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(54) Titre : PROCÉDE POUR FOURNIR UN SYSTÈME D'EXPLOITATION D'UNE COMMANDE DE MACHINE
(54) Title: METHOD FOR PROVIDING AN OPERATING SYSTEM OF A MACHINE CONTROLLER

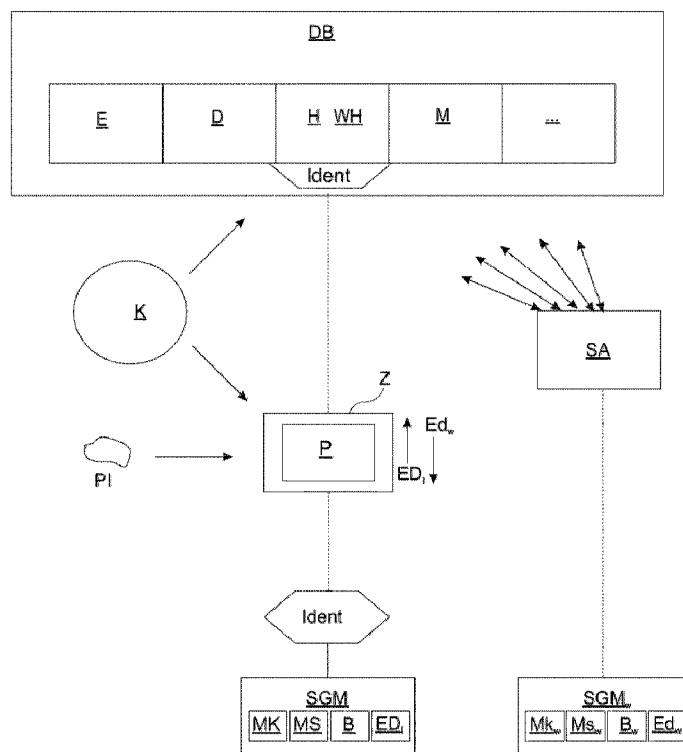


Fig. 1

(57) Abrégé/Abstract:

By means of the method, an operating system (B) of a machine controller for an injection molding machine (SGM) for processing plastics is provided on a target system (Z) having a processor (P), which target system is independent of the injection molding



(57) **Abrégé(suite)/Abstract(continued):**

machine. For this purpose, information about an operating system (B) of a machine controller (MS) of an injection molding machine (SGM) is provided, which operating system can be configured or adapted to the characteristics of the injection molding machine (SGM) by means of configuration data of a first machine configuration (MK1). The operating system (B) is installed with all the configuration data as a digital twin on the target system (Z), using a hardware-independent app to convert the information for the target system. On the target system (Z), a new setting dataset (EDl) is created or an existing setting dataset (EDl) for producing injection-molded parts is changed, the setting dataset being able to run on the injection molding machine (SGM, SGM1). The setting dataset (EDw) created or changed on the target system (Z) is transferred to the injection molding machine (SGM) and the injection molding machine is operated therewith.

Abstract

By means of the method, an operating system (B) of a machine controller for an injection molding machine (SGM) for processing plastics is provided on a target system (Z) having a processor (P), which target system is independent of the injection molding machine. For this purpose, information about an operating system (B) of a machine controller (MS) of an injection molding machine (SGM) is provided, which operating system can be configured or adapted to the characteristics of the injection molding machine (SGM) by means of configuration data of a first machine configuration (MK₁). The operating system (B) is installed with all the configuration data as a digital twin on the target system (Z), using a hardware-independent app to convert the information for the target system. On the target system (Z), a new setting dataset (ED_i) is created or an existing setting dataset (ED_i) for producing injection-molded parts is changed, the setting dataset being able to run on the injection molding machine (SGM, SGM₁). The setting dataset (ED_w) created or changed on the target system (Z) is transferred to the injection molding machine (SGM) and the injection molding machine is operated therewith.

Method for Providing an Operating System of a Machine Controller

Description

5 Reference to related applications

The present application relates to and claims the priority of German patent application
10 2019 208 937.2 filed on June 19, 2019, the disclosure of which is hereby explicitly
10 incorporated by reference into the subject matter of the present application.

Field of the invention

The invention relates to a method for providing an operating system of a machine
15 control system for an injection moulding machine for processing plastics and other
plasticisable masses, on a target system which is independent of the injection
moulding machine, having the features of claim 1.

Where, in the context of this invention, mention is made of an “executable settings
20 dataset”, this refers to a dataset of settings data with which an injection moulding
machine can be operated for the production of injection moulded parts, typically
without the need for a further intervention by a user.

The expression “converted operating system information” should be understood in the
25 context of this application to be information concerning an operating system which is
adapted to a particular target system. The operating system of an injection moulding
machine, for example, is merely a code which, by means of the reading of the specific
machine configuration data, becomes the specific machine.

30 A “digital twin” should be understood in the context of this application to be a digital
copy of a real machine, for example, an injection moulding machine. The digital twin
has all the properties, specifications and settings possibilities of the real machine. The
digital twin is preferably one-to-one from the operating system code, which by means

of exactly the same configuration data is executable on another target operating system, for example, by means of an APP.

Prior art

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From DE 10 2011 005 062 A1, a method is known for providing data of a field device by means of a cloud solution. The field device is arranged on an automation technology network and is connected to other field devices via a data bus. The field devices communicate at least with a server of a service provider so that a

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preconfigured dataset can be augmented with customer-specific and/or user-specific data. A dataset extended with the additional data is then made available to a remotely located client.

In the field of plastics injection moulding machines, a method for the interactive control of a machine is known from EP 0 573 912 B1, wherein in a data processing unit, a basic knowledge set and a dataset relating to the fundamental rules of the operation of an injection moulding machine are fed in. By means of a sequence editor, a machine operation can be generated, wherein the machine checks each input for plausibility and makes interactive proposals for the augmentation of the already existing sequence.

