

⑫

EUROPEAN PATENT SPECIFICATION

④⑤ Date of publication of patent specification: **05.06.85**

⑤① Int. Cl.⁴: **G 03 G 15/00, B 65 H 7/20**

②① Application number: **82201042.7**

②② Date of filing: **19.08.82**

⑤④ **Method of controlling an electrographic device, and a device of this kind for carrying out this method.**

③① Priority: **27.08.81 NL 8103985**

④③ Date of publication of application:
06.04.83 Bulletin 83/14

④⑤ Publication of the grant of the patent:
05.06.85 Bulletin 85/23

③④ Designated Contracting States:
DE FR GB NL

⑤③ References cited:
US-A-3 806 242
US-A-4 210 319

⑦③ Proprietor: **Océ-Nederland B.V.**
St. Urbanusweg 43
NL-5914 CC Venlo (NL)

⑦② Inventor: **Koeleman, Gerardus Antonius Josef**
Bernhardstraat 15
Velden (NL)
Inventor: **van de Laarschot, Franciscus Antonius**
Eeuwsestraat 9
Geldrop (NL)

⑦④ Representative: **Bleukx, Lucas Lodewijk Maria,**
Ir. et al
Océ-Nederland B.V. Patents & Information Dept.
Postbus 101
NL-5900 MA Venlo (NL)

Note: Within nine months from the publication of the mention of the grant of the European patent, any person may give notice to the European Patent Office of opposition to the European patent granted. Notice of opposition shall be filed in a written reasoned statement. It shall not be deemed to have been filed until the opposition fee has been paid. (Art. 99(1) European patent convention).

Courier Press, Leamington Spa, England.

EP 0 075 974 B1

Description

This invention relates to a method of controlling an electrographic device by means of which sheets of receiving material can be printed, the sheets being present in the form of a pile in a magazine. The invention also relates to an electrographic device for carrying out the said method by means of which device sheet-like receiving material can be printed, and comprising a supporting surface on which a pile of the sheets of receiving material can be placed in readiness, a detection device for determining the distance between the top sheet of the pile and the supporting surface, and a means of setting a required number of sheets to be printed by the device. A method and electrographic device of this kind are known in practice. It is also known to prevent further copying, if a predetermined weight or height of the feed pile is reached (US—A—3806242).

A method of this kind is used, for example, in an electrographic device in order to obviate the need to add sheets of paper during a copying run. In order to obviate this, the minimum pile height of the sheets of receiving material is frequently made larger than the maximum possible run of, for example, 99 copies. If, however, longer copying runs are required, e.g. to 999 copies, problems arise. A copying run will fairly often have to be interrupted because the sheet magazine is empty, and this is considered a disadvantage.

The object of the invention is to remedy this problem in a simple manner. To this end, in a method of the kind referred to in the outset, according to the invention, the number of sheets present in the pile is determined from the height of the pile, the number thus determined is compared with a required number of sheets to be printed, and a signal is generated indicating which of the two numbers is the larger. The method according to the invention enables any operator of the electrographic device to check whether he can have a copying run started by him carried out. If the run length is longer than the stock of sheets, an indication is given, e.g. "add paper" or the number of sheets still present is shown and, if necessary, the run is blocked. If such blocking is considered an excessive constraint at the start of the run, the copying run can be started with the foreknowledge that there is an insufficient stock, and can be continued until the magazine is empty. To this end, according to the invention, the electrographic device is so constructed that a control device is provided, which from a signal delivered by the detection device derives a first signal which is an indication of the number of sheets still present in the pile, said control device comparing the first signal with a second signal derived from the setting of the setting means in order to generate a third signal if the required number of sheets to be printed is larger than the number of sheets present in the pile.

In another advantageous way of carrying out

the method according to the invention, the electrographic device is prevented from coming into operation if the required number of sheets to be printed is larger than the determined number of sheets present. To this end, the electrographic device can be so constructed that means are provided which can prevent the device from coming into operation, said means being connected to the control device and responding to the third signal.

