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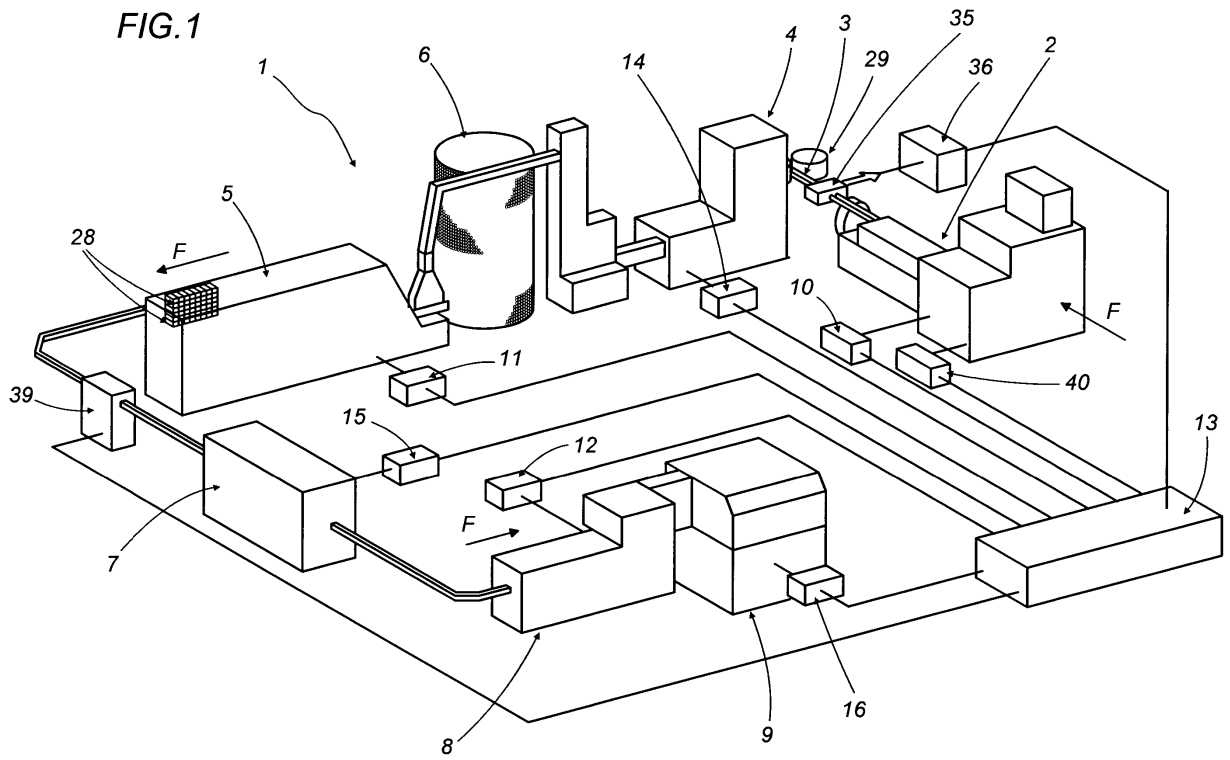
(54) A method and a system for the manufacture of tobacco products

(57) Tobacco products are manufactured by a system (1) including at least a first production machine (2, 5, 8) turning out the tobacco products (3, 28) and at least one user machine (4, 7, 9) in receipt of the products, connected together in cascade. In the event of a stoppage at the user machine (4, 7, 9), the speed of the first machine (2, 5, 8) is reduced to a first level, lower than that of the normal operating speed, whereupon the lower speed is maintained for a programmed length of time during which the tobacco products (3, 28) that continue to be turned out by the first machine (2, 5, 8) are ejected at an outfeed station, and thus prevented from reaching the user machine.

FIG.1



EP 1 704 785 A1

Description

[0001] The present invention relates to a method and to a system for the manufacture of tobacco products.

[0002] A conventional system of the type in question appears normally as a line comprising a plurality of machines linked one to the next in cascade.

