July 8, 1930. G. M. THORN ET AL 1,770,051

APPARATUS FOR MARKING COAL

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FIG. I.

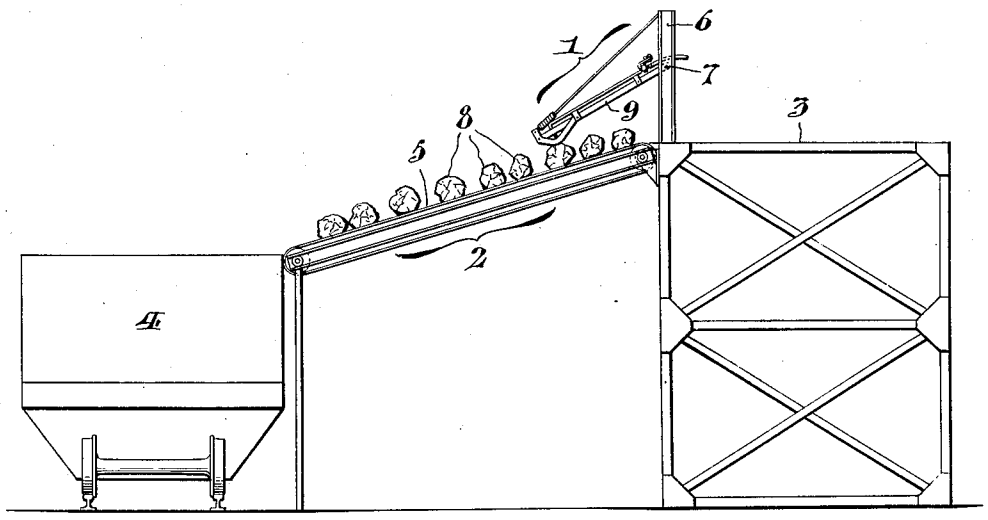
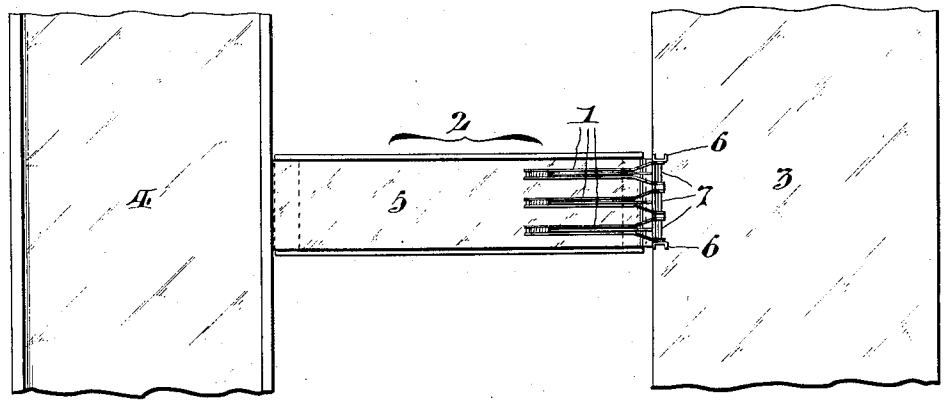


FIG. II.



WITNESSES

Thomas W. Kerr, Jr.

John A. Weidler

INVENTORS:

George M. Thorn, Herbert W. Warden, Jr.,
William J. Blackburn & Arthur E. Shannon,

BY Raley & Paul

ATTORNEYS.

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FIG. III.

