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(54) Spraying machinery.

(57) A machine for spraying cement or plastic based materials for building purposes comprises two separate portions. A hopper portion comprises a frame 10 with a hopper 11 and pump 26 driven via a flexible coupling and shaft 25 from an air motor 20 controlled via a control unit 21 from the end (not shown) of the spray pipe. A mixing portion comprises a frame 40 with a mixing chamber 60 mounted thereon, the mixing chamber containing mixing paddles driven by a second air motor mounted on the frame 40 (Figure 4). The base of the frame 40 fits into one end of the hopper 12 and can be bolted thereto by bolts through the holes 15, 41. The two portions can be separated quickly for servicing if either breaks down, and a conventional mixer can be used temporarily with the hopper portion (Figure 1).

EP 0 153 071 A2

SPRAYING MACHINE

The present invention relates to spraying machinery, and more specifically to machinery for spraying building materials such as cement or plastic based materials, e.g. for application to walls as fire protective layers.

Spraying machinery of this type is well known. In one machine in common use, there is a hopper for containing the material to be sprayed, with a paddle stirrer built into the hopper for mixing the constituents (e.g. cement and water) to the required consistency, driven by a mixer motor. The hopper is funnel-shaped so that it narrows to a small area at the bottom, and there is a pump attached at the base of the hopper so that the material can be pumped out when desired. The pump has a coupling to which a flexible pipe can be attached, so that the material can be sprayed where desired. The pump is driven by a pump motor. The flexible pipe has, at its far end, control means for turning the flow of material on and off, and an air pipe attachment so that the material can be sprayed in the form of an aerosol.

This known machine has been used for at least two decades. However, it has two major disadvantages. First, it is large and heavy and therefore has to be transported on a large lorry or by being towed; and second, it is so constructed that the failure of any one component renders it very difficult to use the machine, and it is difficult and time consuming to effect repairs to failed components.

The object of the present invention is to provide a spraying machine which is relatively easy to use and in which the failure of some components, e.g. the failure of the mixing means, can be dealt with relatively quickly while leaving the rest of the machine capable of continuing to be used.

Accordingly the present invention provides a spraying machine comprising a hopper, a pump motor, and a mixing means characterized in that the hopper and pump motor are mounted together on a first frame, and the mixing means comprise a mixing

chamber mounted on a second frame together with a mixing motor, the upper edge of the hopper being formed to receive and have bolted thereto a mating portion of the second frame. By this means, the machine as a whole comprises a hopper with a separate mixing chamber mounted above it, such that in the event of a failure of the mixing motor or other failure relating to the mixing, the second frame, with the mixing chamber and mixing motor mounted thereon, may be rapidly and easily unbolted from the hopper and removed. The mixing motor or chamber may then be repaired, while the hopper and pump motor continue to operate. If need be, mixing can temporarily be carried out by means of a second mixer, e.g. an ordinary cement mixer, while the mixing chamber and motor are being repaired.

Other advantageous features of the invention will be pointed out in the course of the following description of the preferred form of the invention, with reference to the drawings, in which:

Figure 1 is a side view of the first frame with the hopper and pump motor mounted thereon;

Figure 2 is a top view thereof;

Figure 3 is a side view of the second frame with the mixing chamber and mixing motor mounted thereon, and

Figure 4 is an end view thereof.

Referring to Figure 1, the hopper portion of the machine comprises a frame 10 with a hopper 11 mounted thereon. The frame 10 is rectangular, and carries uprights 13 which support the top edge 14 of the hopper. The hopper 11 is formed of four major sloping plates which form a funnel shape, with three further small plates forming a well 12 at its base. The top edge 14 of the hopper is in the form of a band forming an upright rim to the hopper.

Also mounted on the frame 10 is the pump motor 20. This may be a diesel motor or an electric motor, but it is preferably an air motor, driven from a compressed air supply which is coupled to it via a coupling 23. This is convenient because a compressed air supply is required anyway for the spraying. The air supply

is fed to the motor 20 through a control valve 21, which is controlled by a control line 22.

The motor output is coupled through reduction gearing 24 to a shaft 25, which passes through the well 12 at the base of the hopper 11. This shaft 25 passes longitudinally through the well (with a coupling which is accessible in the well) to a pump 26 fixed to the well 12 and having a coupling 27 at its outer end. The pump 26 may be of any convenient type; preferably it is a worm and stator type, in which the shaft 25 drives a metal worm (somewhat resembling a spiral carved leg of a certain style of furniture) which passes through a rubber stator having helical grooves, of the same sense but of tighter pitch, formed on its inside.