[0003] More exactly, such a line typically comprises a cigarette maker at the upstream end and, proceeding downstream along the feed direction followed by the products, a filter tip attachment machine, then a packer, a cellophaner for overwrapping packets, a cartoner by which packets are wrapped in multiples, and a further cellophaner or equivalent machine by which the cartons are overwrapped.

[0004] Such lines can also be equipped with temporary storage units or "buffers", interposed between cascaded machines and serving to compensate any imbalances in output between these same machines, as well as allowing one machine to keep operating for a given period of time in the event of another machine connected directly to this same machine being shut down temporarily due to a fault or for maintenance purposes.

[0005] Since it is impossible to install such buffers between every single pair of machines making up the production line, and given therefore that lines will also include machines linked directly one to another, it is obvious that a stoppage occurring in one machine for whatever reason will result also in a stoppage of the machine, or machines, directly linked to this same machine.

[0006] The consequences of these enforced stoppages are conspicuously negative, in terms both of production losses and of wasted material, particularly when involving machines equipped with devices (such as printing or gumming equipment) that need a certain amount of time at each restart for normal operating conditions to be established.

[0007] An example of the aforementioned situation would be that of a stoppage occurring on a line equipped with a cigarette maker and a filter tip attachment machine connected directly one to another.

[0008] In cigarette makers of conventional embodiment, a stream of tobacco particles supplied by one feed unit, and a continuous strip of paper supplied by another unit, are directed into a garniture section along which the paper is wrapped progressively around the stream of tobacco to form a continuous cigarette rod.

[0009] Emerging from one end of the garniture section, the cigarette rod is caused by the cigarette maker to advance along a predetermined feed path, passing through a succession of quality control devices and into a cutting station where it is divided up by a rotary cutter device into discrete cigarette sticks of prescribed length.

[0010] Operating downstream of the cutter device are transfer means by which the cigarette sticks are taken up and conveyed to the infeed of the filter tip attachment machine.

[0011] Conventionally, the filter tip attachment machine comprises a succession of rotating drums furnished with aspirating flutes accommodating the single cigarette sticks; as the sticks progress from the infeed to the outfeed stage of the machine, they are paired with respective filter plugs to form respective filter cigarettes.

[0012] Likewise conventionally, once the system has been started up, a certain interval of time must elapse before cigarettes of an acceptable quality can be produced, given that the various machine units, and in particular those of the cigarette maker, need to stabilize at normal operating speed, temperature, etc.

[0013] During this interval, a cut-off device operating between the garniture section and the rotary cutter will slice through the continuous cigarette rod and divert it away from the line so it cannot reach the filter tip attachment machine.

[0014] The operation of the cut-off device will also be invoked in the event of the filter tip attachment machine being forced to shut down suddenly, due to a fault or for maintenance purposes.

[0015] During these transient phases in the operation of the system, when the cigarette maker continues to function for a certain duration while the filter tip attachment machine remains inactive, notable quantities of tobacco are lost, not least through the effect of the high operating speeds of which modern cigarette makers and filter tip attachment machines are capable, and especially in the case of twin-track, dual-rod type cigarette makers.

[0016] Even where the tobacco in question is reclaimed, its quality is significantly degraded thereafter.

[0017] Moreover, should the period for which the filter tip attachment machine remains inactive persist beyond a given limit, the cigarette maker will also shut down. To restore normal operating conditions of the system in this situation, an operator must intervene manually to remove a length of continuous cigarette rod that will be left between the cut-off device and the rotary cutter.

[0018] The task of removing this fragment of cigarette rod is a complex one, since besides opening up the casing of the machine it may also be necessary to disturb the quality control and gumming devices, dismantling them in part and occasioning lengthy periods of inactivity as a result.

[0019] A further example of the difficulty in question is afforded by the portion of the production line made up of the packer and the cellophaner. In this instance, a stoppage occurring at the cellophaner for whatever reason will in turn force a stoppage of the packer, resulting in loss of time and waste of wrapping materials and cigarettes alike, as the packets currently being assembled must be discarded before normal operation can be resumed.

[0020] The object of the present invention is to provide a method and a system for manufacturing tobacco products, by which the drawbacks described above can be minimized and eliminated.

[0021] The stated object is realized in a method and a system for the manufacture of tobacco products, as char-

acterized in any one or more of the appended claims.