In another advantageous embodiment, the electrographic device is so constructed that the amount of stock remaining at any time, expressed as the number of sheets present, is indicated to the operator. To this end, the control device may be provided with a selector switch for setting a conversion factor which is used as a parameter according to the type of paper used, said conversion factor indicating the height per sheet in order to determine, from the first signal based on the pile height, the remaining stock.

In an electrographic device comprising a counter for counting the number of sheets removed per run, the control device may also be provided with a sampling circuit to fix the first signals at times determined by the counts of the counter at the beginning and the end of a copying run, and the control device divides the difference in height determined from the first signals on each copy run by the associated difference in counts in order to determine, from the recent first signal based on the pile height, the remaining stock.

The invention will be explained in detail with reference to the drawings, wherein:

Fig. 1 is a block diagram of the circuits used in the control device and

Fig. 2 is a schematic view of the supporting surface, lifting mechanism and detection device used in the magazine of the electrographic device.

In Fig. 1, reference 1 denotes the detection device or height sensor, 2 is a buffer amplifier, 10 a setting means for setting the required number of sheets to be printed, 3 is a differential amplifier to which a selector switch 4 can be connected, 18 is a differential amplifier, 9 a signalling means, 11 a means of blocking the device to prevent its operation, 5 a conversion unit which can comprise a sampling circuit 6, 7 a counter, and 8 an indicator for indicating the number of sheets in the remaining stock in the magazine.

Operation is as follows. The first signal from the detector device 1 is compared, in the differential amplifier 18, with the second signal from the setting means 10. The third signal from amplifier 18 is fed to the signalling means 9 and the means 11. With the help of the third signal the signalling means 9 indicates that the required number of sheets to be printed is larger than the numbers of sheets present in the pile, e.g. by displaying "add paper", or else the converse, in which case the copying run can be continued to the end. If the required number of sheets to be printed is larger than the number present, means 11 can prevent the device from coming into operation.

The other circuits comprise two variants.

In the one case, the selector switch 4 is set to the basis weight of the type of paper used. For each type of paper this is a conversion factor which can be used as a parameter to indicate the height per sheet. The voltage derived from the selector switch 4 is fed to one input, and the signal from the amplifier 2 is fed to the other input, of the differential amplifier 3. The voltage from the differential amplifier 3 is then converted in the conversion unit 5 to a signal that directly indicates on indicator 8 the remaining stock, accurately expressed as the number of sheets present.

In the second case, the counter 7 which in each case counts the number of sheets removed per run is connected to the conversion unit 5. The latter comprises a sampling circuit 6 which determines the continuously sensed pile height at times determined by counts of the counter which are consecutive at intervals. An interval of this kind may, for example comprise ten sheets. Preferably, however, the count of the counter is determined at the beginning and end of a run. The height difference determined per interval is divided in the conversion unit by the associated difference in counts which can be used as a parameter and from which division the height per sheet follows. The voltage taken from the differential amplifier 3 is then converted in conversion unit 5 to a signal that directly indicates on indicator 8 the remaining stock, accurately expressed as the number of sheets present.

In Fig. 2, reference 16 denotes a table or supporting surface in the magazine, on which the pile of sheets 17 rests, 12 is a lifting mechanism, 13 a first potentiometer, and 14 a second potentiometer with an associated sensor 15.

During operation the pile 17 will frequently be lifted by the table 16 so that the upper surface of the pile or the top sheet is kept at a constant level by means of the sensor 15. The potentiometer 13 coupled to the driving chain wheel of the lift mechanism 12 delivers a specific voltage for each position of the lifting mechanism, which voltage indicates the pile height. This potentiometer may, for example, be a ten turns potentiometer.

In another embodiment the table 16 can also be kept at a constant level, in which case the potentiometer 14 then delivers a voltage from which the remaining stock is determined via the conversion unit.