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A device for processing plastics is disclosed in DE 10 2004 041 891 B3. The device has recording means which record the raw material supply or are provided on the forming unit and/or the plasticiser unit and serve for recording process and/or material parameters. Through evaluating means, data of the recording means can be determined with regard to the expected production duration and/or the expected production costs. A control apparatus for controlling the material feed apparatus can be configured as the end device (client) and can be connected to a data network, by means of which different data services are made available. It is also possible to modify parameters of a production process by means of the data services of the control apparatus.

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In WO 2006/098451 A1, a method for controlling and operating a production cell for producing plastics injection moulded parts is disclosed. Therein, machine processes

are formed on the basis of functionally complete components which together form a domain model, created, administered and executed with the aid of a domain language. A particular component can thus be programmed component-oriented and/or command-oriented. For example, the components of the moulding tool can
5 thus be programmed through the commands Open and Close.

CH 705456 A1 discloses a computerised machine control system which comprises an application-independent, machine-specific part and an application-specific, machine-independent part. By this means, a better integration of machines from
10 different manufacturers can be realised.

A device and a method for controlling and for operating a production cell are disclosed in US 2012/0185077 A1. Machine processes that are based upon machine control components are created, administered and executed with the aid of
15 a domain language. For a free configurability of machine control components, it is proposed to select a machine control component from a set of pre-determined component types and to assign to a machine control component a permissible technology from a set of technologies, wherein for each technology of a component type, a logic is stored which comprises and defines the interfaces required for the
20 machine control component and the technology.

Object of the invention

25 Proceeding from this prior art, it is an object of the present invention to make available to a processor a copy of a machine control system, so that settings data can be created or modified independently of the injection moulding machine, manufacturer data being referred to if necessary.

30 This object is achieved with a method for providing an operating system of a machine control system having the features of claim 1. Advantageous developments are the subject matter of the dependent claims. The features individually set out in the claims are combinable with one another in a technically

meaningful manner and can be supplemented with explanatory facts from the description and details from the Figures, wherein further embodiments of the invention are disclosed.

5 According to the method, information relating to an operating system of a machine control system of an injection moulding machine is provided, said operating system already being configurable or adaptable by means of configuration data to a first injection moulding machine. This operating system can then be used with all the configuration data as a digital twin on a target system, making use of a hardware-
10 independent app for converting the information to the target system. Since the machine control software is, in and of itself, already configured on the machine control system of the injection moulding machine to the properties of the physically existing machine, with the preferably identical configuration file from the machine control system, which is adapted bidirectionally converted to the target system, it is possible to work on the
15 target system with the control screen of the real machine. In this way, datasets and, in particular, settings datasets can preferably be originally created offline or existing settings datasets can be modified there. An executable settings dataset created in this way is then transferred from the target system to the injection moulding machine, whereby again an adaptation for the operating system of the machine control system
20 takes place by means of a hardware-independent app. The further settings dataset thus created then usually enables an immediate operation of the injection moulding machine.

Preferably, the digital twin is operated on the target system offline from the first injection moulding machine and/or as a platform solution in the cloud, so that the
25 injection moulding machine can be further operated independently. It is possible simultaneously to prepare the injection moulding machine for the production of new injection moulding parts and also to check whether the injection moulding machine is at all suitable for the production of the next job. In this way, the suitability of the injection moulding machine can be checked in advance of a current production, so that
30 down times can be reduced.

Preferably, the target system also receives product information relating to a product to be produced on an injection moulding machine, for which a specific calculation of a settings dataset can take place. The calculation takes place on a processor without a

postprocessor and without a virtual model of the injection moulding machine, since due to the machine configuration and the data available locally or preferably at the manufacturer, all the information is available which enables an executable settings dataset to be generated for the respective injection moulding machine.

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It is advantageous if an expert knowledge set is made available at least to the target system, but preferably also to the injection moulding machine, from which it is apparent which components and which configuration a machine configuration must have so that a settings dataset is also executable on the respective injection moulding machine. By this means, both faulty input and also the production of faulty parts can be prevented. At the same time, the run-up or starting phase at the start of production of a new injection moulded part is significantly reduced.

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Additionally, in an advantageous manner, on the basis of the expert knowledge set and/or on the basis of the existing machine configuration on the respective injection moulding machine, it can be checked whether the further settings dataset is executable on the first injection moulding machine. For this purpose, sufficient information is available to the processor to enable such calculation and checking. If the result is that this is possible, the corresponding steps are carried out on the existing injection moulding machine. If, however, the result leads thereto that the processor ascertains that it is not possible on the injection moulding machine provided for the production, then a necessary machine configuration is determined. In this case, according to the method, it is checked whether further injection moulding machines are available to the user and whether one of these injection moulding machines has a machine configuration required for the production. If this is the case, the production of the injection moulded part is passed to the identified other injection moulding machine. If no other injection moulding machine is identifiable, the user is notified accordingly. By means of this procedure, it is firstly possible to carry out production effectively wherever production is indeed possible and, secondly, the user can discover at an early stage whether production is at all possible at his plant. This has cost advantages and contributes to an effective production.

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Preferably, in the context of the notification, the user also receives information concerning with which components the existing machine configuration can be adapted

and reconfigured so that the settings dataset is also executable on the injection moulding machine. In other words, he receives information regarding how he can equip his injection moulding machine if needed, in order to ensure production.

Precisely here, the advantage of an early advance calculation is clear since then

5 reconfiguration measures are still possible if needed.

Advantageously, the machine configuration is identified by means of a key, a password or an identifier, which is preferably the machine number, towards the processor. Through this identifier, the current machine configuration is stored in a

10 database which is available either locally at the user or externally, e.g., at the manufacturer. In this database, there is available the essential information, for example, configuration data of the injection moulding machine, knowledge data of an expert knowledge set, software functionality data of the operating system of the machine control system or of the injection moulding machine, which the user can
15 access with the processor on creating further settings datasets. Precisely when information is preferably also accessible in a database at the manufacturer, the user can be comprehensively informed from there about which additional possibilities are available to him.