[0022] The invention will now be described in detail, by way of example, with the aid of the accompanying drawings, in which:

- figure 1 shows a system for manufacturing tobacco products, able to implement the method according to the present invention, illustrated schematically with blocks and viewed in perspective;
- figure 2 shows a cigarette maker and a filter tip attachment machine forming part of the system in figure 1, illustrated schematically and viewed in perspective.

[0023] With reference to figure 1, numeral 1 denotes a system or line for manufacturing tobacco products, comprising a plurality of machines connected one to another.

[0024] More exactly, proceeding from the upstream to the downstream end of the line along the direction F followed by the products, the system 1 comprises a cigarette maker 2 turning out cigarette sticks 3, a filter tip attachment machine 4 turning out filter cigarettes, and a packer 5 turning out packets 28, to which the filter tip attachment machine 4 is connected by way of a cigarette buffer denoted 6.

[0025] The packer 5 is connected to a cellophaner 7 by which the packets 28 are overwrapped. Packets 28 emerging from the cellophaner 7 are directed into a cartoner 8 and assembled in multiple packs, which thereupon are conveyed to a further cellophaner or overwrapper 9 and enveloped in cellophane or paper.

[0026] The cigarette maker 2 is driven by a relative motor denoted 10, the packer 5 is driven by a motor denoted 11 and the cartoner 8 is driven by a motor denoted 12. The motors 10, 11 and 12 are connected to a master control unit denoted 13.

[0027] Also indicated in figure 1 are sensing means 14, 15 and 16 associated respectively with the filter tip attachment machine 4, the packet cellophaner 7 and the carton overwrapper 9, such as will respond to a break in the operation of the relative machine by relaying a signal to the control unit 13.

[0028] The cigarette maker 2, packer 5 and cartoner 8 are definable, for reasons that will become clear in due course, as production machines turning out tobacco products, whilst the filter tip attachment machine 5, the cellophaner 7 and the overwrapper 9 are also definable as users of these same products.

[0029] With reference to figure 2, the cigarette maker 2 is composed of a feed device 17 supplying tobacco particles, a feed unit 18 designed to gather and advance the particles in two streams 19, a feed unit 20 advancing a continuous strip of paper 21 decoiled from a roll 22, and a garniture section 23 along which two continuous cigarettes rods 24 are formed.

[0030] The outfeed end of the garniture section 23 is equipped with a cut-off device 25 by which the two continuous cigarette rods 24 can be severed and diverted toward a tobacco reclaiming device, not illustrated in the drawings.

[0031] Beyond the cut-off device 25 are quality control devices shown schematically as blocks denoted 26, and a rotary cutter 27 by which the two continuous rods 24 are divided up into cigarette sticks 3 of predetermined length.

[0032] The filter tip attachment, or user machine 4, comprises a transfer unit 29 by which the cigarette sticks 3 are taken up and placed on a first drum or roller 30 of a plurality of rollers 31 furnished with aspirating flutes proportioned to accommodate the single sticks 3.

[0033] In the course of their progress from the infeed end to the outfeed end of the filter tip attachment machine 4, the cigarette sticks 3 are assembled with respective filter plugs 32 dispensed from a feed hopper 33, to form filter cigarettes 34.

[0034] Located at a given point between the outfeed of the cigarette maker 2 and the infeed of the filter tip attachment machine 4, and more exactly between the rotary cutter 27 and the transfer unit 29, are ejector means 35 by which cigarette sticks 3 can be diverted into a recovery vessel shown schematically as a block denoted 36.

[0035] With the system in operation, and assuming normal conditions, the cigarette maker 2 and filter tip attachment machine 4 are set in motion at a given operating speed by the respective motors, and the cigarette sticks 3 are directed by the transfer unit 29 onto the rollers 30 and 31 of the filter tip attachment machine 4, whereupon each successive stick 3 is fitted with a respective filter plug 32 to create a succession of filter cigarettes 34.

[0036] In the event that the operation of the filter tip attachment machine 4 should be interrupted due to a fault, or in order to carry out maintenance work, a signal is relayed by the sensing means 14 to the master control unit 13, indicating that a stoppage has occurred.