Claims

1. A method of controlling an electrographic device by means of which sheets of receiving material can be printed, the sheets being present in the form of a pile in a magazine, characterised in that the number of sheets present in the pile (17) is determined from the height of the pile (17), in that the number thus determined is compared with a required number of sheets to be printed, and in that a signal is generated indicating which of the two numbers is the larger.

2. A method according to claim 1, characterised

in that the electrographic device is prevented from coming into operation if the required number is larger than the determined number.

3. An electrographic device by means of which sheet-like receiving material can be printed, comprising a supporting surface on which a pile of the sheets of receiving material can be placed in readiness, a detection device for determining the distance between the top sheet of the pile and the supporting surface, and a means of setting a required number of sheets to be printed by the device, characterised in that a control device (1, ..., 10, 18) is provided, which form a signal delivered by the detection device (1) derives a first signal which is an indication of the number of sheets still present in the pile (17), said control device (1, ..., 10, 18) comparing the first signal with a second signal derived from the setting of the setting means (10) in order to generate a third signal if the required number of sheets to be printed is larger than the number of sheets present in the pile.

4. An electrographic device according to claim 3, characterised in that means (11) are provided which can prevent the electrographic device from coming into operation, said means (11) being connected to the control device (1, ..., 10, 18) and responding to the third signal.

5. An electrographic device according to claim 3 or 4, characterised in that the control device (1, ..., 10, 18) contains a selector switch (4) for setting a conversion factor which is to be used as a parameter according to the type of paper used, said conversion factor indicating the height per sheet in order to determine from the first signal based on the pile height the remaining stock accurately expressed as the number of sheets present.

6. An electrographic device according to claim 3 of 4, provided with a counter for counting the number of sheets removed per run, characterised in that the control device (1, ..., 10, 18) comprises a sampling circuit (6) to fix first signal at times determined by counts of the counter at the beginning and the end of a copying run, and in that the control device (1, ..., 10, 18) divides the difference in height determined from the first signals on each copy run by the associated difference in counts in order to determine, from the recent first signal based on the pile height, the remaining stock accurately expressed as the number of sheets present.

7. An electrographic device according to any one of claims 3 to 6, in which the supporting surface is lifted by a lifting mechanism during operation in such a manner that the upper surface of the pile of sheets is always kept at a constant level, characterised in that a potentiometer (13) is coupled as a detection device to the lifting mechanism (12) and continuously indicates the position of the lifting mechanism and hence the pile height.

Patentansprüche

1. Verfahren zur Steuerung einer elektrogra-

fischen Einrichtung, mit der Blätter aus Empfangsmaterial bedruckt werden können, welche Blätter in Form eines Stapels in einem Magazin enthalten sind, dadurch gekennzeichnet, dass die Zahl der in dem Stapel (17) vorhandenen Blätter in Abhängigkeit von der Höhe des Stapels (17) bestimmt wird, dass die derart bestimmte Zahl mit einer benötigten Zahl von zu bedruckenden Blättern verglichen wird, und dass ein Signal erzeugt wird, das anzeigt, welche der beiden Zahlen grösser ist.

2. Verfahren nach Anspruch 1, dadurch gekennzeichnet, dass die elektrografische Einrichtung an einer Betriebsaufnahme gehindert ist, wenn die benötigte Zahl grösser als die festgestellte Zahl ist.