20 This is particularly advantageous if, in the database which is preferably a database at the manufacturer, the current equipment and machine configuration of a respectively identifiable injection moulding machine is available and, furthermore, the further extension possibilities are also present there. For a comprehensible decision-making guide, it is also advantageous if there are stored in the database the history of the
25 injection moulding machine in respect of its delivered state and later alterations, the service history with regard to service operations performed and/or datasets already created on the injection moulding machine which were executable for the production of products on the injection moulding machine. This information can be present optionally and also only partially. The same applies for the case that a plurality of
30 injection moulding machines is present at a user, for the association and linking of these injection moulding machines. Such a database is then contacted by the processor for obtaining further information and/or for reconciling information in order to generate corresponding settings datasets and/or user information therefrom.

A reliable and updated calculation and support can take place, in particular, if the processor is associated with at least the database at the manufacturer or has access to a cloud solution, so that the method can preferably be carried out on the processor at the manufacturer. In this case, it is thus ensured that this information is
5 indeed up to date and does not have to be updated, where relevant, by means of a remote access.

Preferably, the method can be further developed in that update information for an injection moulding machine is also accessible on the database, this relating, in
10 particular, to updates relating to the machine configuration and a functional scope of the injection moulding machine possibly modified thereby. In this way, a new settings dataset can be made available for the injection moulding machine on the basis of the update information, which also makes it easier for the user, where relevant, to make his machine capable of operation for the respective product or, for
15 example, more energy-efficient.

In an advantageous manner, a similarity assistant can be provided which preferably identifies anonymised similarities between already produced products and products to be produced as well as between machine configurations with which products
20 have already been produced and are to be produced, specifically using injection moulding machines that are present at different users. With this, knowhow generated by different users together which supports a reliable production of injection moulded parts can be accessed. For this purpose, the similarities identified are used for creating the at least one new, or modifying the at least one existing,
25 settings dataset and/or for calculating the further settings dataset.

Further advantages are disclosed by the subclaims and the description below of preferred exemplary embodiments. The features set out individually in the claims
30 are combinable with one another in a technologically useful manner and can be supplemented with explanatory facts from the description and with details from the drawings, whereby further embodiments of the invention are disclosed.

Short description of the Figures

The invention is described in greater detail below, making reference to exemplary
5 embodiments illustrated in the drawings, in which:

Fig. 1 shows a schematic representation of an injection moulding machine
cooperating with a processor which has access to a database, if needed,

Fig. 2 shows a schematic representation of the processor and the information
accessible to it,

10 Fig. 3 shows a schematic representation of a plurality of injection moulding
machines connected to a local database,

Fig. 4 shows a flow diagram for the creation of an executable settings dataset,

Fig. 5 shows a modified method sequence with integrated executability checking.

15 Detailed description of preferred exemplary embodiments

The invention will now be described in greater detail, using examples, making
reference to the attached drawings. The exemplary embodiments are merely
examples, however, which should not be regarded as restricting the inventive concept
20 to a particular arrangement. Before the invention is described in detail, it should be
noted that it is not restricted to the respective components of the device and the
respective method steps, since these components and methods can vary. The
expressions used here are intended only to describe particular embodiments and are
not used restrictively. Furthermore, where the singular or the indefinite article are used
25 in the description or the claims, this also relates to a plurality of these elements,
provided it is not clearly indicated otherwise in the overall context.

The Figures show a method that is suitable for providing an operating system B of a
30 machine control system MS for an injection moulding machine SGM, SGM₁ for
processing plastics and other plasticisable masses. The operating system B of the
machine control system MS is thereby provided on a target system Z which is
independent of the injection moulding machine, having a processor P. This is
described below making reference to Fig. 1 in conjunction with Fig. 4.

According to the invention, in principle, it is to be made possible to use a copy of an operating system of a machine control system on any desired computer. This preferably identical copy is installed on a target system Z so that only the specific requirements for the display device and the input and output unit predetermined by the target system are adapted during the installation. For this purpose, the drivers that are specific for the target system Z and different from the machine control system MS are installed. For this, a hardware-independent APP is provided for the operating system B of the machine control system MS (steps 102, 103). Similarly, information items relating to the operating system B of the machine control system MS of a first injection moulding machine SGM, SGM₁ are provided, said operating system being configurable or adaptable (step 101) by means of configuration data of a first machine configuration MK₁ to the properties of the first injection moulding machine SGM, SGM₁. In this way, the machine control system MS and/or its operating system B is in and of itself adapted to the properties of the actually available injection moulding machine.

With the preferably identical configuration file of the machine control system MS, possibly bidirectionally converted to the respective input and output units of the systems used and, in particular, of the target system Z preferably used offline, the machine control system MS thus also becomes a control copy in the form of a digital twin of the real machine (step 104).

On the target system Z, at least a new, further settings dataset ED_w can now be created or at least an existing settings dataset ED_i can be modified which is executable for producing injection moulded parts on the injection moulding machine SGM, SGM₁ (step 105). This is shown in Fig. 1, in which the injection moulding machine SGM at bottom centre in Fig. 1 is connected to the processor P of the target system Z. From there, the executable settings dataset ED_i can be used in order to generate a further settings dataset ED_w and possibly to return it to the injection moulding machine. For this purpose, the further settings datasets ED_w created or modified on the target system Z are transferred to the first injection moulding machine SGM, SGM₁ (step 106). There, the injection moulding machine can be operated (step 107) with the dataset ED_w created or modified on the target system.

Preferably, the digital twin of the machine control system MS can be operated on the target system Z offline from the first injection moulding machine SGM, SGM₁ and/or on the target system as a platform solution in the cloud. In particular, for this purpose, an identification is possibly required using an identifier Ident. While during local
5 operation of the machine according to the method, the machine can be identified by the machine number, and the associated data are present on a local server, a customer identifies himself in a cloud solution by means of a key or a password assigned to the customer. In each case, the respective datasets are transportable and are tested as system files for the respective machine in the context of the processing.