[0037] The control unit 13 in turn outputs a signal to the motor 10 of the cigarette maker 2, causing its speed to drop to a first level lower than normal operating speed.

[0038] At the same time, a further signal is sent by the control unit 13 to the ejector means 35, which will proceed to divert the sticks 3 turned out by the cigarette maker 2 while operating at lower speed, directing them into the recovery vessel 36.

[0039] This continues to be the situation until normal operation of the filter tip attachment machine 4 is restored, an event signalled to the control unit 13 by the sensing means 14 as and when verifiable, or until a predetermined time out occurs.

[0040] In effect, the master control unit 13 comprises time measurement means 37 serving to monitor the duration of the stoppage affecting the filter tip attachment machine 4, and comparison means 38 by which the duration of the stoppage monitored via the time measurement means 37 is compared with a predetermined reference value.

[0041] Should the filter tip attachment machine 4 return to normal operation within an interval of time no longer than the reference value, the master control unit 13 will generate an output signal piloting the motor 10 of the cigarette maker 2 to resume normal operating speed, and a further signal deactivating the ejector means 35.

[0042] In the event of the stoppage at the filter tip attachment machine 4 persisting beyond the time reference value aforementioned, a signal generated by the control unit 13 will cause the motor 10 to shut off, and the entire system 1 is shut down.

[0043] Self-evidently, the method is also applicable to other pairs of production and user machines making up the system 1.

[0044] For example, in the eventuality of a stoppage at the cellophaner 7 overwrapping the packets 28, the control unit 13 receives a signal from the sensing means 15 and responds by generating output signals that will reduce the speed of the motor 11 driving the packer 5, as well as activating means 39 by which the packets 28 emerging from the packer 5 are ejected.

[0045] Likewise in this instance, the considerations are exactly the same as described above for the pair of machines illustrated in figure 2.

[0046] In a further example of the method, not shown in the drawings, the aforementioned pair of machines might include a filter maker turning out plugs or composite filters, connected on the outfeed side to a user machine that could again be the filter tip attachment machine 4,

[0047] It will be seen that the method according to the present invention is especially advantageous when applied to the cigarette maker 1 and filter tip attachment machine 4 of the system 1. In effect, the procedure is such that normal operation of the system 1 can be restored following a stoppage of the downstream machine 4 lasting no longer than a predetermined duration, without any need for manual operations on the cut-off device 25 as required in prior art systems.

[0048] Lastly, in the event of the cigarette maker 2 being affected by stoppages of short duration, and use of the cut-off device 25 may not be required, the cigarette maker 2 similarly can be equipped with sensing means 40 designed to relay a signal to the master control unit 13 indicating the inactive state of the machine 2, whereupon the unit 13 will respond by executing exactly the same comparisons and functions as described above.

Claims

1. A method for the manufacture of tobacco products in a system (1) comprising at least a first production machine (2, 5, 8) turning out tobacco products (3, 28), and at least one user machine (4, 7, 9) in receipt of such tobacco products (3, 28),
   characterized
   in that it includes the steps of:
   - adjusting the speed of the first machine (2, 5, 8) to a first level, slower than normal operating speed, at least in the event of a break in the operation of the user machine (4, 7, 9);
   - causing tobacco products (3, 28) turned out in the course of the first step to be ejected at the outfeed of the first machine (2, 5, 8).

2. A method for the manufacture of tobacco products as in claim 1, wherein the system (1) comprises a first machine (2) equipped with means for the production of at least one continuous rod (24) of a tobacco product (3), means (27) by which the continuous rod (24) is cut into sticks (3), and a second user machine (4) in receipt of the sticks (3), comprising the steps of:
   - adjusting the speed of the first machine (2) to a first level, slower than normal operating speed, at least in the event of a break in the operation of the second user machine (4);
   - ejecting the sticks (3) turned out in the course of the first step.

3. A method for the manufacture of tobacco products as in claim 1 or 2, wherein the first machine (2) consists in a cigarette maker turning out cigarette sticks (3), and the user machine consists in a filter tip attachment machine (4) by which filters are applied to the cigarette sticks (3).