The coupling 27 has a flexible pipe (not shown) fixed to it in use, with the other end of the pipe ending in a nozzle at which an air supply is injected so that the operator can spray a mixture of air and the material being pumped from the hopper 11. Preferably the nozzle also has a control handle which is coupled to the other end of the control line 22 to the control valve 21, so that the operator can turn the pump motor 20 on and off. The control line 22 may be either pneumatic or a flexible mechanical cable.

It will be noted that the well 12, to which the hopper 11 narrows at its base, has a large area, and that the pump 26 is fed from a point slightly above the bottom of the well. This results in a good uninterrupted flow of the material through the pump, resulting in fast and relatively uniform spraying. In some previous machines, a narrow throat has been used, resulting in slow and interrupted feeding of the material to be sprayed.

The motor 20 with the control valve 21 is normally covered by a hinged cover 30, shown in the open position in Figure 1. The frame 10 has feet 31 at one end and wheels 32 at the other so that it can easily be moved about.

Figures 3 and 4 show the second frame with the mixing motor and hopper. The second frame 40 comprises a rectangular portion

40A with an extension 40B to the left as seen in Figure 4. The portion 40A fits inside the rim 14 of the hopper 11, and isprovided with holes 41 which match with holes 15 in the rim 14. Thus when the second frame 40 is fitted into the rim 14, it can be bolted to the rim 14 by means of bolts 16, as shown in Figure 2. The frame 40 is shown in Figure 3 vertically above the position which it occupies when bolted to the hopper as shown in Figure 1.

The frame 40 carries a pair of supports 43 and 44 through which a shaft 51 passes, the shaft 51 being driven by a mixer motor 50 fixed to the frame 40. The motor 50 may be a diesel or electric motor, but is preferably an air motor (line motor 20) with a control valve 52, a coupling 53, and a control line 54. It is not usually necessary to control the motor 50 from the spray nozzle (not shown), because mixing is a batch operation which is carried out separately from the spraying.

The shaft 51 passes through a mixer chamber 60, into which the materials to be sprayed (e.g. cement and water) are put for mixing. The shaft 51 carries mixing paddles 55. In addition, at the right-hand end of the mixing chamber 60, as seen in Figure 4, there is a shaft 61 fixed to the chamber 60 and having a tipping wheel 62 fixed to its other end. The chamber 60 is obviously normally held at or near the upright position, as shown, for mixing, and when mixing is complete, it is tipped over by means of the wheel 62 to tip the mixed material into the hopper 11.

The frame 40 also carries wheels 65 at the motor end, so that it can be moved easily when it is dismounted from the hopper 11, and a cover 66 (shown in the open position) for the motor 50.

CLAIMS

1. A spraying machine comprising a hopper (11), a pump motor, (20) and a mixing means (50, 55, 60) characterized in that the hopper (11) and pump motor (20) are mounted together on a first frame (10), and the mixing means comprise a mixing chamber (60) mounted on a second frame (40) together with a mixing motor (50), the upper edge (14) of the hopper being formed to receive and have bolted thereto a mating portion (40A) of the second frame.
2. A spraying machine according to claim 1, characterized in that the hopper is formed with a narrow area (12) at the bottom and the pump (26) is connected substantially horizontally at a short distance above the base of the narrow area.
3. A spraying machine according to claim 2, characterized in that the pump is driven by means of a shaft (25) which passes through the narrow area and has a coupling in the narrow area.
4. A spraying machine according to any previous claim, characterized in that the two motors (20, 50) are air motors.