10 According to the method, a first settings dataset ED_i that is executable on the first injection moulding machine is transferred to the target system Z, wherein at this time point, information items relating to the operating system B of the machine control system MS (steps 101, 112 in Fig. 5) are already present. Additionally, product information items
15 PI according to Fig. 1 and Fig. 5 (step 113) are provided relating to a product to be produced as an injection moulded part on an injection moulding machine. Using the information relating to the first machine configuration MK₁ and the settings dataset ED_i that is executable on the injection moulding machine, a further settings dataset ED_w for producing the product to be produced is now calculated (step 114), wherein the
20 calculation according to Fig. 1 takes place on a processor P. For this purpose, neither a postprocessor nor a virtual model of the injection moulding machine is needed.

Subsequently, the further settings dataset calculated on the digital twin is transferred to the first injection moulding machine SGM₁ or at least one other injection moulding
25 machine SGM, SGM₂, ..., SGM_x, as set out for the last case illustrated in Fig. 3. The respective injection moulding machine can thus be operated with the further settings dataset ED_w for producing the product to be produced.

Figs. 1 and 2 show that, if relevant, an expert knowledge set K is provided. This
30 expert knowledge set K contains information regarding which components and which configuration a machine configuration MK must have so that a further settings dataset ED_w is or will be executable on an injection moulding machine.

It is advantageous if at this time point, i.e., after the provision of the settings dataset and possibly also on the basis of the expert knowledge set K, it is checked whether the further settings dataset ED_w is at all executables (step 115) on the first injection moulding machine SGM_1 . If this is the case, the respective injection moulding machine SGM_1 can obtain the settings dataset ED_w and can thus also be operated (steps 116, 122).

If, however, this is not the case, the processor is capable, on the basis of the information provided to it, to determine a machine configuration MK_n (step 117) for the production of an injection moulded part to be produced. In this case, in the next step, it is enquired firstly whether a plurality of injection moulding machines is available at a user in order to ascertain whether a required machine configuration MK_n is present at another injection moulding machine $SGM_2, \dots, SGM_x$ at the user. If this is the case, the injection moulded part to be produced can be operated on the identified other injection moulding machine with the further settings dataset ED_w . If, therefore, another suitable machine can be identified in step 118, the settings dataset according to step 119 is transferred to the identified injection moulding machine and this can be operated accordingly as per step 122. If no other injection moulding machine is identified, the user is notified accordingly.

This notification has the advantage for the user that he is now informed that the product cannot be produced at the moment on his injection moulding machine. In this way, action can be taken in good time to initiate corresponding reconfiguration work or for alternatives to be considered. Preferably, the notification of the user includes information concerning with which components the machine configuration MK_1 , MK can be adapted and reconfigured so that the further settings dataset ED_w is executable on the injection moulding machine (step 120). In principle, the user receives information therewith regarding how he can reconfigure his machines so that a production of the injection moulded part to be produced becomes possible. If the injection moulding machine has been reconfigured accordingly, then the new settings database ED_n can be transferred to the correspondingly reconfigured injection moulding machine SGM_n (step 121) and the injection moulding machine can be operated accordingly (step 122).

According to Fig. 1, the machine configuration MK_1 , MK of an injection moulding machine SGM , SGM_1 is preferably identified towards the processor P by means of an identifier $Ident$ which is preferably the machine number or a password or key
 5 known to the user in such a way that access to the current machine configuration in a database DB is provided. This database contains at least the following information:

- configuration data of a machine configuration MK , MK_1 , MK_w , MK_2 , ..., MK_x
- knowledge data of an expert knowledge set K ,
- 10 - software functionality data of the operating system B of the machine control system MS or the injection moulding machine.

As shown at the top in Fig. 1, this database also has further information since preferably in this database, which is particularly preferably a database at the
 15 manufacturer, the following information is available to access:

- current equipment E and machine configuration MK of a respective injection moulding machine identifiable with the identifier $Ident$,
- information regarding further extension possibilities M of equipment E as well as the machine configuration MK of the respective identifiable injection moulding machine.

20 Optionally, the following information can also be present at least partially in the database DB :

- a history H of the identifiable injection moulding machine with regard to the delivery status and later reconfigurations undertaken since delivery,
- a service history WH relating to service operations undertaken,
- 25 - information relating to datasets D already created on the injection moulding machine in the past which were executable on the injection moulding machine for the production of injection moulded parts,
- if a plurality of injection moulding machines is operated at the user, an association and linking of this plurality of injection moulding machines to one another.

30 Preferably, the processor P can contact the database DB to receive further information and/or for reconciliation information, in particular if what is required is to create a correspondingly adapted further settings dataset ED_w .

It is also advantageous if the database DB shown at the top in Fig. 1 is present externally, that is, for example at the manufacturer and an association of the processor P with this database DB takes place. In this case, the method can also be carried out on a processor P at the manufacturer. The data can be provided to the user in any desired manner, whereby access via an app, via the Internet or a cloud-based solution are conceivable.

If a plurality of injection moulding machines is available at the user, then it is also possible to determine a preselection of machines that are suitable for the further settings dataset ED_w and also to condition these accordingly. This provides the possibility of creating operational planning for the user in order to be able to produce high value injection moulded parts as efficiently and effectively as possible in a time-optimised manner.

With all this information, the processor P is capable, in accordance with Fig. 2, given the existence of an execution-capable settings dataset ED_i with an expert knowledge set K relating to possible machine configurations and settings datasets, to propose a new machine configuration MK_n and to generate a further settings dataset ED_w . Similarly, however, the processor P is also capable, without knowledge of an existing settings dataset ED_i , of generating a new settings dataset ED_n .

In addition, update information for an injection moulding machine can be provided on the database DB, this update information comprising, in particular, updates for the machine configuration MK and a thereby modified functional scope of the injection moulding machine. It is thereby possible, for example, to provide a new settings dataset ED_n which can be, or at least could be, executed on the injection moulding machine on the basis of the update information. This gives the user the possibility of informing himself regarding with which update he can, where relevant, operate his machine still more efficiently.

With the database DB, in particular, if it is provided at the manufacturer, similarities can also be identified by means of the similarity assistant SA shown on the right side in Fig. 1. For this purpose, anonymised similarities between already produced products and products to be produced are preferably also made available, such as

similarities between machine configurations MK with which products have already been produced, and machine configurations with which products are to be produced. This takes place using injection moulding machines SGM which are preferably present with different users, in order thereby to make an information pool usable. The

5 similarities identified are then used to create the at least one new, or to modify the at least one existing, settings dataset ED_i and/or to calculate the further settings dataset ED_w .