3. Elektrografische Einrichtung zum Bedrucken blattförmigem Empfangsmaterial, mit einer Stützfläche, auf der ein Stapel aus Blättern des Empfangsmaterials in Bereitschaft angeordnet werden kann, mit einer Detektoreinrichtung zur Bestimmung des Abstands zwischen dem obersten Blatt des Stapels und der Stützfläche, sowie mit einer Einrichtung zur Einstellung einer benötigten Anzahl von durch die Einrichtung zu bedruckenden Blättern, dadurch gekennzeichnet, dass eine Steuereinrichtung (1 bis 10, 18) vorgesehen ist, die von einem von der Detektoreinrichtung (1) gelieferten Signal ein erstes Signal ableitet, dass die Anzahl der noch in dem Stapel (17) vorhandenen Blätter anzeigt, welche Steuereinrichtung (1 bis 10, 18) das erste Signal mit einem zweiten, von der Einstellung der Einstellungseinrichtung (10) abgeleiteten Signal vergleicht, und ein drittes Signal zu erzeugen, falls die benötigte Zahl von zu bedruckenden Blättern grösser als die Zahl der in dem Stapel vorhandenen Blätter ist.

4. Elektrografische Einrichtung nach Anspruch 3, dadurch gekennzeichnet, dass eine Einrichtung (11) vorgesehen ist, welche eine Inbetriebnahme der elektrografischen Einrichtung verhindern kann, und dass diese Einrichtung (11) mit der Steuereinrichtung (1 bis 10, 18) verbunden ist und auf das dritte Signal anspricht.

5. Elektrografische Einrichtung nach Anspruch 3 oder 4, dadurch gekennzeichnet, dass die Steuereinrichtung (1 bis 10, 18) einen Wählschalter (4) zur Einstellung eines Umwandlungsfaktors enthält, der als Parameter entsprechend der benutzten Papierart vorgesehen ist, und dass dieser Umwandlungsfaktor die Blattdicke beinhaltet, um aus dem ersten Signal entsprechend der Stapelhöhe den verbleibenden Vorrat ausgedrückt als genaue Anzahl der vorhandenen Blätter zur bestimmen.

6. Elektrografische Einrichtung nach Anspruch 3 oder 4, die mit einem Zähler zum Zählen der bei einem Durchlauf entfernten Zahl von Blättern versehen ist, dadurch gekennzeichnet, dass die Steuereinrichtung (1 bis 10, 18) eine Ausmusterungsschaltung (6) zum Festhalten erster Signale zu Zeitpunkten aufweist, die durch Zählstände des Zählers beim Beginn und beim Ende eines Kopierlaufs bestimmt werden, und dass die Steuereinrichtung (1 bis 10, 18) die Differenz der von den

ersten Signalen bestimmten Höhe bei jedem Kopierlauf durch die zugeordnete Differenz der Zählstände dividiert, um aus dem letzten ersten Signal entsprechend der Stapelhöhe den restlichen Vorrat genau als Zahl der vorhandenen Blätter zu bestimmen.

7. Elektrografische Einrichtung nach einem der Ansprüche 3 bis 6, bei der die Stützfläche durch einen Hebemechanismus während des Betriebs derart angehoben wird, dass die Oberseite des Stapels von Blättern immer auf einem konstanten Niveau gehalten wird, dadurch gekennzeichnet, dass ein Potentiometer (13) als Detektoreinrichtung mit dem Hebemechanismus (12) gekoppelt ist und kontinuierlich die Lage des Hebemechanismus und damit die Stapelhöhe anzeigt.

Revendications

1. Un procédé pour commander un dispositif électrographique au moyen duquel des feuilles de matière support peuvent être imprimées, les feuilles étant disposées sous forme d'une pile dans un magasin, caractérisé en ce que le nombre des feuilles présentes dans la pile (17) est déterminé à partir de la hauteur de la pile (17), en ce que le nombre ainsi déterminé est comparé à un nombre requis de feuilles à imprimer et en ce qu'un signal est engendré indiquant celui des deux nombres qui est le plus grand.

2. Une procédé selon la revendication 1, caractérisé en ce que le dispositif électrographique est empêché d'entrer en fonctionnement si le nombre requis est plus grand que le nombre déterminé.