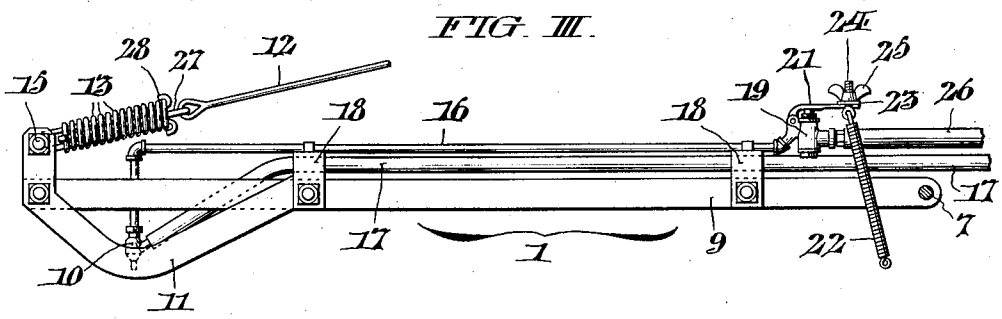


FIG. IV.

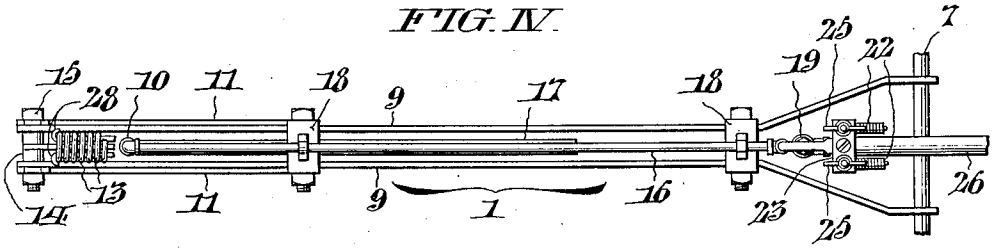


FIG. V.

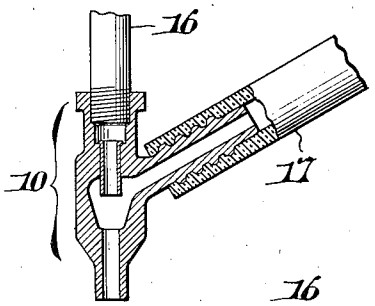
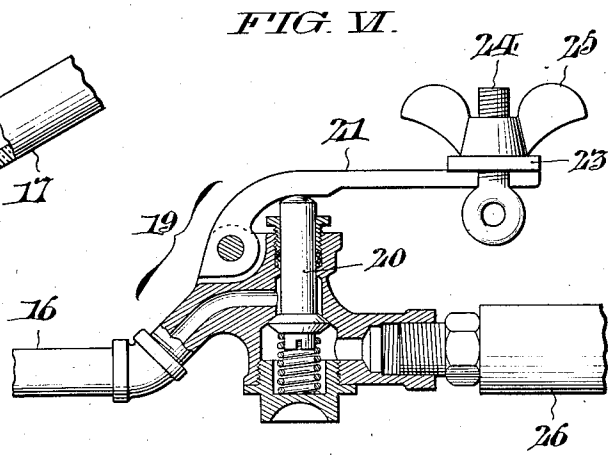


FIG. VI.



WITNESSES

Thomas W. Kerr, Jr.

John A. Weidler

INVENTORS:

George M. Thorn, Herbert W. Warden, Jr.,
William J. Blackburn & Arthur E. Shannon,

BY

Fraley & Paul

ATTORNEYS.

Patented July 8, 1930 1,770,051

UNITED STATES PATENT OFFICE

GEORGE M. THORN, OF BLACKWOOD, VIRGINIA, AND HERBERT W. WARDEN, JR., OF HAVERFORD, PENNSYLVANIA, AND WILLIAM J. BLACKBURN AND ARTHUR E. SHANNON, OF CALVIN, VIRGINIA, ASSIGNORS TO BLACKWOOD COAL & COKE COMPANY, OF BLACKWOOD, VIRGINIA, A CORPORATION OF VIRGINIA

APPARATUS FOR MARKING COAL

Application filed February 16, 1929. Serial No. 340,382.

This invention relates to an apparatus for marking coal, and it has for its object the provision of means for automatically applying colored stripes to lumps of coal as they are conveyed from one point to another.