It goes without saying that this description may be subject to the most diverse modifications, changes and adaptations which are within the range of equivalents to
10 the attached claims.

Reference signs

B	Operating system
D	Datasets
DB	Database
DB local	Local database
E	Equipment
ED _i	Executable settings dataset
ED _w	Further settings dataset
ED _n	New settings dataset
H	History
Ident	Identifier
K	Expert knowledge set
M	Modification possibilities
MS	Machine control system
MK	Machine configuration
MK ₁	First machine configuration
MK _n	Required machine configuration
P	Processor
PI	Product information
SA	Similarity assistant
SGM	Injection moulding machine
SGM ₁	First injection moulding machine
SGM ₂ , ..., SGM _x	Further injection moulding machines
WH	Service history
Z	Target system

Claims

1. Method for providing an operating system (B) of a machine control system for an injection moulding machine (SGM, SGM₁) for processing plastics and other plasticisable masses on a target system (Z) with a processor (P), said target system being independent of the injection moulding machine, comprising the following steps:
 - a) providing information relating to an operating system (B) of a machine control system (MS) of a first injection moulding machine (SGM, SGM₁), said operating system being configurable or adaptable by means of configuration data of a first machine configuration (MK₁) to the properties of the first injection moulding machine (SGM, SGM₁),
 - b) providing a hardware-independent APP for the operating system (B) of the machine control system (MS),
 - c) installing the operating system (B) for the machine control system (MS) with all the configuration data as a digital twin on the target system (Z) using the hardware-independent APP for converting the information relating to the operating system (B) of the machine control system (MS) to the target system (Z), wherein a configuration file of the machine control system is adapted bidirectionally converted to the target system for offline creation or modification of settings datasets,
 - d) creating at least one new, or modifying at least one existing, settings dataset (ED_i) on the target system (Z) for producing injection moulded parts, which is executable on the first injection moulding machine (SGM, SGM₁),
 - e) transferring a further settings dataset (ED_w) created or modified on the target system (Z) to the first injection moulding machine (SGM, SGM₁),
 - f) operating the first injection moulding machine (SGM, SGM₁) with the further settings dataset (ED_w).
2. Method according to claim 1, wherein the digital twin is operated on the target system offline from the first injection moulding machine (SGM, SGM₁) and/or on the target system (Z) as a platform solution in the cloud.
3. Method according to claim 1 or 2, wherein it further comprises the steps:

- g) transferring the at least one settings dataset (ED_i) that is executable on the first injection moulding machine to the target system (Z),
 - h) providing product information (PI) to the target system (Z) relating to a product to be produced on an injection moulding machine as an injection moulded part,
 - i) calculating the further settings dataset (ED_w) for producing the product to be produced using the information relating to the first machine configuration (MK_1) and the settings dataset (ED_i) executable on the injection moulding machine, on the target system (Z), wherein the calculation takes place on a processor (P) without a postprocessor and without a virtual model of the injection moulding machine,
 - j) transferring the further settings dataset (ED_w) from the target system (Z) to the first injection moulding machine (SGM_1) or at least one other injection moulding machine ($SGM_1, SGM_2, \dots, SGM_x$),
 - k) operating the first injection moulding machine (SGM_1) or another injection moulding machine with the further settings dataset (ED_w) for producing the product to be produced.
4. Method according to one of the preceding claims, wherein it comprises the following further step:
- providing an expert knowledge set (K) regarding which components and which configurations a machine configuration (MK) must have so that the further settings dataset (ED_w) is executable on an injection moulding machine.
5. Method according to one of the claims 3 or 4, wherein it comprises the following further steps:
- checking after step (i) of claim 3 on the basis of the expert knowledge set (K) and/or on the basis of the machine configuration (MK) present on the respective injection moulding machine whether the further settings dataset (ED_w) is executable on the first injection moulding machine (SGM_1),
 - if the answer is positive, carrying out steps (j) and (k),
 - if the answer is negative, determining a necessary machine configuration (MK_n),
 - if a plurality of machines is available at a user, determining whether a required machine configuration (MK_n) is present on another of the injection moulding

- machines (SGM₂, ..., SGM_x) available at the user and transferring the further settings dataset (ED_w) to the identified other injection moulding machine,
- if no other injection moulding machine is identifiable, notifying the user.
6. Method according to claim 5, wherein the notification of the user contains information concerning with which components the machine configuration (MK₁; MK) can be adapted and reconfigured so that the further settings dataset (ED_w) is executable on the injection moulding machine.
7. Method according to one of the preceding claims, characterised in that the machine configuration (MK₁; MK) of an injection moulding machine (SGM, SGM₁) is identified in the direction toward the processor (P) by means of an identifier (Ident), preferably by means of the machine number under which the current machine configuration is stored in a database (DB) in which at least one of the following information items is contained: configuration data, knowledge data of an expert knowledge set (K), software functionality data of the operating system (B) of the machine control system (MS) or the injection moulding machine (SGM, SGM₁).
8. Method according to one of the preceding claims, having the steps:
- providing a database (DB), preferably a database at the manufacturer in which the following information items are contained:
 - current equipment (E) and machine configuration (MK) of a respective identifiable injection moulding machine,
 - further extension possibilities (M) of the equipment (E) and the machine configuration (MK) of the respective identifiable injection moulding machine,
 and the following information items are contained wholly or partially:
 - history (H) of the identifiable injection moulding machine with regard to the delivery status and later reconfigurations,
 - service history (WH) with regard to service operations carried out,
 - datasets (D) already created on the injection moulding machine which were executable for the production of products on the injection moulding machine,

