

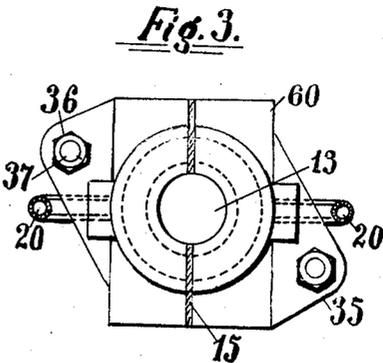
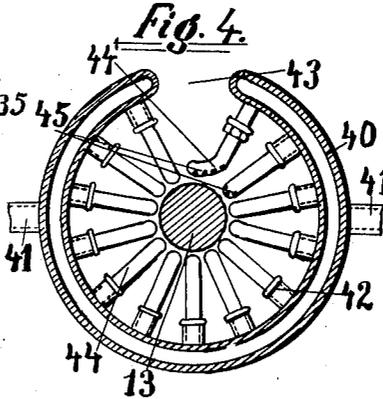
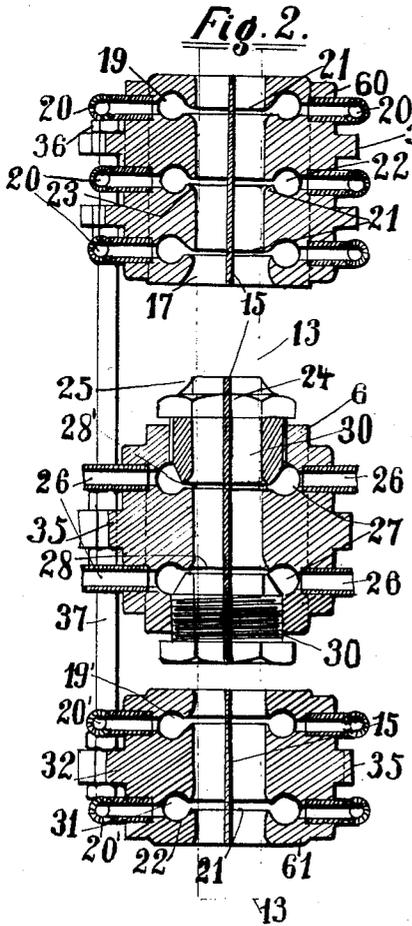
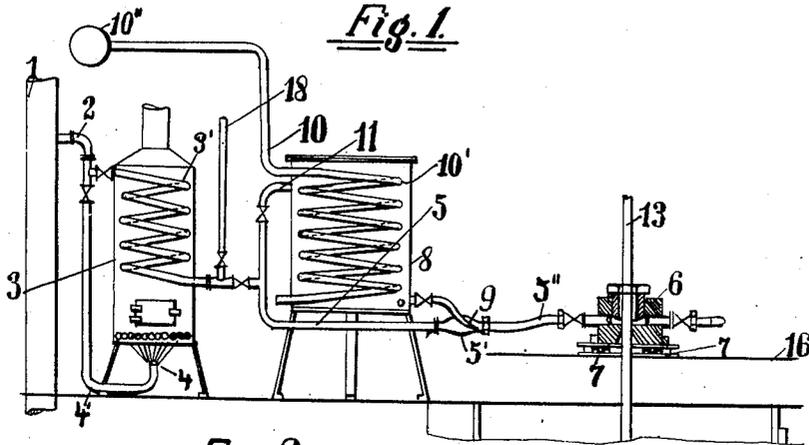
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K. BÖCHER

METHOD OF AND APPARATUS FOR CLEANING AND CONSERVING HOIST CABLES

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UNITED STATES PATENT OFFICE.

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METHOD OF AND APPARATUS FOR CLEANING AND CONSERVING HOIST CABLES.

Application filed May 5, 1925. Serial No. 28,184.

