

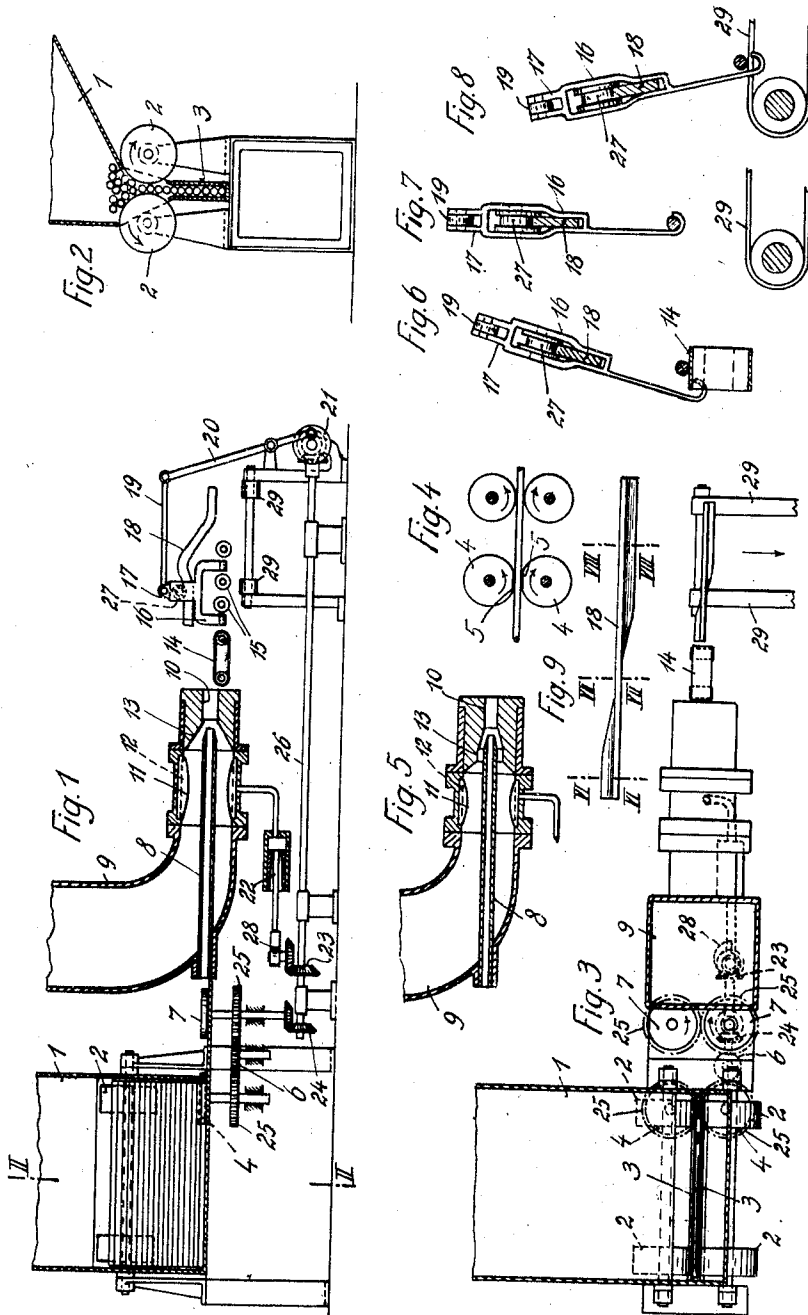
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PROCESS FOR COATING ELECTRODES FOR ARC WELDING

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PROCESS FOR COATING ELECTRODES
FOR ARC WELDING

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1 Claim. (Cl. 18—59)

The invention relates to a process for making electrodes for arc welding, with pressed-on coatings, according to which the coating substance is pressed on the welding rod by means of a nozzle system. According to former manufacturing processes wire rods of suitable thickness and length were coated with a pulpy or dough-like substance, dried and then had their contact end freed from the coating by means of grinding. The feeding and removal of the rods to and from the extrusion machine and the making of the contact ends was heretofore done manually.

According to the present invention the manufacture of the electrodes for arc welding is carried out entirely automatically by having the wire rods, arranged one before another, periodically moved forward, by one rod length, from a rod magazine by making use of a feeding device. During the interruption of the motion the contact end of the rod is freed from the coating and the rods, extruding from the coating nozzle, are conveyed separately and taken from the conveyor and deposited on a coordinated drying band by means of a mechanical device operating synchronously with the feeding device.

The contact end of the electrodes, according to the invention, is freed from coating substance before the drying of the coating takes place.

