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PRINTING MACHINE CONTROL SYSTEM

This invention relates to a printing machine incorporating a plurality of units including printing units, sheet feed and delivery devices, and a separate device for the control and/or monitoring of the printing machine, this separate device being connected to the other units of the printing machine by means of electrical lines.

In the printing machine art, it is known to provide control desks for the control and monitoring of the inking process, which are installed in the vicinity of the printing machine and are connected to the printing machine by means of sets of lines. For example, a printing machine is known from DE-AS 2728738, in the case of which a control desk or control panel and other peripheral devices are provided which are linked with the printing machine directly or indirectly via electrical lines. In addition to inking control, this control desk can also be used, as reported in the "Heidelberger Nachrichten" (Heidelberger News) No. 3/40 of Heidelberger Druckmaschinen AG, to adjust the register of the individual printing units. When installing a printing machine together with the related control or monitoring desk, it is necessary for the wiring between the printing machine and the control desk to be made to suit local conditions, and to arrange in situ the correct association of the output signal lines of the control desk with the input signal lines to the relevant printing units or to other units of the printing machine, and vice

versa. Even when this wiring has been laid correctly, it is still possible, owing to the great number of electric wires and cables involved, to find that lines are interchanged, resulting in malfunctions occurring during initial operation of the printing machine, which may possibly necessitate tedious fault tracing.

It is an object of the invention, therefore, to arrange the wiring between the printing machine units and the separate device for the control and/or monitoring of the printing machine in such a way as to facilitate safe, reliable and time-saving installation of the machine.

According to the invention, there is provided a printing machine incorporating a plurality of units including printing units, sheet feed and delivery devices, and a separate device for the control and/or monitoring of the printing machine, this separate device being connected to the other units of the printing machine by means of electrical lines, wherein these electrical lines have connection points with plug-type connections, and there is only a single detachable connection between the outlet point at which the said electrical lines are led out of the housing of the said separate device and each of the connection points with plug-type connections.

An important advantage of this invention can be found in the fact that the wiring can be prefabricated and attached to the said separate device, this being for instance a control cabinet for the printing machine, so that during installation of the machine the electrical lines are simply connected to the other units of the machine with the aid of the plug-type connectors. As a

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result, during transport there are no cables on the individual printing units and other components of the printing machine which are subject to a risk of damage.

Another advantage of the invention is that, due to the provision of only a single connection, the total transmission resistance between the control cabinet and the other units of the printing machine can be considerably reduced. Particularly with a great number of electrical lines, this can permit a considerable reduction in power losses.

A further advantage is that comprehensive testing of the wiring and the machine control system, for example with the aid of a simulator which simulates the functions of the printing machine, can be carried out immediately after the control cabinet has been made ready. In addition, it is of advantage to carry out a "self-test" of the wiring, by means of central control equipment provided in the control cabinet, after installation of the machine together with the control cabinet.

Advantageously all input and output lines for a printing unit or for another unit of the printing machine are combined at one connection point, this connection point affording a plurality of connections. The connection points can provide disconnectable connections, plug-type connectors for instance. It is therefore evident that installation of the printing machine is still further simplified. In addition, after installation of the printing machine or individual units thereof, the electrical functions can be tried out, e.g. by connecting electronic test circuitry to the relevant connection point with a plug-type connector. The possibility of

confusing the connectors can be excluded, in a machine according to the invention, in that the detachable connections may be coded, or the cable lengths so selected that confusion is not possible; thus the lengths of cable may be so selected and disposed that an entire cable strand leading to the printing machine runs along the side of the machine, with branches turning off to the respective units of the machine.

The electrical lines to the drive motor of the printing machine may be so pre-installed in the control cabinet that they also require only a single connection point.

The respective connection points for the various units of the printing machine advantageously employ distributor devices, encapsulated in a housing, in which the plug-type connections are protected from dirt and other adverse environmental influences.

Various other preferred and optional features of the invention will be appreciated from the subsidiary claims as well as the remainder of the description.

The invention will now be described in more detail with reference to the accompanying drawing, the single Figure of which is a diagrammatic side view of a printing machine according to the invention.

The Figure shows the arrangement of a printing machine and a control cabinet for its control. The printing machine 1 (a sheet offset printing machine) consists of four printing units 4-7, a sheet feed 2, and a sheet delivery 3. The drive of the printing machine is provided by a motor 39. The sheet feed 2, the sheet delivery 3 and the individual printing units 4-7 employ sensors 16-25, serving, for instance, for sheet feed monitoring, for side monitoring, for monitoring the settings of the ink blade, and generally for monitoring adjustable

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elements, as well as for monitoring the sheet run. In addition, the individual components of the printing machine employ control elements 8-15, which, like the sensors, are represented only schematically in the Figure. For example, it is known that side and circumferential registers can be set by means of control elements, just as control elements are also known for ink blade setting and for dampening solution setting. Also mounted on each component of the printing machine, though not illustrated in this case, are signal indicators and control elements such as switches, an emergency stop switch and similar elements.