4. A method for the manufacture of tobacco products as in claim 1 or 2, wherein the system (1) comprises a filter maker turning out filter plugs, and a filter tip attachment machine (4) by which filter plugs are applied to cigarette sticks (3), comprising the steps of:
   - adjusting the speed of the filter maker to a first level, slower than normal operating speed, at least in the event of a break in the operation of the filter tip attachment machine (4);
   - ejecting the filter plugs turned out in the course of the first step.

5. A method for the manufacture of tobacco products as in claim 1 or 2, wherein the system (1) comprises a packer machine (5) and/or a cellophaner machine (7) turning out packets (28), connected in cascade to a cartoner machine (8) by which the packets (28) are assembled in multiple packs.

6. A method for the manufacture of tobacco products as in claim 1 or 2, wherein the system (1) comprises a cartoner machine (8) by which the packets (28) are assembled in multiple packs, connected in cascade to a cellophaner machine (9).

7. A method as in claims 1 to 6, including the further

step of maintaining the speed of the first machine (2, 5, 8) at the first level for a predetermined length of time.

8. A method as in claims 1 to 7, including the further step of adjusting the speed of the first machine (2, 5, 8) to the first level when the system (1) is started up.

9. A method as in claims 1 to 7, including the steps of measuring the duration of the break in operation of the second user machine, comparing the duration of the break with a predetermined time reference value, and suspending the operation of the first machine (2, 5, 8) when the duration of the break matches the predetermined time reference value.

10. A system for the manufacture of tobacco products, comprising at least a first production machine (2, 5, 8) turning out tobacco products, at least one user machine (4, 7, 9) in receipt of the tobacco products, and drive means (10, 11, 12) to which the first machine (2, 5, 8) is coupled,
characterized in that it comprises:

- a master control unit (13) by which the drive means (10, 11, 12) are caused to operate at least at a lower first level of speed and at a higher second level of speed, assumed in normal operation;
- ejector means (35, 39) interposed between the outfeed of the first machine (2, 5) and the infeed of the user machine (4, 7) and interlocked to the master control unit (13);
- first sensing means (14, 15, 16) connected on the output side to the master control unit (13) and generating signals to indicate a break in operation of the user machine (4, 7, 9).

11. A system as in claim 10, comprising second sensing means (40) connected on the output side to the master control unit (13) and generating signals to indicate the start-up of the first machine (2).

12. A system as in claims 10 and 11, wherein the master control unit (13) is programmed to generate a signal serving to adjust the speed of the drive means (10, 11, 12) to the lower first level, and a signal serving to activate the ejector means (35, 39), in response to a signal received from the first sensing means or the second sensing means.

13. A system as in claims 10 to 12, wherein the master control unit (13) comprises means (37) by which to measure the duration of the break in operation of the user machine, also means (38) by which to compare the duration of the break in operation with a predetermined time reference value, and is designed to generate:

- a signal serving to adjust the speed of the drive means (10, 11, 12) to the lower first level and a signal serving to activate the ejector means (35, 39), in response to a signal received from the first sensing means (14, 15, 16);
- a signal serving to adjust the speed of the drive means (10, 11, 12) to the higher second level of normal operating speed and a signal serving to deactivate the ejector means (35, 39), when the signal generated by the first sensing means (14, 15, 16) ceases within an interval of time less than the predetermined reference value;
- a signal serving to shut down the drive means (10, 11, 12) in the event that the duration of the break in operation of the user machine (4, 7, 9) persists for a time equal to that of the reference value.

14. A system as in claims 10 to 13, wherein the first machine (2, 5, 8) consists in a cigarette maker turning out cigarette sticks (3) for assembly into cigarettes (34), and the user machine consists in a filter tip attachment machine (4) by which filters are applied to the cigarette sticks (3).

15. A system as in claims 10 to 13, wherein the first machine (2, 5, 8) consists in a filter maker turning out filter plugs, and the user machine consists in a filter tip attachment machine (4) by which filters are applied to cigarette sticks.

16. A system as in claims 10 to 13, wherein the first machine consists in a packer machine (5) and/or a cellophaner machine (7) turning out packets (28), connected in cascade to a user machine consisting in a cartoner machine (8) by which the packets (28) are assembled in multiple packs.