3. Un dispositif électrographique au moyen duquel une matière support du type feuille peut être imprimée, comprenant une surface support sur laquelle une pile de feuilles de matière support peut être placée à l'état prêt, un dispositif de détection pour déterminer la distance entre la feuille supérieure de la pile et la surface support et un moyen de fixation d'un nombre requis de feuilles à imprimer par le dispositif, caractérisé en ce qu'il comporte un dispositif de commande (1—10, 18) qui, à partir d'un signal fourni par le dispositif de détection (1), engendre un premier signal qui est une indication du nombre des feuilles encore présentes dans la pile (17), ledit dispositif de commande (1—10, 18) comparant le premier signal à un second signal produit par le réglage du moyen de fixation (10) afin d'engendrer un troisième signal si le nombre requis de feuilles à imprimer est plus grand que le nombre des feuilles présentes dans la pile.

4. Un dispositif électrographique selon la revendication 3, caractérisé en ce qu'il comporte un moyen (11) qui peut empêcher le dispositif d'entrer en fonctionnement, ledit moyen (11) étant connecté au dispositif de commande (1—10, 18) et fonctionnant en réponse au troisième signal.

5. Une dispositif électrographique selon la revendication 3 ou 4, caractérisé en ce que le dispositif de commande (1—10, 18) contient un commutateur sélecteur (4) pour régler un facteur

de conversion qui est utilisé comme paramètre en fonction du type de papier utilisé. ledit facteur de conversion indiquant la hauteur par feuille afin de déterminer, à partir du premier signal basé sur la hauteur de la pile, la réserve restante exprimée avec précision en nombre de feuilles présentes.

6. Un dispositif électrographique selon la revendication 3 ou 4, muni d'un compteur pour compter le nombre des feuilles enlevées par tirage, caractérisé en ce que le dispositif de commande (1—10, 18) comporte également un circle d'échantillonnage (6) pour établir les premiers signaux à des temps déterminés par les comptes du compteur au début et à la fin d'un tirage de copies et en ce que le dispositif de commande (1—10, 18) divise la différence de hauteur déterminée à partir des premiers signaux lors de

chaque tirage de copies par la différence de comptes correspondante afin de déterminer à partir du premier signal récent basé sur la hauteur de la pile, la réserve restante exprimée avec précision en nombre de feuilles présentes.

7. Un dispositif électrographique selon l'une quelconque des revendications 3 à 6, dans lequel la surface support est soulevée au cours du fonctionnement par un mécanisme élévateur d'une manière telle que la surface supérieure de la pile de feuilles est toujours maintenue à un niveau constant, caractérisé en ce qu'un potentiomètre (13) est couplé, en tant que mécanisme de détection, au mécanisme élévateur (12) et indique continuellement la position du mécanisme élévateur, et, par conséquent, le hauteur de la pile.