To all whom it may concern:

Be it known that I, KARL BÖCHER, a citizen of Germany, residing at Brambauer, Germany, have invented certain new and useful Improvements in Methods of and Apparatus for Cleaning and Conserving Hoist Cables, of which the following is a specification.

My invention relates to a method of, and apparatus for, cleaning and conserving hoist cables, particularly cables used in mines. My novel method comprises the following successive stages which may be performed in a single continuous operation: cleaning the cable, drying it, applying a conserving preparation such as varnish to the cable, and drying said preparation.

Generally, hoist cables require a fresh coating of preparation within determined periods, for instance, eight weeks for new cables and four weeks for old ones, unless the conditions of operation, wet shafts, acid mine water, etc., require a more frequent treatment of the cables.

The preparation is applied by means of a piece of cloth or a brush but in this method those parts of the cable which are mostly exposed to failure, that is, the fine partitions of the profiled strands, are inaccessible to the preparation.

It is an object of my invention to overcome this drawback by injecting the said preparation into the finest crevices of the cable through suitable nozzles, and, preferably, drying and cleaning the cable before applying the preparation, and drying the preparation when it is on the cable, by hot air from similar nozzles.

With my novel method, it is possible to treat a cable in about an hour as compared with a duration of three or four days in the old method. Moreover, the treatment is very efficient because the finest crevices of the cable are thoroughly filled with the preparation and said preparation sticks to the cable very firmly as it is immediately dried.

In performing my method, compressed and, preferably, highly heated, air, is directed on the slowly moving cable through annular or other nozzles for a certain distance and the air so ejected cleans mechanically the surface and the crevices which are open toward the outside of the cable, and, at the same time, dries and heats the cable.

The air nozzles or the set of air nozzles, as the case may be, is followed by similar nozzles or a set of nozzles through which a mixture of heated preparation, varnish or the like, and preferably heated compressed air, is sprayed on the cable. The preparation readily adheres to the cable, is uniformly distributed over its surface and enters the smallest crevices between the wires. It is dried by means of a second set of air nozzles like the first which project cold or heated compressed air on the cable so that the preparation adhering to the cable is dried and its stickiness is removed. The nozzles or sets of nozzles are preferably arranged directly above the shaft opening or higher up, as desired. Means should be provided for permitting a slight lateral displacement of the apparatus so that it may adapt itself to the "whipping" of the cable.

In the drawings, I have illustrated devices in which my novel method may be performed.

Fig. 1 is a diagrammatic elevation of the complete apparatus,

Fig. 2 is a sectional elevation, and

Fig. 3 is a plan view of a set of nozzles.

Fig. 4 is a sectional plan view of a modified nozzle arrangement.

Referring now to Fig. 1, 1 is a pipe line conveying a fluid under pressure, for instance, compressed air. 2 is a branch pipe which conducts the air from the pipe line 1 to a heating coil 3' in a heater 3. A burner 4 may be provided at the base of the heater to which compressed air is supplied through an extension 4' of the pipe 2. The end of the coil 3' is connected to a pipe 11 which opens into a tank 8 containing the preparation with which the cable is to be treated, varnish or the like. An extension 5 of the pipe 11 is fitted to a sort of injector 5' to which preparation from the tank 8 is supplied through a pipe 9. The delivery pipe 5'' of the injector 5' is connected with the spraying apparatus 6. A heating coil 10' to which steam is supplied from a header 10'' through a pipe 10, may be provided in the tank but it will be understood that any other heating means, for instance, an electric heater, may be employed. A branch pipe 18 supplies heated air under pressure to the air spraying nozzles or sets.

In Fig. 1, only the central or preparation spraying nozzle 6 is shown. The complete

nozzle apparatus is illustrated in Figs. 2 and 3. It comprises two sets of air nozzles, 60 and 61, and the afore-mentioned set of preparation nozzles 6.

5 Each nozzle body is divided at its centre so as to permit its being placed over the cable which is indicated at 13, and a packing strip 15 is inserted between the two halves which may be secured together by any
10 suitable means such as screws, not shown.