17. A system as in claims 10 to 13, wherein the first machine consists in a cartoner machine (8) by which the packets (28) are assembled in multiple packs, connected in cascade to a cellophaner machine (9) for overwrapping cartons.

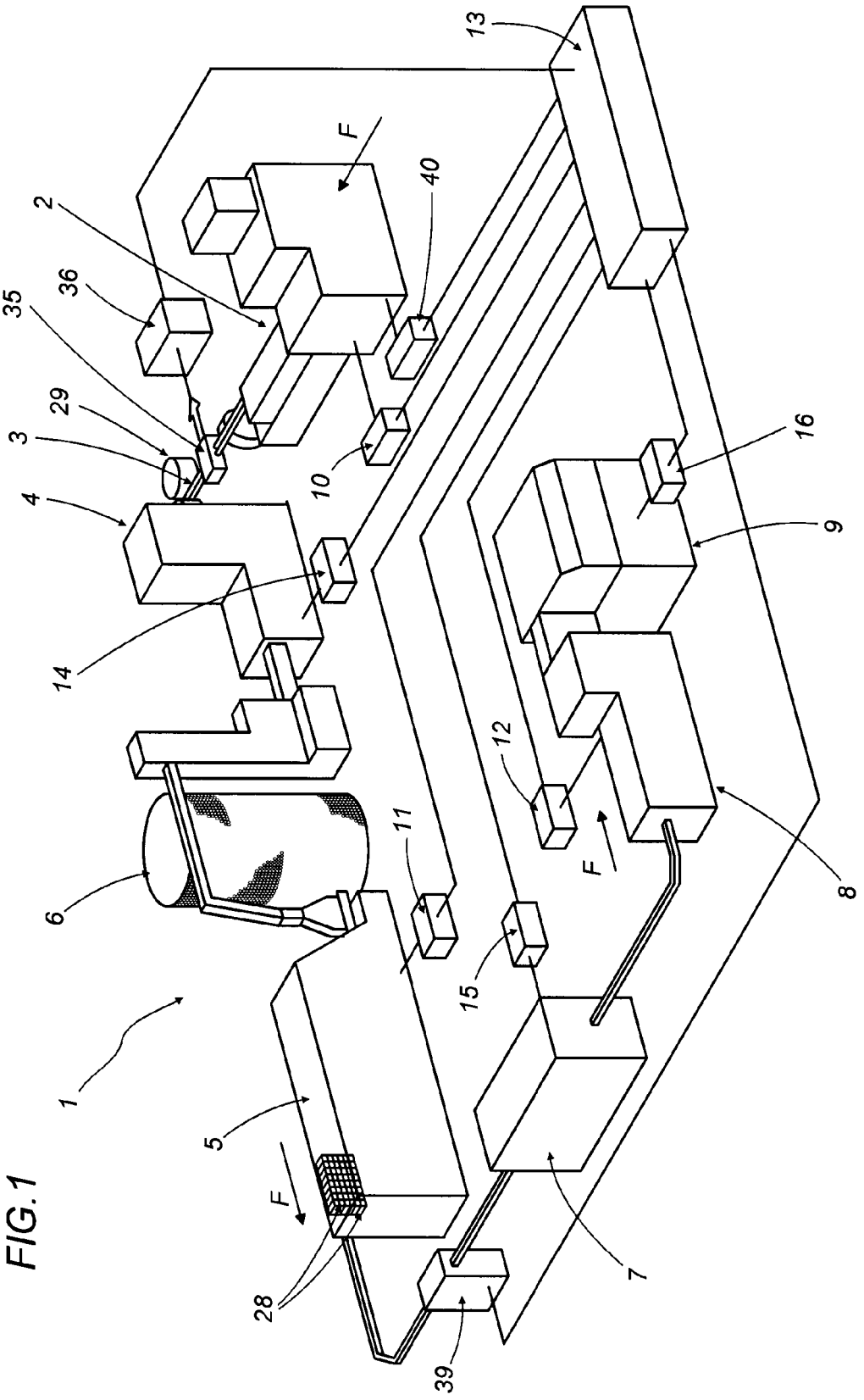


FIG.1

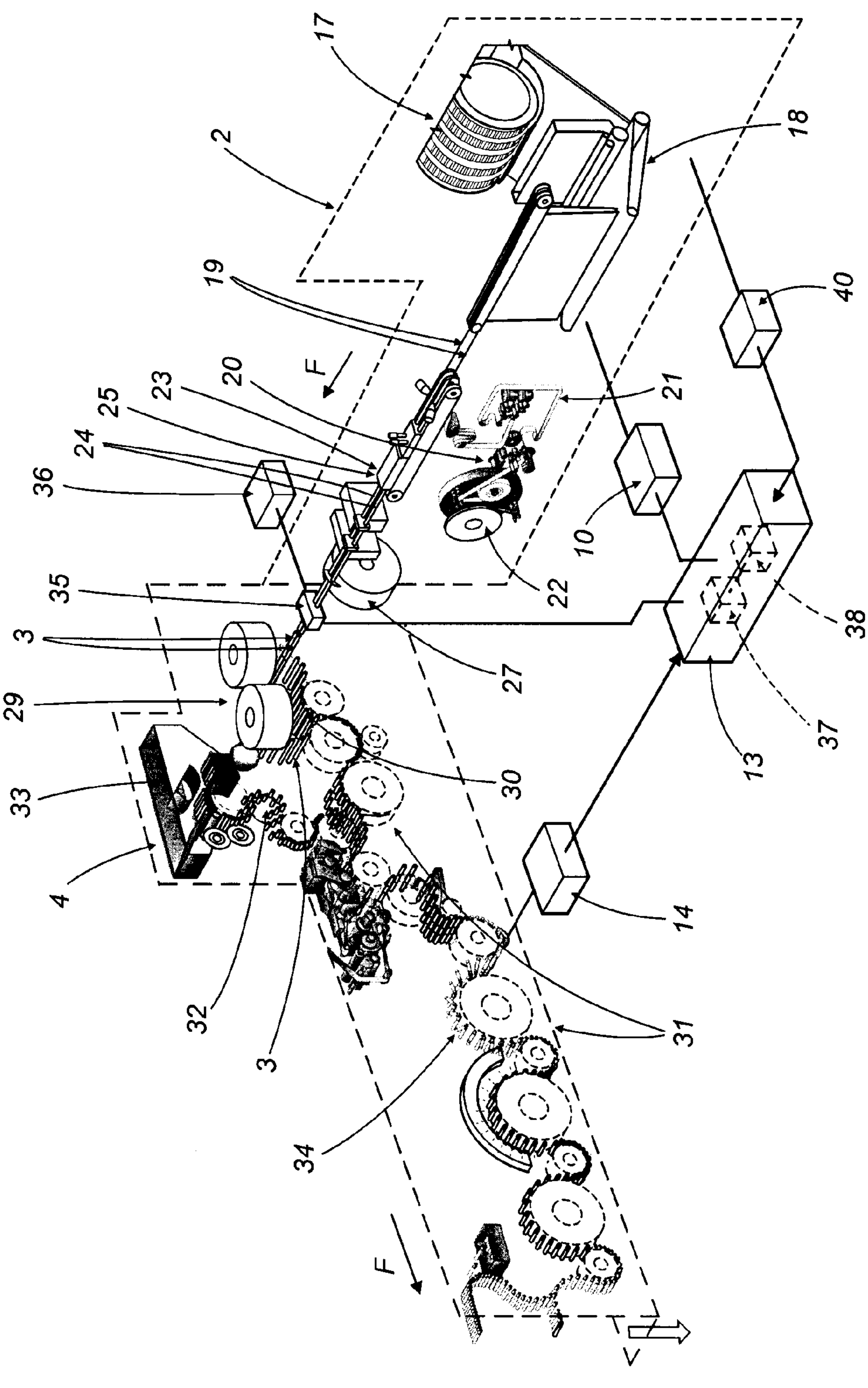

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FIG.2

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EUROPEAN SEARCH REPORT

Application Number
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The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	30 June 2006	MARZANO MONTEROSSO

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