The contact ends of the rods can be freed of the coating as the rod emerges from the coating nozzle by means of a knife or other cutting device, or by a jet of compressed air. This removal of the coating substance for the contact end takes place during the period, when the advance movement of the rods is interrupted, namely, when the coated rod is at rest. But instead, the contact end of the rod may be left uncovered by the coating from the start. This is attained, for instance, by causing during the interruption of the forward movement of the rods a sudden enlargement of the fore space of the nozzle, so that the pressure on the nozzle for applying the coating is reduced for a brief period and the rod passes through the nozzle without being covered.

The sudden enlargement of the fore space of the nozzle may also take place independently of the interruption of the feeding of the rod. The subsequent reduction of the volume to the original volume is, as far as the time is concerned, made to occur gradually during the feeding of the part of the rod length to be coated.

The drawing shows by way of example a mode of construction of a device in accordance with the invention.

Figure 1 shows a longitudinal section of the device.

Figure 2 shows the device according to Figure 1 in section on the line II—II.

Figure 3 shows the device in plan view partly in section.

Figure 4 shows the rollers which advance the rods periodically.

Figure 5 shows in side section a special mode of construction of the extrusion nozzle.

Figures 6, 7 and 8 show the take-off device in various operating positions.

Figure 9 shows the guide way for the take-off device.

The wire rods are placed in the container 1 and are loosened by the rotation of the roller pairs 2 in the direction of the arrow. The rollers 2 may be provided with rough surfaces or recesses. But the rollers arranged on a common axis may also be smooth and the other rollers also arranged on a common axis may have two or more recesses in their peripheries. The rods, having been placed in alignment by the rollers, drop in succession through the slot between the rollers 2 into the narrow passage 3, where they are stacked up arranged one after another. The then lowest rod drops, from the narrow passage, between two counter-acting conveying friction rollers 4 moving in the direction indicated by the arrow, the flattened portion 5 of which permitting the dropping of the rods between the rollers and, at the same time, causing a brief interruption of the transport of the rods towards and through the coating nozzle. The coated rods, released by the nozzle 10, continuously moved forward by a continuous band 14, an interval will occur, behind the nozzle, between the individual rods permitting automatic removal of the rods provided with the still soft coating substance from the band 14. The conveying friction rollers 4 have a circumferential shape of a circular arc, and a flattened portion 5, so that by one rotation the rod will be advanced by one rod length. If the length of the circular arc of the seizing and transporting rollers 4 is smaller, but the multiplicity of the total circumference larger and never equal to a rod length, there will be provided after them full-circular arc conveying rollers 7 for advancing the rod delivered at the time until its end emerges from the slot between the rollers 7.

As the feeding of the rods to the rollers 7 takes place with interruptions, the conveying rollers 7 will also cause a corresponding periodic feeding motion by one rod length in each case.

The width of the passage slot between the loosening rollers 2, the narrow passage 3 and the conveying rollers 4 and 7 may be jointly adjustable, so as to be able to adapt them to the diameter of the particular wire rods to be worked. The segment-like flattened portions 5 of the conveying friction rollers 4 are arranged symmetrically to one another. When using a simple nozzle 10 a cutting-off device, not shown in the drawing, is provided behind the coating nozzle, by which coating substance is removed at the contact end of the rod.

The nozzle head is advantageously provided with a membrane 11, which for the purpose of altering the space of the nozzle head is periodically and externally subjected to suddenly decreased pressure, which thereafter gradually or suddenly, following the completion of the enlargement of the fore space of the nozzle, rises again to the original pressure. The bending of the membrane to the original form corresponds, as far as the time is concerned, to the feeding of one rod length, so as to obtain uniform coating. This results in interruption for a brief period of the extrusion of coating substance from the nozzle owing to increasing the space of the nozzle head. The periodic feeding of the rod and the periodic short period of enlargement of the space of the nozzle head are adjusted in such a manner, that at the moment of space enlargement, the rods are at rest and that during the period of reduction of pressing force within the nozzle the contact end of the rod is pushed through the nozzle. The contact end of the rod, in consequence thereof, emerges from the nozzle uncoated whereas the other part of the rod in consequence of the re-established pressing force within the nozzle emerges from the nozzle coated with the usual substance.