Compressed air from the pipe 18 is supplied to each nozzle body 60 and 61 through pipes 20 and 20', respectively. These pipes connect with annular chambers 19, 19', respectively which are provided with upwardly directed lips 31, 32 in the lower body 61, and with downwardly directed lips 22 and 23 in the upper body 60. The central opening of the body 60 is flared at the bottom at
20 17.

The central body 6 is connected with the injector delivery pipe 5'' by pipes 26, 26 which open into annular spaces 27, 27 at the top and bottom of the nozzle body. Hollow
25 nuts 24 and 30 are screwed into both ends of the body 6 so that adjustable slots 28, 28' are formed through which the mixture of air and preparation is directed toward the cable 13.

30 The spraying apparatus is supported by bolts 37 and nuts 36 which are inserted in the eyes of flanges 35 at the several bodies. Obviously, any other means may be provided for connecting the bodies. The central
35 body 6 is shown suspended on rollers 7 on a track 16 so that the apparatus is free to yield laterally. The pipe connections from the injector 9 and the branch 18 must be flexible to permit this. It will be understood that
40 any one of the sets of nozzles may be so supported and that the resiliency may also be obtained by other means.

The operation of this apparatus is as follows: Air under pressure is heated in the
45 coil 3' and supplied to the bodies 60 and 61 as described. The air flows in downward direction in the body 60, and in upward direction in the body 61. The cable is moving downwards. Any dirt, rust or other matter which the air in the body 60 detaches from the cable, is deflected by the flaring opening
50 17 at the bottom of the body and the conical top 25 of the nut 24 so that it cannot get into the spraying body 6. Here, the mixture of preparation and hot air is ejected in a downward direction by the slot 28', and in an upward direction by the slot 28. After the cable has been sprayed with preparation in the body 6, it is dried in the body 61
55 where the air flows in counter current to the motion of the cable.

It will be understood that it is somewhat
60 inconvenient to have to divide the entire apparatus including the nuts 24 and 30 every time it is to be used, and to reassemble

it about the cable. This drawback is overcome by the apparatus shown in plan view and part section in Fig. 4.

Here, compressed air or a mixture of such air and preparation, is supplied to an annular pipe 40 at 41, 41. Radial nozzles 44 with perforations 45 at their inner ends extend from the annular pipe 40 radially toward the centre where the cable 13 is moving. The ends of the pipe 40 do not meet but
70 leave a space 43 through which the apparatus may be placed over the cable 13 after one of the nozzles in the vicinity of the opening 43 has been turned aside. This nozzle is bent at 44' and, when it is in its normal
75 position as shown in Fig. 4, the bend is turned toward the cable with its perforations 45.

I claim:

1. Method of cleaning and applying conserving preparation to cables consisting in blowing fluid under pressure on to the cable, spraying a preparation thereon, and blowing fluid under pressure on to such preparation on the cable.
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2. Method of cleaning and applying conserving preparation to cables consisting in heating a fluid under pressure, blowing it on to the cable, spraying a preparation thereon, and blowing such heated fluid under pressure on to the preparation on the cable.
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3. Method of cleaning and applying conserving preparation to cables consisting in blowing fluid under pressure on to the cable, spraying a preparation thereon through the medium of such fluid, and blowing such fluid onto such preparation on the cable.
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4. Apparatus for cleaning and applying conserving preparation to cables, comprising a tank adapted to contain a supply of conserving preparation, a pipe line adapted to receive fluid under pressure, an injector connected with said tank, pipes connecting said pipe line with the space above the preparation in said tank and said injector, and an annular spray nozzle adapted to surround said cable and connected with said injector.
100

5. Apparatus for cleaning and applying conserving preparation to cables, comprising a tank adapted to contain a supply of conserving preparation, a pipe line adapted to receive fluid under pressure, an injector connected with said tank, pipes connecting said pipe line with the space above the preparation in said tank and said injector, an annular spray nozzle adapted to surround the cable and connected with said injector, and annular fluid nozzles adapted to surround the cable and connected with said
105 pipe line.