- if a plurality of injection moulding machines is available at a user, association and linking of this plurality of injection moulding machines,
 - contacting the database (DB) by the processor (P) for obtaining further information and/or for the reconciliation of information.
9. Method according to one of the preceding claims, having the steps:
associating the processor (P) with the database (DB) at the manufacturer and carrying out the method on the processor (P) at the manufacturer.
10. Method according to one of the claims 3 to 9, having the step:
if a plurality of injection moulding machines is available at a user, determining a preselection of injection moulding machines suitable for the further settings dataset (ED_w) according to step (i) of claim 3.
11. Method according to one of the preceding claims, having the steps:
- providing update information for an injection moulding machine on the database (DB), wherein the update information comprises, in particular, updates for the machine configuration (MK) and a functional scope of the injection moulding machine modified thereby,
 - providing a new settings dataset (ED_n) for the injection moulding machine on the basis of the update information.
12. Method according to one of the preceding claims having the steps:
- providing a similarity assistant (SA) for identifying preferably anonymised similarities between already produced products and products to be produced and between the machine configurations (MK) with which products have already been produced and are to be produced using injection moulding machines (SGM) that exist with different users,
 - using the identified similarities for creating the at least one new, or for modifying the at least one existing, settings dataset (ED_i) and/or for calculating the further settings dataset (ED_w).

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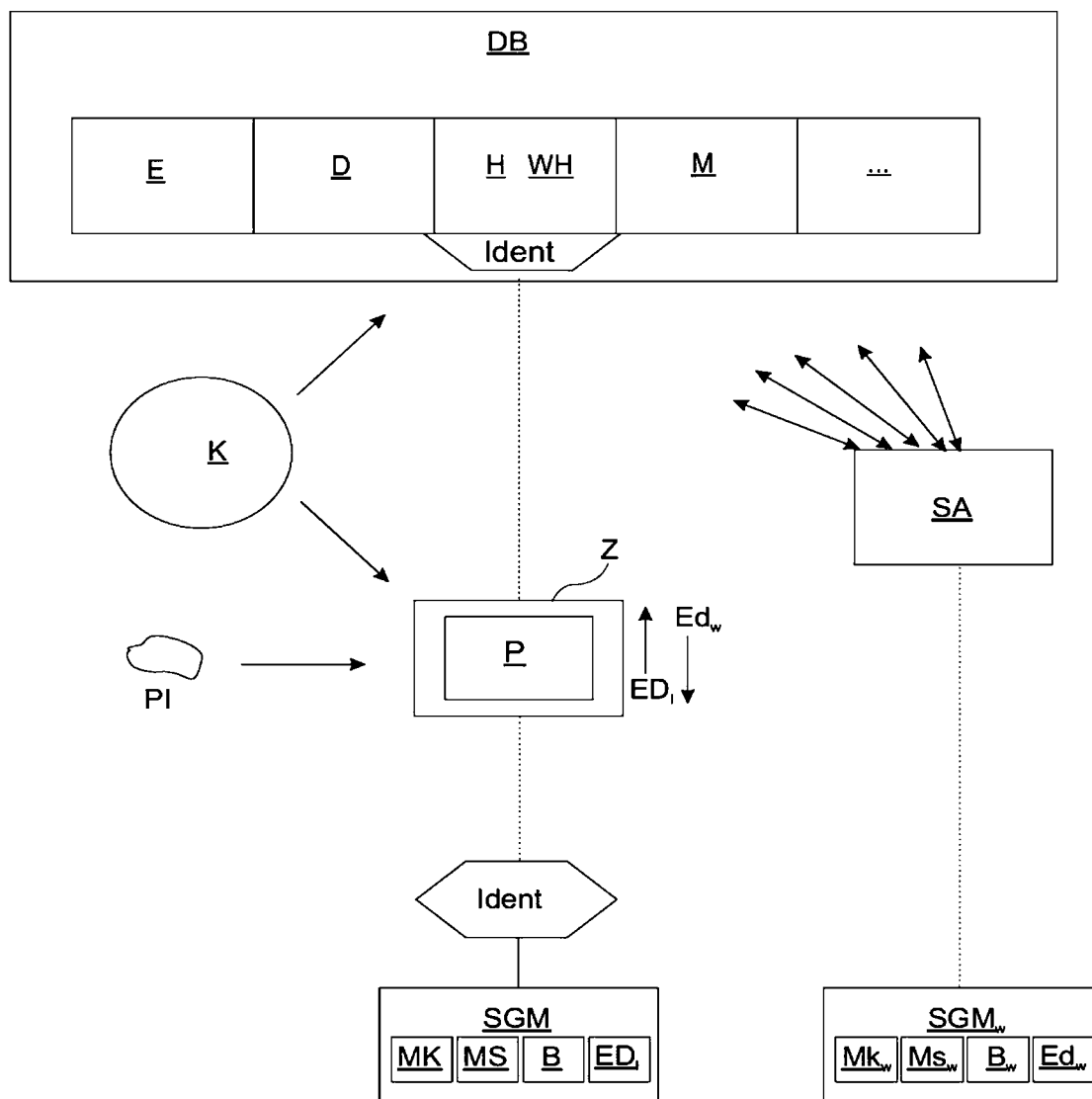


Fig. 1

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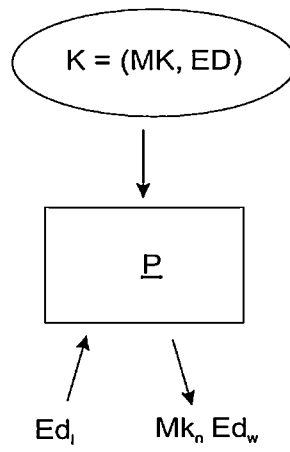


