

DERUSTING SYSTEMS

This invention relates to derusting systems.

At the initial stage of rust formation on shell plating, small areas or patches of rust are generally formed. It is therefore ideal to remove such patches of rust and to coat the resulting derusted shell plating portions with paint without damaging other shell plating areas on which rust is not formed.

A known shell plating derusting machine of the centrifugal projection type uses a grit blast and incorporates only one centrifugal projecting head having a derusting width of about 1 m. The derusting width is therefore relatively large and cannot freely be changed. Accordingly, when patches of rust are formed on shell plating, this known machine cannot selectively derust only rust patches, of a small area.

Another known derusting system uses a sand blast arrangement. Such a system, however, has the disadvantage of scattering a large amount of dust and derusting matter.

According to this invention there is provided a derusting system comprising a derusting machine movable along a surface of a wall and having a plurality of projecting heads for projecting derusting matter onto said wall surface to form derusting patterns, and means for individually controlling supply and cut-off of the derusting matter of the projecting heads.

The invention will now be further described, by way of illustrative and non-limiting example, with reference to the accompanying drawings, in which:-

Figure 1 is a structural diagram of a derusting system embodying the present invention; and

Figure 2 is a schematic view of the system when in use.

Rust patches 2 are formed in places on a surface 1 of a wall formed of shell plating. A vehicle 3 is movable towards the right, as shown in Figure 2, along the surface 1.

5 A derusting machine 4 is supported by a support 5 on the vehicle 3. The derusting machine 4 comprises four vertically arranged centrifugal projecting heads 6, four motors 7 each for rotating a respective one of the projecting heads 6, a supply hopper 8 of derusting matter constituted by grit particles or crushed steel balls, a supply tube 9 for guiding the derusting matter from the supply hopper 8 to the projecting heads 6, derusting matter supply valves 10, each constituted by an electromagnetic valve or the like, disposed at branch tubes extending from the supply tube 9 to the projecting heads 6, a derusting matter collecting hopper 11, and a circulating means 12 for circulating the derusting matter from the collecting hopper 11 to the supply hopper 8.

Derusting matter is projected from the projecting heads 6 onto the surface 1 to form longitudinal derusting patterns, whereby rust patches 2 are derusted.

15 A video camera 13 is supported by a support 14 on the vehicle 3 at a location to the right of or forward of the derusting machine 4 with respect to the direction of travel of the derusting machine. The video camera 13 photographs or monitors a portion of the surface 1 along which the projecting heads 6 passes later.

20 An operating stand 15 is disposed on the vehicle 3. A microcomputer 16 is disposed on the operating stand 15. A colour cathode-ray tube (CRT), which is a peripheral device of the microcomputer 16, has a fluorescent screen on which image signals from the video camera 13 are displayed. Thus, the surface 1 and patches 2 are displayed at 1' and 2', respectively, on the screen of the CRT 17. By means of a light pen 18, coordinates on the CRT screen can be read by the microcomputer 16. Thus, if the light pen 18 is pressed against a rust portion 2' on the surface 1' displayed on the CRT 17, the coordinates on the CRT screen corresponding to such rust portion 2' are read by and stored in the microcomputer 16.

30 An output driver 19 is arranged for individually controlling the supply valves 10 of the projecting heads 6 according to control outputs from the microcomputer 16. Derusting patterns 20 are formed on the surface 1 in an area 21 of the surface 1 previously surveyed by the video camera 13.

35 The coordinates on the CRT screen are divided into four vertically-spaced portions according to the projection heads 6. Each of these four portions is transversely divided into predetermined derusting

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areas. When the light pen 18 is pressed against a portion of the surface 1' (as represented on the CRT screen) which corresponds to a rust patch 2 to be derusted, a compartment of such portion is displayed on the screen, thus facilitating the designation on the screen of a place to be derusted.

5 Data as to the speed of travel of the vehicle 3 and the distance between the derusting machine 4 and the video camera 13 are supplied in advance to the microcomputer 16. The microcomputer 16 is programmed so as to control the supply valves 10 according to the time when the derusting machine 4 passes the position of the surface 1 corresponding to the
10 coordinates of the rust portion 2' on the CRT screen designated by the light pen 18.

The operation of the above-described embodiment will now be explained.

15 While the vehicle 3 is moved along the surface 1 at a predetermined speed, image signals from the video camera 13 are continuously displayed on the CRT 17. It is necessary previously to adjust the brightness and contrast of the CRT 17 such that the coordinates of the image can be read by the light pen 18.

20 While watching the image displayed on the CRT screen in a manner flowing from the right to the left thereon, the operator monitors rust patches 2 on the surface 1. When a rust patch 2 is displayed on the screen of the CRT 17, the operator presses the light pen 18 to the rust portion 2' against the screen and data as to the corresponding coordinates are supplied to the microcomputer 16. In the microcomputer 16, data as to the
25 coordinates are stored in a memory and then processed. A control signal is supplied to the output driver 19 according to the time when the derusting machine 4 passes the rust patch 2 on the wall surface 1 corresponding to the rust portion 2' on the screen designated by the light pen 18. The derusting matter supply valve(s) 10 of one or more projecting heads 6 facing such rust
30 patch 2 are then opened to perform a derusting operation on the patch.

35 In the above-described embodiment the microcomputer 16 and the CRT 17 are both mounted on the vehicle 3. Instead, only the derusting machine 4 and the video camera 13 may be mounted on the travelling vehicle 3, other devices being installed and remotely controlled in a monitor room.

With the arrangement described above continuous derusting of a wide area can be carried out. Furthermore, with the maximum derusting width being defined by four projecting heads 6, derusting matter may be supplied to one or more projecting heads 6 which face a rust patch 2 to be derusted, while derusting matter is not supplied to one or more projecting heads 6 which face parts of the wall surface 1 on which no rust is formed. Thus, rust areas formed in places on the shell plating extending over part only of the maximum derusting width may be selectively derusted.

The provision of the microcomputer 16, the video camera 13, the CRT 17, the *light* pen 18 and the derusting machine 4 facilitate the manipulation required on the part of the operator. Namely, the operator is merely required to continuously press the *light* pen 18 against rust portions 2 of the surface 1' displayed on the CRT 17. Thereafter, the microcomputer 16 reads and stores the coordinates of the rust portions 2' on the CRT screen designated by the *light* pen 18. When one or more projecting heads 6 of the derusting machine 4 pass the positions of the wall surface 1 corresponding to such coordinates, the projecting heads 6 perform a derusting operation, so that the rust patches 2 are automatically removed in succession.

The system embodying the present invention can thus easily be operated, requiring no special reflex actions and imposing minimal mental strain and fatigue on the operator. Working efficiency can thus greatly be improved.



CLAIMS

1. A derusting system comprising a derusting machine movable along a surface of a wall and having a plurality of projecting heads for projecting derusting matter onto said wall surface to form derusting patterns, and means for individually controlling supply and cut-off of the derusting matter of the projecting heads.

2. A derusting system according to claim 1, comprising a video camera located in the path of travel of the derusting machine and movable at the same speed as the derusting machine, the video camera being operative to monitor said wall surface, a cathode-ray tube for displaying image signals from the video camera, a light pen by means of which the coordinates of a rust patch on the wall surface, which coordinates are also displayed on the CRT screen, can be designated, and a microcomputer so constructed as to read the coordinates designated by the light pen and responsive thereto to cause the supply of derusting matter to one or more projecting heads facing the rust patch on said wall surface when the derusting machine arrives at the rust patch.

3. A derusting system substantially as herein described with reference to the accompanying drawings.
