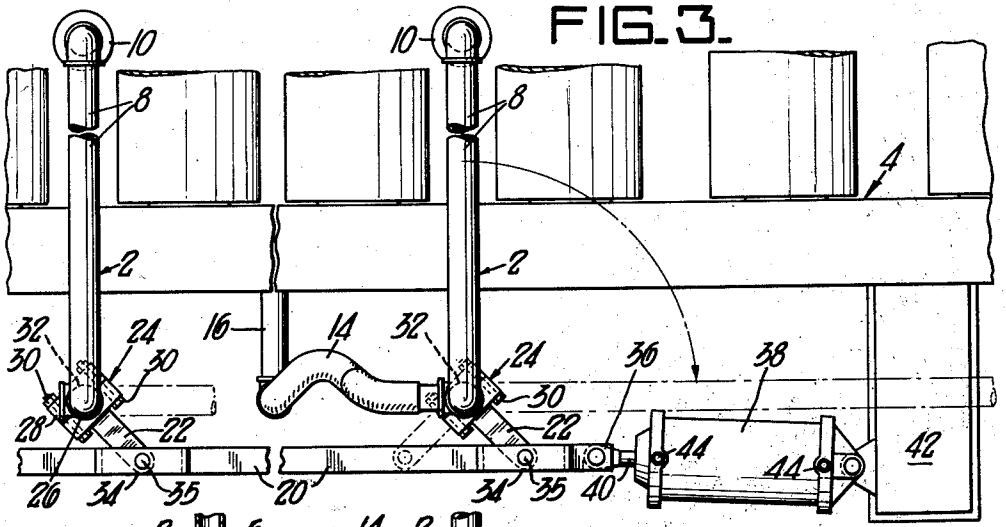


FIG. 5.

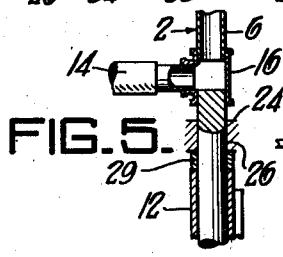


FIG. 4.

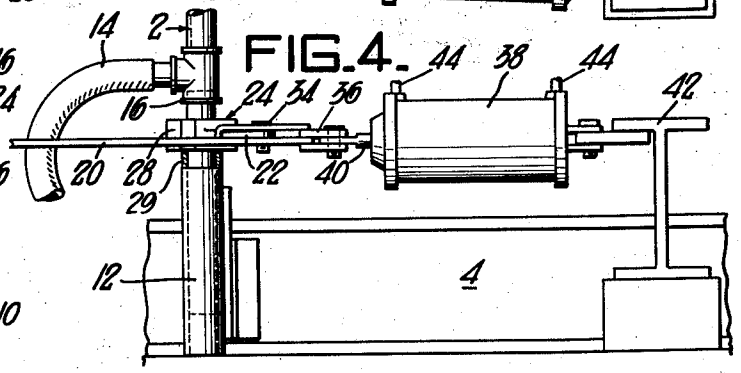
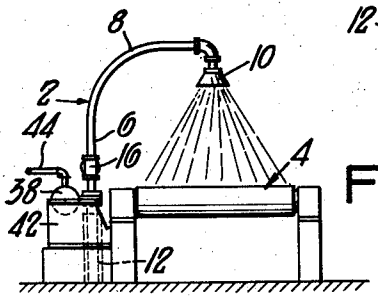


FIG. 2.



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United States Patent Office 2,696,823 Patented Dec. 14, 1954

2,696,823

MOVABLE WATER SPRAY SYSTEM FOR ROLLING MILL RUN-OUT TABLES

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Application March 31, 1952, Serial No. 279,663

4 Claims. (Cl. 134—122)

The present invention relates in general to cooling fluid spray systems and in particular to a water spray system for the run-out table of a continuous strip mill which may be easily and speedily moved out of operating position to safeguard against damage from strip accumulating on the run-out table due to an interruption in the operation of the table.

In the hot rolling process, as utilized in the manufacture of strip steel, it is common practice to subject the hot rolled strip to cooling water sprays after it emerges onto the run-out table from the final roll stand in the mill train. Water is sprayed onto the top surface of the steel strip as it passes along the run-out table in predetermined amounts to obtain the desired coiling temperatures and consequent control of various metallurgical properties. Up to the time of my invention, the apparatus used to spray the surface of the strip comprised a series of vertically projecting pipes rigidly mounted in spaced relationship along one side of the run-out table. Each pipe had its top portion bent in an arc of approximately 180 degrees and at a radius that positioned the arched end over the center line of the run-out table. A conventional diffusing spray nozzle was attached to the end of the arched portion of the pipe.

Operating experience with the above described spray system brought out certain shortcomings, the most important of which is its immobility in the event of trouble occurring on the run-out table. Even though a cobble occurs on the rolling mill run-out table it is necessary to clear the mill of all slabs that are in the process of being rolled by continuing the rolling operation and allowing the strip to pile up on the table. In so doing, the strip piled up on the run-out table and frequently reached such a height that it exerted pressure upon the arched portions of the cooling spray pipes. This pressure was sufficient to deflect the pipes out of position and damage the spray nozzles.

It is accordingly an object of my invention to provide a water spray system consisting of a plurality of individual spray pipes with means whereby said spray pipes may be simultaneously moved out of operating position to protect them.

This and other objects will become more apparent after referring to the following specification and attached drawings, in which:

Figure 1 is a top plan view;

Figure 2 is an end elevation;

Figure 3 is an enlarged top plan view;

Figure 4 is a side elevational view; and

Figure 5 is an enlarged detailed view, partly in section, showing the socket installation of the system.