All of the electrical lines leading to the sensors, to the control elements, and to the indicators or switches are brought together in distributors 26-31 for sheet delivery 3, printing units 4-7, and sheet feed 2, respectively. The distributors can be arranged, for example, laterally on the components of the printing machine in an easily accessible position, whereby the electrical lines combined in the distributor terminate at one or more multiple connectors within the distributor. The electrical connections between the distributors 26-31 and a control cabinet 42 are provided by cable connections 44. The control cabinet 42 contains, for example, a switching device 46 which provides control voltages, as well as processing units for the sensor signals. The cable connections 44 to the distributors are passed through the housing 45 of the control cabinet 42, and are connected directly to the switching device 46. The cable connections have at their distal ends plug-type connectors 32-37, assigned respectively to the individual components

2-7 of the printing machine 1.

To prevent the plug-type connectors 32-37 from being interchanged, said connectors are coded, for example, in such a manner that only one connector can be connected to a given distributor, although on the other hand the possibility of confusion can also be excluded by providing precisely measured cable lengths, i.e. confusion is eliminated by the external design of the connecting means comprising the cable connections 44 and the plug-type connections 32-37. The cable connections 44 comprise connections which lead not only to the printing units 4-7 and sheet feed 2 or sheet delivery 3, but also to the drive motor 39, as well as to one or more auxiliary units 40; these further cable connections can also be equipped with plug-type connectors 38, 41.

During the transport of the printing machine to its place of installation, the cable connections 44 can be wound up at the rear of the control cabinet 42, so that the individual printing units 4-7 and the other components 2,3 of the printing machine 1 have attached to them no electrical lines which could be damaged during transport or during installation of the machine. For initial operation of the printing machine, all that is necessary is to connect the cable connections 44 with their plug-type connectors 32-37 to the proper distributors, so that the time-consuming and costly laying and connection of cables which is normally necessary is avoided.

It will be understood that the invention has been described above purely by way of example, and that various modifications of detail can be made within the ambit of the invention.

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LIST OF COMPONENTS

- 1 Printing machine
- 2 Sheet feed
- 3 Sheet delivery
- 4 Printing unit
- 5 Printing unit
- 6 Printing unit
- 7 Printing unit
- 8 Control element
- 9 Control element
- 10 Control element
- 11 Control element
- 12 Control element
- 13 Control element
- 14 Control element
- 15 Control element
- 16 Sensor
- 17 Sensor
- 18 Sensor
- 19 Sensor
- 20 Sensor
- 21 Sensor
- 22 Sensor
- 23 Sensor
- 24 Sensor
- 25 Sensor
- 26 Distributor
- 27 Distributor
- 28 Distributor
- 29 Distributor
- 30 Distributor
- 31 Distributor
- 32 Plug-type connector
- 33 Plug-type connector
- 34 Plug-type connector
- 35 Plug-type connector
- 36 Plug-type connector
- 37 Plug-type connector
- 38 Plug-type connector
- 39 Drive motor
- 40 Auxiliary unit
- 41 Plug-type connector
- 42 Control cabinet
- 43 Cable outlet
- 44 Cable connection
- 45 Housing
- 46 Switching device

CLAIMS

1. A printing machine incorporating a plurality of units including printing units, sheet feed and delivery devices, and a separate device for the control and/or monitoring of the printing machine, this separate device being connected to the other units of the printing machine by means of electrical lines, wherein these electrical lines have connection points with plug-type connections, and there is only a single detachable connection between the outlet point at which the said electrical lines are led out of the housing of the said separate device and each of the connection points with plug-type connections.
2. A machine in accordance with claim 1, wherein for each of the said other units there is a single connection point affording a plurality of connections.
3. A machine in accordance with claim 2, wherein the said connection points respectively provide the said single detachable connections.
4. A machine in accordance with any of the preceding claims, wherein there is also a connection point for the power supply, this being disposed on the drive motor and/or on an auxiliary unit associated with the power supply.
5. A machine in accordance with any of claims 1-3, wherein the connection points are positioned in distributor devices, and lines on the operative (printing or sheet advancing) side of the distributor devices lead directly to electrical control elements, sensors, setting elements or signal generators of the relevant printing machine unit.
6. A machine in accordance with any of the preceding claims, wherein the detachable connections are coded.



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7. A machine in accordance with any of the preceding claims, wherein the lengths of the electrical lines respectively correspond to the distances between the said separate device and the relevant printing machine unit.

8. A machine in accordance with claim 1, substantially as described with reference to the accompanying drawings.



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