20

25

30

35

40

45

50

55

60

65

5

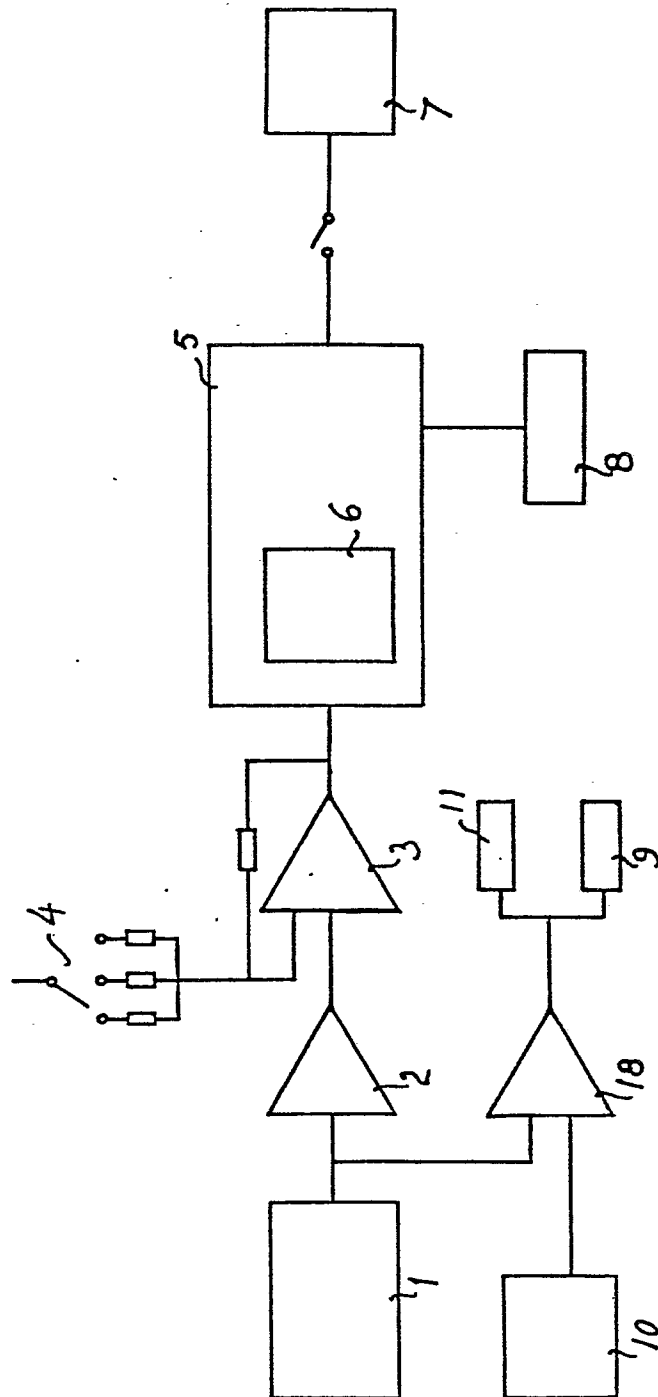


FIG.1

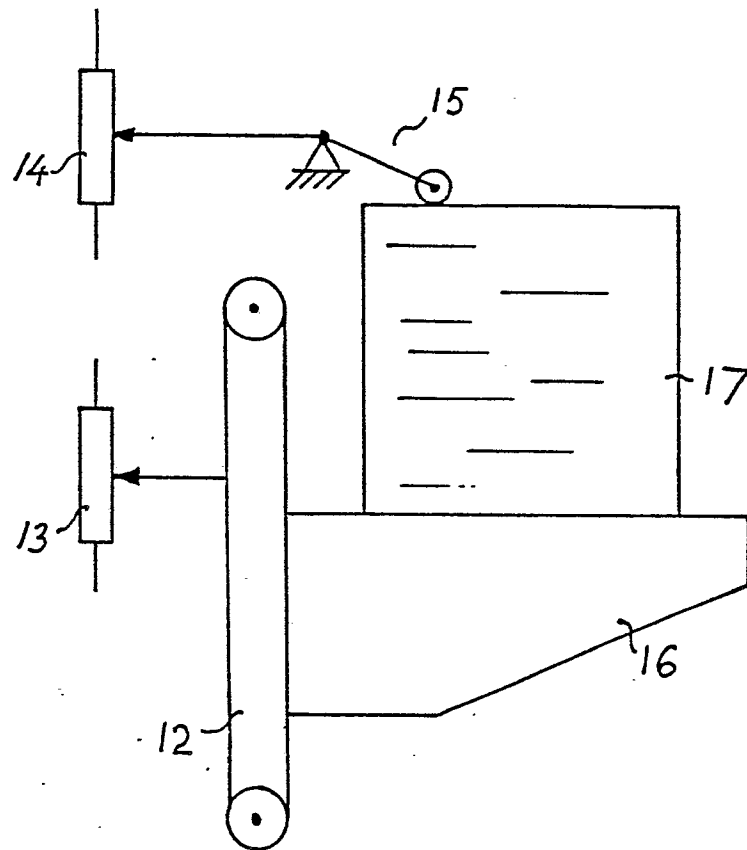


FIG.2