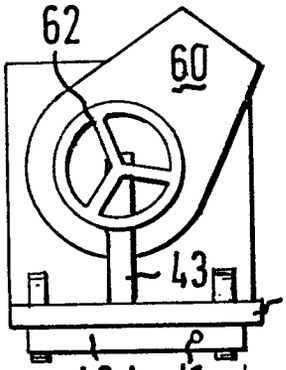

FIG.3

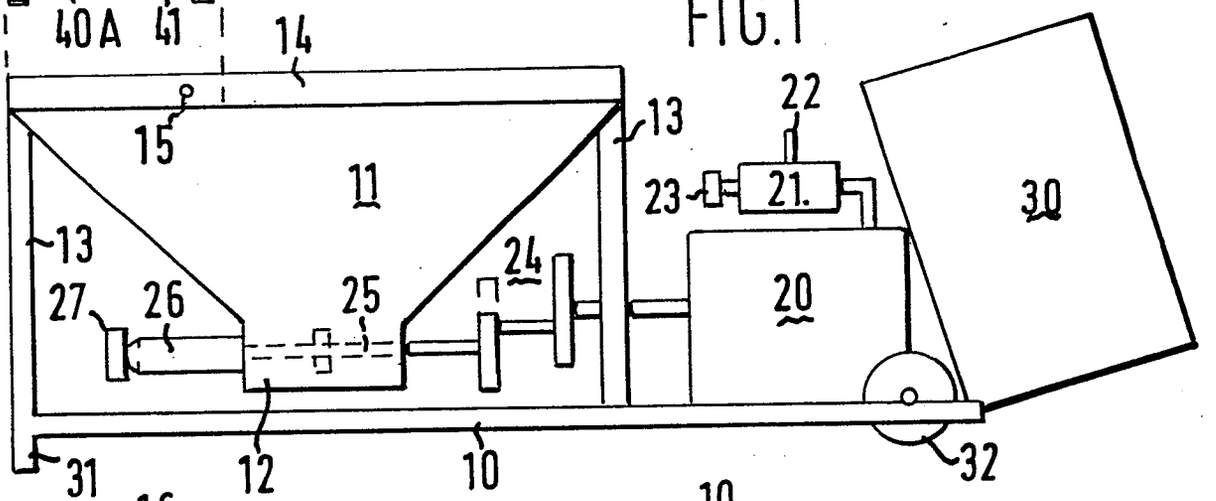

FIG.1

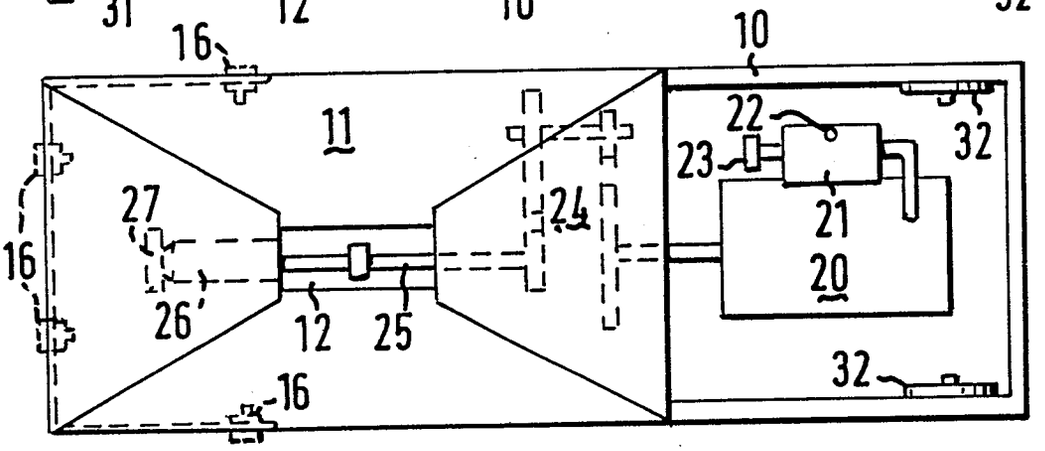

FIG.2

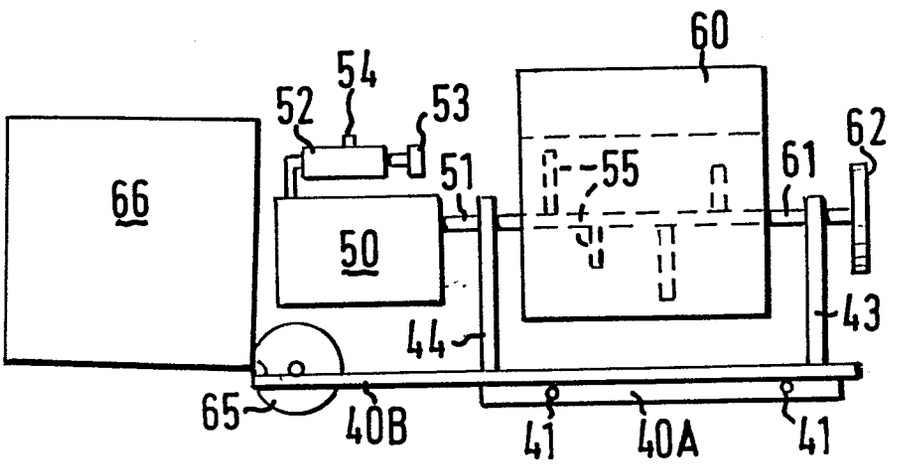

FIG.4