The labeling or trade-marking of coal to identify the product of the producer has heretofore been accomplished by various means, including the use of stickers carrying colored labels and adapted to be attached to individual lumps. Such labels have failed to adhere satisfactorily to the irregular surfaces of lumps of coal, and it has been found to be more desirable to apply paint markings directly to the coal. Such paint markings to be effective must necessarily be distinct, and it is also of prime consideration that the machine for applying the marks should be fully automatic. These and other requirements are satisfied by the present invention which is characterized by its simplicity of construction and its efficient and economical operation.

One embodiment of our invention is hereinafter described in connection with the illustrations of the accompanying drawings, whereof:

Fig. I represents a side elevation of a conveyor for transporting coal from a sorting station at the mines to cars for shipment, the marking apparatus being shown mounted above the conveyor.

Fig. II is a top plan view of the same.

Fig. III is an enlarged side elevation of the marking apparatus.

Fig. IV is a top plan view of the same.

Fig. V is an enlarged detailed view, partly in section, of a spray nozzle; and

Fig. VI is an enlarged detailed view, partly in section, of an automatic control valve.

With reference to Figs. I and II the coal marking devices, comprehensively designated by the numeral 1, are shown in this instance mounted above an endless belt conveyor 2 which is used for transporting coal from a platform 3 to freight cars 4 for shipment from the mine. Mounted on the conveyor 2 above its moving belt 5 there is a frame 6 which carries a horizontal shaft 7 upon which the marking devices 1 are pivoted, there being ample room for the lumps of coal 8 to pass on the belt 5 beneath the shaft 7.

Each coal marking device 1, as best illustrated in Figs. III and IV, comprises a pair of arms 9 pivoted on the shaft 7 and a spray nozzle 10 adapted to deliver a stream of paint to stripe the coal passing therebeneath. The arms 9 are normally inclined to the belt 5 of the conveyor 2 at an angle of approximately 30°, and guards 11 are affixed to the free ends of the arms 9 to protect the nozzles 10 against injury from striking the coals. In order to keep the guards 11 clear of the belt 5 and to absorb the shock occasioned by the fall of the apparatus, flexible cables 12 are provided, one end of each cable being attached to the frame 6 and the other end being attached to a shackle 27 with a spring 13 and an additional shackle 28 on the spring 13 affixed to the guard 11. The arms 9 and guards 11 of each marking device, which are preferably held in parallel and spaced relation to each other by means of pipe spacers 14 and bolts 15, provide protection for a compressed air line 16 and a paint supply hose 17 which extend therealong and terminate in the spray nozzle 10. Suitable brackets 18 hold the air line 16 and paint hose 17 centrally of the arms 9.

A valve 19 which is adapted to open and close upon vertical movement of the arms 9 is shown situated near the pivoted end of the marking device. This valve 19 being in fixed relation to the arms 9 is bodily movable therewith, whereas movement of the valve stem 20, which is operated by a lever 21, is restrained by means of springs 22 which are attached to a plate 23 on the end of the lever 21 by bolts 24 and thumb screws 25. Accordingly the valve 19 is adapted to move relative to its stem 20 to cause the air supply line 26 to open and close communication with the line 16.

Both the air supply line 26 and the paint supply line 17 are preferably made of rubber hose to provide the requisite flexibility.