Fig. 2

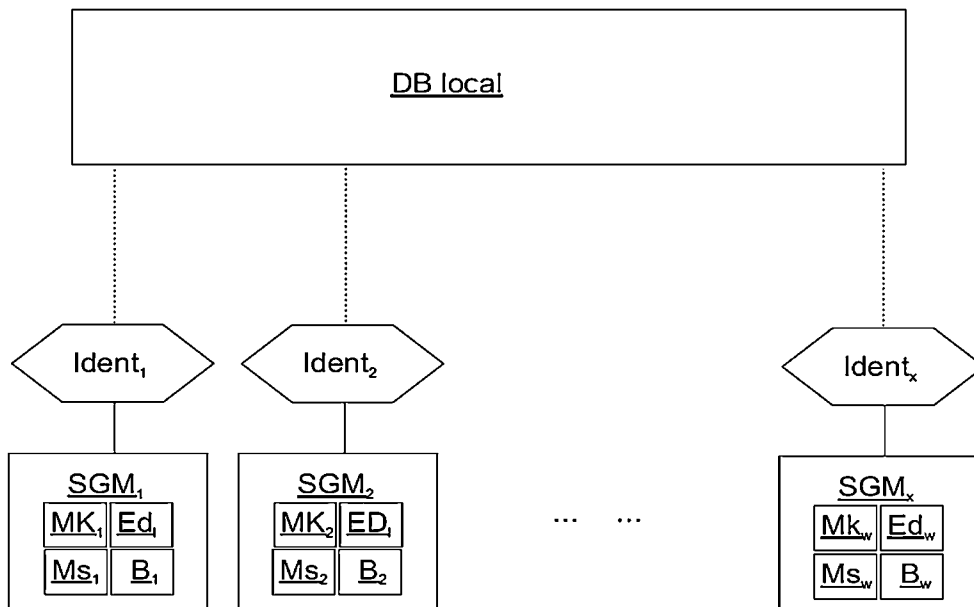
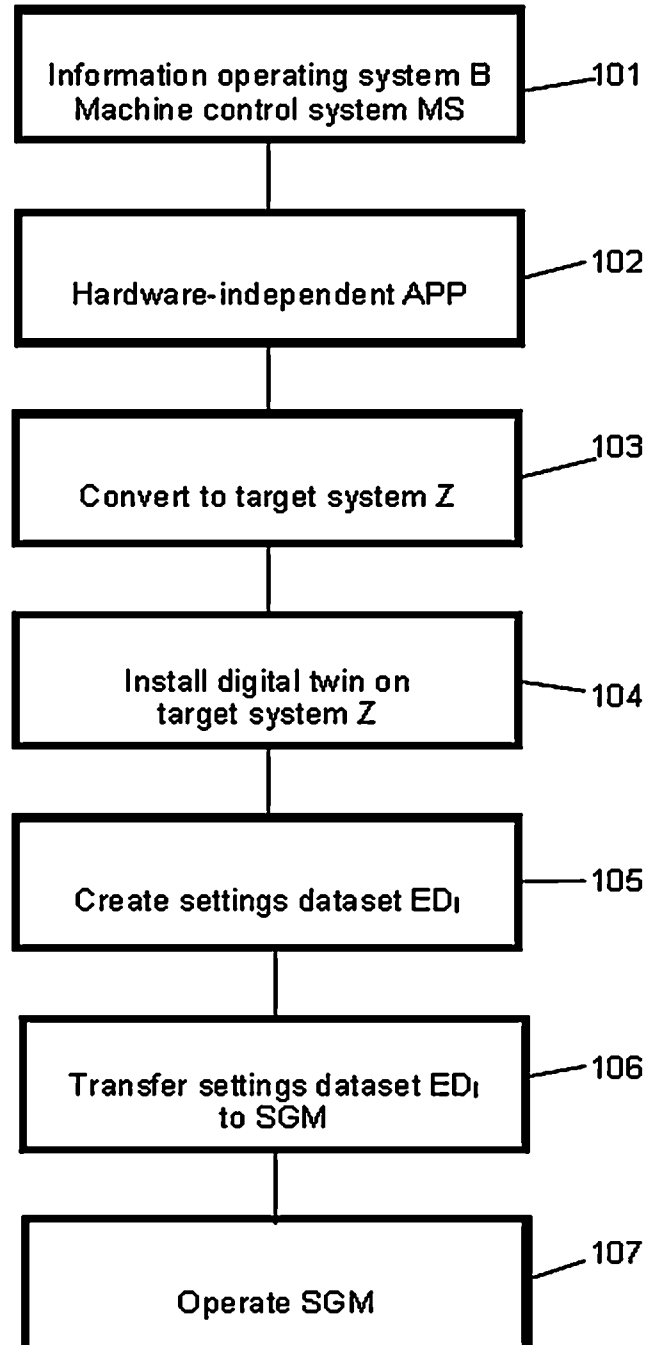
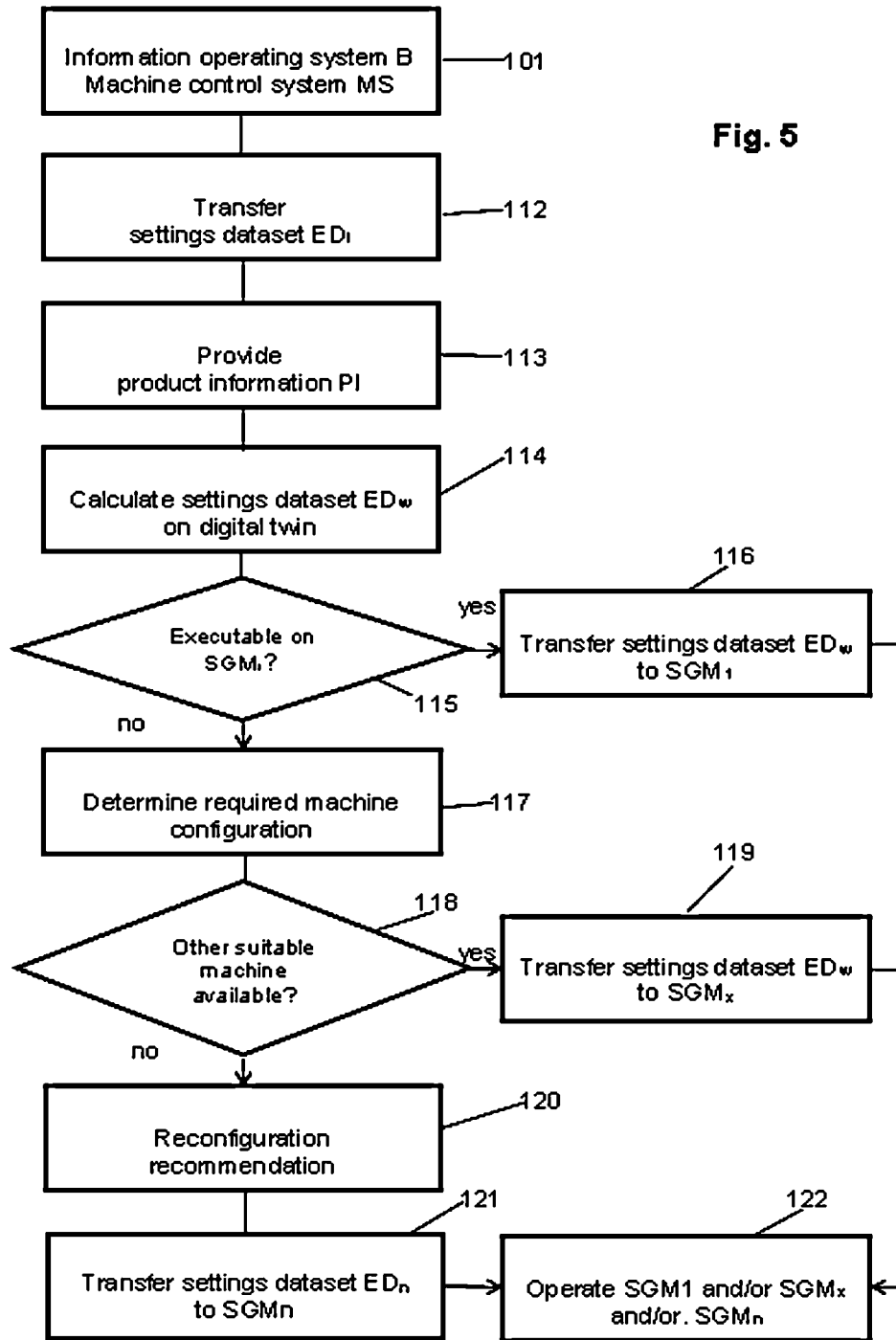