6. Apparatus for cleaning and applying conserving preparation to cables, comprising a tank adapted to contain a supply of conserving preparation, a pipe line adapted
110

to receive fluid under pressure, annular spray and fluid nozzles adapted to surround said cable and connected with said pipe line and said tank, respectively, and means for heating the fluid under pressure.

7. Apparatus for cleaning and applying conserving preparation to cables, comprising a tank adapted to contain a supply of conserving preparation, a pipe line adapted to receive fluid under pressure, annular spray and fluid nozzles adapted to surround said cable and connected with said pipe line and said tank, respectively, and means for heating said tank.

8. Apparatus for cleaning and applying conserving preparation to cables, comprising a tank adapted to contain a supply of conserving preparation, a pipe line adapted to receive fluid under pressure, annular spray and fluid nozzles adapted to surround said cable and connected with said pipe line and said tank, respectively, and means for adjusting the free area of said nozzles.

9. Apparatus for cleaning and applying conserving preparation to cables, comprising a tank adapted to contain a supply of conserving fluid, a pipe line adapted to receive fluid under pressure, annular spray and fluid nozzles adapted to surround said cable and connected with said pipe line and said tank, respectively, and means for displacing said nozzles to yield to the "whipping" of the cable.

10. Apparatus for cleaning and applying conserving preparation to cables, comprising a tank adapted to contain a supply of conserving preparation, a pipe line adapted to receive fluid under pressure, divided annular spray and fluid nozzles connected with said pipe line and said tank, respectively, and means for connecting the parts of said divided nozzles so that said nozzles will surround the cable.

11. Apparatus for cleaning and applying conserving preparation to cables, comprising a tank adapted to contain a supply of conserving preparation, a pipe line adapted to receive fluid under pressure, a divided annular spray nozzle connected with said pipe line and said tank, and divided annular fluid nozzles arranged co-axially above and below said spray nozzle and connected with said pipe line.

12. Apparatus for cleaning and applying conserving preparation to cables, comprising a tank adapted to contain a supply of conserving preparation, a pipe line adapted to receive fluid under pressure, a divided annular spray nozzle connected with said pipe line and said tank, divided annular fluid nozzles arranged co-axially above and below said spray nozzle and connected with said pipe line, and means in said fluid nozzles for directing the fluid issuing from them in opposite directions.

13. Apparatus for cleaning and applying conserving preparation to cables, comprising a tank adapted to contain a supply of conserving preparation, a pipe line adapted to receive fluid under pressure, a divided annular spray nozzle connected with said pipe line and said tank, divided annular fluid nozzles arranged co-axially above and below said spray nozzle and connected with said pipe line, and means for laterally deflecting the fluid issuing from said upper fluid nozzle.

14. Apparatus for cleaning and applying conserving preparation to cables, comprising a tank adapted to contain a supply of conserving preparation, a pipe line adapted to receive fluid under pressure, an annular spray nozzle connected with said pipe line and said tank, and annular fluid nozzles arranged co-axially above and below said spray nozzle and connected with said pipe line, and radial branch pipes extending from the perimeter to the centre of said annular nozzles.

15. Apparatus for cleaning and applying conserving preparation to cables, comprising a tank adapted to contain a supply of conserving preparation, a pipe line adapted to receive fluid under pressure, a partly open annular spray nozzle connected with said pipe line and said tank, partly open annular fluid nozzles arranged co-axially above and below said spray nozzle and connected with said pipe line, and radial branch pipes extending from the perimeter to the centre of said annular nozzles, one of said pipes being arranged near the open portion of said annular nozzle, bent at its inner end and adapted to be rotated about its axis.

In testimony whereof I affix my signature.

KARL BÖCHER.