The operation of the apparatus is as follows: The marking devices normally rest with their guards 11 a few inches above the conveyor belt 5 in which position the valves 19 are closed. As coal passes along the conveyor 2 it strikes the guards 11 and raises the arms 9. The guard 11 will necessarily follow the contour of the upper surface of a lump of coal which it strikes, even though it be irregular, and the guard 11, accordingly, serves to maintain the nozzle 10 at a substantially constant distance from the surface of the lump of coal so as to insure an even distribution of paint over the surface of the lump. As each pivoted arm 9 is elevated the resulting tension on the springs 22 through the lever 21 operates the valve stem 20 to open the compressed air supply line 26 and cause a spray of paint to issue from each nozzle 10. By suitable adjustment of the thumb nuts 25 the marking devices may be set to operate only upon the passage therebeneath of coals of a predetermined size. While the conveyor is filled with coals of a size sufficient to cause the operation of the nozzles 10, a continuous stream of paint will issue from the nozzles and cause the coals to be striped in the desired manner. By the maintenance of each nozzle 10 near the lowest point of its guard 11, the coals, particularly those of regular surface, may be marked with a stripe with clearly demarcated edges so as to present a distinctive appearance.

Obviously the marking apparatus may be situated at any convenient location, either at the mines or elsewhere, and instead of being associated with an endless conveyor may be affixed to a gravity chute or other types of conveying apparatus. When the conveying apparatus is comparatively wide a series of marking devices may be situated side by side as here shown, whereas with a narrower conveyor a single device may be sufficient.

While we have illustrated and described one embodiment of our invention, it will be apparent that numerous changes may be made in the form of the apparatus shown without departing from the spirit of the invention.

Having thus described our invention, we claim:—

1. In an apparatus for marking coal or the like, means for conveying the material to be marked, means adjacent said conveying means in the path of said material and adapted to be raised by the passage of the material therebeneath, said latter means carrying a spray nozzle directing a spray of paint towards said material, a valve associated with said spray nozzle, said valve being normally closed, and means for automatically opening said valve as said material passes beneath the nozzle.

2. In an apparatus for marking coal or the like, means for conveying the material to be marked, a pivoted arm adjacent said conveying means and adapted to be raised by the passage of said material therebeneath, a paint spray nozzle carried on said arm, a valve associated with said spray nozzle, and means for automatically opening said valve as said pivoted arm is raised and closing said valve as said pivoted arm returns to its normal position.

3. In an apparatus for marking coal or like material of irregular shape, means for conveying the material to be marked, means adjacent said conveying means and adapted to strike said material and to follow the contour of its upper surface, said latter means carrying a spray nozzle directing a spray of paint towards said material, a valve associated with said spray nozzle, said valve being normally closed, and means for automatically opening said valve while said material is passing beneath the nozzle.

4. In an apparatus for marking coal or the like, a pivoted arm adapted to be elevated by the passage of the material to be marked therebeneath, a paint spray nozzle carried on the free end of said arm, a guard for protecting said nozzle and means for causing a spray of paint to issue from said nozzle when the arm aforesaid is elevated.

5. In an apparatus for marking coal or the like, means for conveying the material to be marked, a pivoted arm suspended above said conveying means and adapted to be elevated by the passage of the material therebeneath, means on the free end of said arm for absorbing the shock upon the fall of said arm, a spray nozzle carried on said arm for applying markings to the material, a valve associated with said spray nozzle, and means whereby the elevation or depression of the arm aforesaid causes said valve to open or close respectively.

6. In an apparatus for marking coal or the like, a pivoted arm adapted to be elevated by the passage of material to be marked therebeneath, a nozzle carried on the free end of said arm, a paint supply line communicating with said nozzle, a compressed air line likewise communicating with said nozzle, a valve in said compressed air line, and means whereby the elevation or depression of the arm aforesaid causes said valve to open or close respectively.

7. In an apparatus for applying a colored stripe to lumps of coal or the like, a pivoted arm adapted to be elevated by the passage of the material to be marked therebeneath, a paint spray-nozzle carried on the said arm, and a valve controlling the operation of said nozzle, said valve comprising a body car-

ried on the said arm and movable therewith, and a substantially stationary stem whereby the elevation of said arm causes the said valve to open, and the depression of said arm causes the said valve to close.

In testimony whereof, we have hereunto signed our names.

GEO. M. THORN.
HERBERT W. WARDEN, JR.
WILLIAM J. BLACKBURN.
ARTHUR E. SHANNON.