The membrane 11 is preferably subjected externally to hydraulic pressure, whereas the hydraulic press ram 22 is controlled by a cam disc, performing one revolution with each feed movement of the rods by one rod length. The membrane 11, which may consist of thin-walled steel sheet, is preferably made to form an annular cavity 12 at the inner side of the nozzle head. If according to Figure 1 the hydraulic press ram 22, controlled by the cam disc 28, is moved towards the right, liquid is pressed to the space 12 whereby the membrane 11 is bent towards the space of the nozzle head. This results in a reduction of the volume in the nozzle head making the coating nozzle 10 act to its full capacity. As soon as the piston 22 is suddenly relieved or retracted, respectively, by the cam disc 28, the membrane is pressed backwards to about the position indicated by dotted lines, by the coating substance being subjected to pressure from the substance feeding space 9. The flow resistances in the nozzle 10 being higher than the resistance of the relieved membrane 11, the flow of the substance from the nozzle is interrupted in consequence of the retracting motion of the membrane 11 and re-starts on cessation of the backward movement of the piston 22. The annular form of the membrane 11 permits of a uniform flow of the substance, at all sides notwithstanding its periodic interruptions. The change of volume in the nozzle head due to the membrane 11, is correspondingly adapted to the volume of the coating recess at the contact end.

According to Figure 5 the end of the feed of the rod 8, in the direction of the movement of the rod, forms a pin, arranged fully concentri-

cally to the coating nozzle. In this case the substance extrudes from the nozzle 13 in the form of a tube. This tube is then pressed firmly onto the rod, inserted into the tube together with the motion of the tube, during their joint passage through the nozzle 10 resulting in obtaining an absolutely concentric coating.

The coated wires extruding from the nozzle can be engaged by a seizing device 16, which, in laterally swinging outwards, is once moved to and fro once for each rod along a generally declining guide way 18 and releases the rod prior to the start of the return motion and deposits it on drying bands 29. The seizing device may be a pair of tongs with elastic limbs, seizing and guiding the rod while it is still extruding from the nozzle. In this case the motion of the seizing device will be accelerated as soon as the electrode has completely left the nozzle 10. During the period of depositing the rods on the bands 29, the motion of the seizing device is retarded. The sliding, closing and opening of the pair of tongs is automatic and positively controlled.

Instead, the extruded rods can be conveyed away from the nozzle by means of a continuously moving conveying band 14 and conveying rollers 15. A seizing device 16 lifts the coated rods by first being raised, being engaged from beneath from the side during its movement to and fro along the guide way 18, and after this being lowered by swinging to the opposite side, for depositing the seized rod on the conveying bands 29. The alternating motion of the seizing device 16 is caused by an eccentric disc 21 or a corresponding cam disc arrangement over the lever system 20, 19, which is connected to the seizing device 16 at the eye 17.

The seizing device moves on rolls 27 on the guide 18. Figure 6 shows the seizing device in the position occupied prior to seizing the electrode. Figure 7 shows the seizing device with the electrode lifted up. Figure 3 shows the seizing device in the position occupied immediately after having deposited the electrode. The electrodes are dried on the drying bands 29, being passed through a drying room, if necessary.

The take-off members of the seizing device 16 can be arranged movably suspended and perform a circular movement, so that during the upward movement they can grip the electrode and during the downward movement deposit it on the conveying bands 29.

All conveying and moving arrangements may be actuated by a common shaft 25. As disclosed by Figure 1, the rotation of the conveying rollers 4 and 7 can be caused by means of the motion transmitting wheels 24, by directly driving a conveying roller which imparts the required rotating movement to all conveying rollers 4 and 7 by means of a toothed gearing 25 with intermediate toothed wheel 6. The toothed wheel gearing 23 may impart the rotating movement to the cam disc 28. Besides, as shown, the eccentric disc 21 can also be directly engaged by the main shaft 26, and also the conveying band 14, the conveying rollers 15 and the conveying bands 29 can be driven from shaft 25 by means of motion transmitting arrangements not specially shown.

The invention renders possible the full-automatic manufacture of extrusion coated electrodes for arc welding and falling off of coating substance can be completely avoided.

I claim:

Process for coating weld rods for arc welding

while leaving the contact end portions of said rods free of coating, comprising arranging the rods to be coated longitudinally one in front of the other in axial alinement with an extrusion nozzle, intermittently advancing the rods while 5 so arranged for a rod length through the extrusion nozzle and intermittently interrupting said advancing movement, supplying coating material through a space to said extrusion nozzle under pressure during the parts of said advancing 10 movements in which the portions of the rods to be coated are passing through the extrusion

nozzle, interrupting the supply of extrusion material to said nozzle during the parts of said advancing movements in which the contact portions of said rods are passing through said nozzle by enlarging the space through which the coating material is fed to the extrusion nozzle, continuously drawing the coated rods away from the nozzle, so that each coated rod becomes spaced from the following rod during the period in which the advancing movement of said following rod is interrupted.

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