Referring more particularly to the drawings, reference numeral **2** indicates the upstanding spray pipes of a water spray system for a continuous strip mill run-out table **4**. Each of the spray pipes, which are spaced along one side of the table, has a vertical portion **6** and an arched portion **8**. The arched portion **8** extends over the run-out table and is directed downwardly towards the center line of the table. A diffusing spray nozzle **10** is provided on the downwardly directed free end of the arch portion **8** to direct the water spray downwardly towards the table.

Each of the spray pipes **2** is supported in a socket **12** for rotatable movement therein and is supplied with water through a flexible hose **14**. The bottom portion of each of the spray pipes **2** which fits into the socket **12** is

solid and does not extend completely to the bottom of the socket but terminates short thereof as best shown in Figure 4. Each of the sockets **12** may be filled with oil to facilitate rotation of the pipe **2** therein and to reduce the tendency for rust to form. Hose **14** is connected at one end to an inlet fitting **16** on the vertical portion **6** of the spray pipe and at its other end to a pipe line **18**. The pipe line **18** supplies water to all of the spray pipes.

The construction thus far described is conventional and is not claimed as part of my invention which will now be described in detail.

A bar **20** is mounted for reciprocal movement along one side of the run-out table **4** adjacent the spray pipes **2**. Each spray pipe is connected to the bar **20** by means of a connecting arm **22**. One end of each of the connecting arms is formed in the shape of a flange **24** which extends at right angles to the arm and has a semicircular slot **26** in the center portion of its outer surface. The slot **26** of each of the arms **22** engages one half of the outer circumference of the vertical portion of a spray pipe. The connecting arm is engaged around the spray pipe by means of a cap **28** which is attached to the flange **24** by means of bolts **30**. The cap **28** has a semicircular slot **32** which matches the slot **26** and together therewith forms an opening for rigidly engaging the pipe. A circular bushing **29** made of brass or similar material may be provided around each of the spray pipes **2** between the cap **28** and the top of the socket **12**. This arrangement permits the bushing **29** to support the spray pipe and also reduces the friction between the cap **28** and the socket **12** when the pipes are revolved. Each connecting arm **22** extends angularly away from its associated spray pipe to a pivotal connection **34** on the bar **20** by means of a pin **35**. As best seen in Figure 3, the arms extend parallel to each other in the same direction obliquely of the bar.

A double acting fluid cylinder **38** having a piston rod **40** projecting therefrom is pivotally mounted in a support **42** which is disposed adjacent one end of the run-out table. The end **36** of the bar **20** is pivotally connected with the projecting end of the piston rod **40**. Fluid lines **44** supply fluid to the cylinder **38**. Spaced control valves (not shown) may be provided in the supply lines **44** to control the action of the cylinder **38** to prevent whipping and possible damage to the spray pipes.

In operation, when the piston rod **40** is in retracted position the spray pipes **2** are in their normal operating position, as shown in Figure 3, with the arched portions thereof extending out over the run-out table. However, when the fluid cylinder **38** is actuated, the piston rod **40** is ejected causing the bar **20** to move to the left as seen in Figure 3, to cause the pivotal connections **34** to move in a 90 degree arc about the center of the pipe as shown by the dotted lines in Figure 3. This motion causes each of the pipes to revolve 90 degrees in its socket **12**. The pivotal connection of the bar with the piston of the cylinder provides sufficient play so that the bar will be able to move slightly laterally as it is being thrust forward longitudinally to effect the arc-like movement of the connections **34**. When it is desired to again bring the spray pipes back to normal operating position, the fluid cylinder **38** is actuated to cause the piston rod **40** to retract, which brings about the reverse movement of the spray pipes in the manner as explained above.

Although I have shown a plurality of spray pipes being rotated by the apparatus of my invention, it will be noted that my invention may be used with equally good results where it is desired to rotate a single spray pipe from a remote position.

While one embodiment of my invention has been shown and described it will be apparent that other adaptations and modifications may be made without departing from the scope of the following claims.

I claim:

1. In cooling apparatus for a run-out table including a plurality of spray pipes spaced therealong each having a vertical portion upstanding beside said table and a bent portion arching thereover and means mounting said pipes for rotation about the axes of their vertical portions, the

combination therewith of means common to all said pipes for effecting simultaneous rotation thereof through a predetermined angle, and power means adapted to actuate said last-named means.

2. In cooling apparatus as defined in claim 1 characterized by said means common to all of said spray pipes for effecting simultaneous rotation thereof comprising a bar mounted for reciprocal longitudinal movement beside the table adjacent said spray pipes, a connecting arm extending in a plane normal to the vertical axis of the vertical portion of each of the spray pipes for connecting said pipes with said bar, clamping means on one end of each of said connecting arms rigidly engaging the circumference of its associated spray pipe, said arms extending in parallel planes relative to each other angularly away from their respective associated pipes to pivotal connections with said bar, said power means being connected to said bar for moving said bar longitudinally to rotate said spray pipes.

3. In cooling apparatus as defined in claim 2 characterized by said power means including a double acting fluid cylinder having a piston projecting therefrom pivotally mounted beside said table adjacent one end of said bar, said bar being pivotally connected to the projecting end of said piston, and fluid supply means connected with said cylinder.

4. In cooling apparatus for a run-out table as defined in claim 3 characterized by said clamping means including a flange member on the end of each of said connecting arms, said flange having a semicircular slot in the outer edge thereof adapted to engage substantially one half of the circumference of the vertical portion of one of said spray pipes, a cap having a matching semicircular slot therein adapted to be removably attached to said flange with said semicircular slots forming an opening for engaging the circumference of the vertical portion of one of said spray pipes.

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