Fig. 3

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**Fig. 4**

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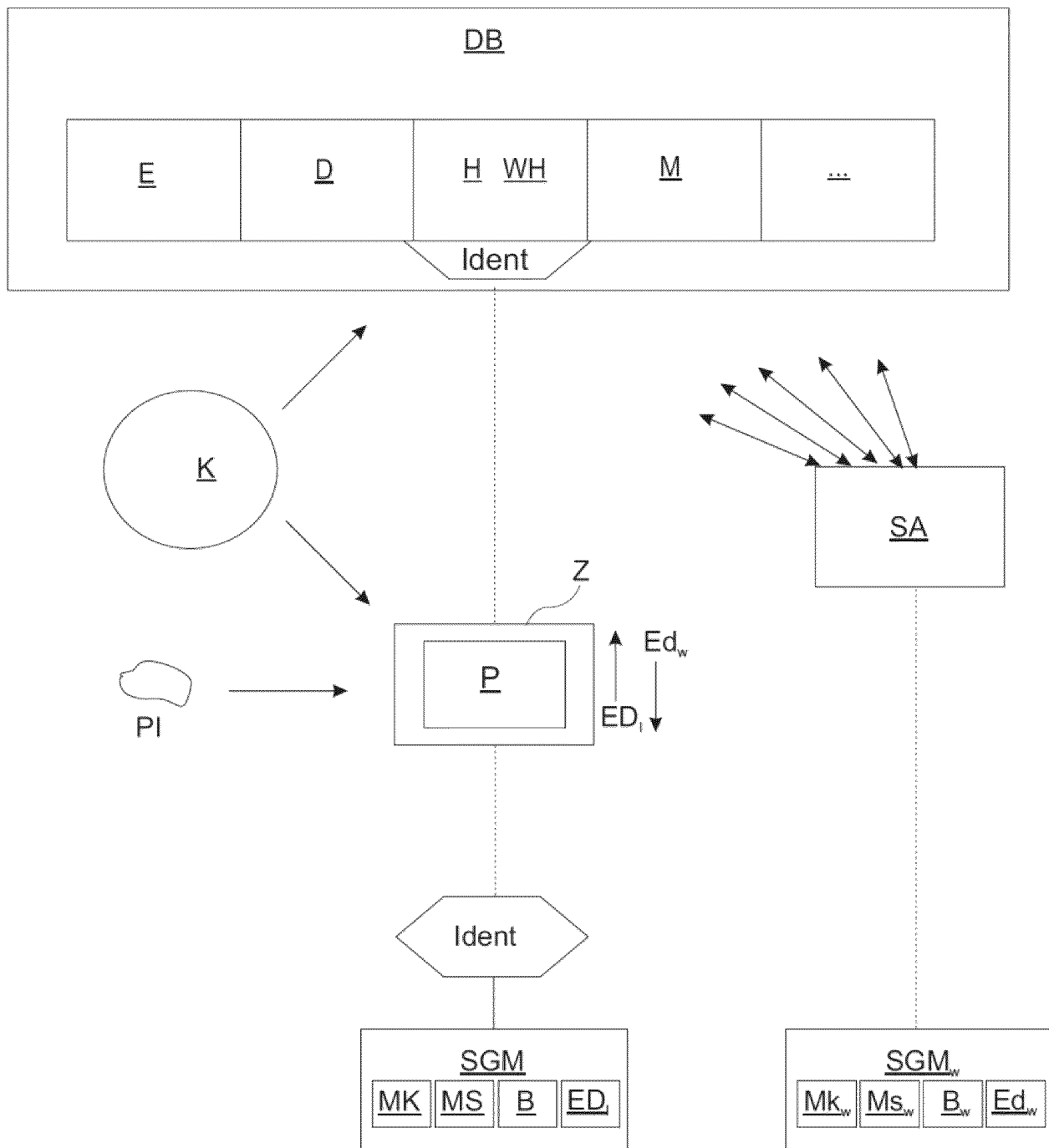


Fig. 1