(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) Publication number: **0 310 425 A1**

(12) EUROPEAN PATENT APPLICATION

(21) Application number: **88309113.4**

(51) Int. Cl.4: **B 41 J 13/00**

(22) Date of filing: **30.09.88**

(30) Priority: **30.09.87 JP 246242/87**

(43) Date of publication of application:
05.04.89 Bulletin 89/14

(84) Designated Contracting States: **DE FR GB IT**

(71) Applicant: **BROTHER KOGYO KABUSHIKI KAISHA**
35, Horita-dori 9-chome Mizuho-ku
Nagoya-shi, Aichi 467 (JP)

(72) Inventor: **Ueno, Hideo Brother Kogyo K.K.**
35, 9-chome, Horita-dori Mizuho-ku
Nagoya-shi Aichi-ken (JP)

Murakami, Masahiro Brother Kogyo K.K.
35, 9-chome, Horita-dori Mizuho-ku
Nagoya-shi Aichi-ken (JP)

(74) Representative: **Senior, Alan Murray et al**
J.A. KEMP & CO 14 South Square Gray's Inn
London WC1R 5EU (GB)

(54) Printer with paper loading device.

(57) A printing apparatus, including a medium advancing mechanism (F) for advancing a recording medium (P1, P2) along an advancing path (4), a printing mechanism (M) for printing on the recording medium, a sheet feeding mechanism (T) for feeding sheets of paper (P1) one after another from a stack of the sheets to the advancing path, and a paper insertion path (25) along which a manually inserted medium (P2) is guided to the advancing path. A sensor (11) is provided for detecting the recording medium (P1, P2) existing in the advancing path, and a controller (35, 36, 37) is provided for activating the medium advancing mechanism (F) in response to a command to load the printing mechanism (M) with the recording medium (P1, P2). The controller determines whether the sensor (11) has detected the manually inserted medium (P2) within a predetermined time (t1) after the activation of the medium advancing mechanism, or not, and activates the sheet feeding mechansim (T) if the control means determines that the sensor has not detected the manually inserted medium within the predetermined time.

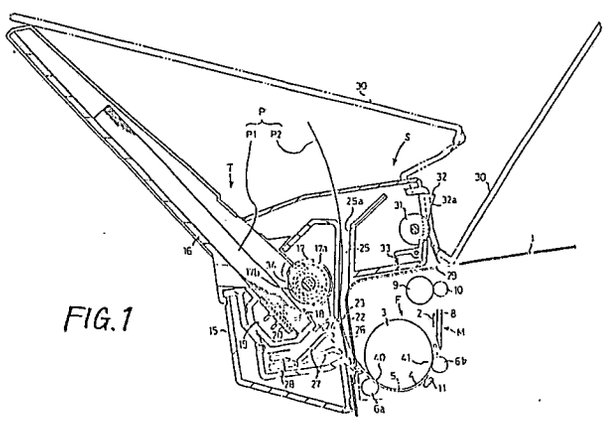


FIG.1

EP 0 310 425 A1

Description

PRINTER WITH PAPER LOADING DEVICE

The present invention relates generally to a printer equipped with a paper loading device, and more particularly to a printing apparatus which can be automatically loaded with a cut sheet fed by a sheet feeding mechanism, and manually loaded with a recording medium inserted by an operator.

There is known a printer equipped with a paper loading device, which permits the printer to be automatically loaded with cut sheets that are fed one after another from a stacker of a sheet feeding device, and manually loaded with a desired recording medium that is inserted into the printer by an operator.

The paper loading device of this type of printer generally has a sheet feeding path along which the cut sheets are fed, and a separate paper insertion path along which the desired recording medium is manually inserted. The cut sheets are stored in a stack on a suitable stacker provided in the loading device. The cut sheets are fed one after another along the sheet feeding path by a sheet feeding mechanism, into a medium advancing path defined in the printer. When the printer is loaded with the recording medium different from the cut sheets, the medium is manually inserted into the paper insertion path and is then automatically advanced along the medium advancing path in the printer.

Usually, the printer of the type indicated above has suitable selector or switching means for selectively loading the printer with either an automatically fed cut sheet or a manually inserted recording medium. Namely, the switching means is provided to prevent the sheet feeding mechanism from feeding the cut sheet while another recording medium is present in the manual insertion path, thereby preventing the printing mechanism of the printer from being simultaneously loaded with the two different recording media. The switching means may be a mechanism or a switch which is adapted to inhibit the activation of the sheet feeding mechanism when the printer is placed in a manual paper insertion mode. If the sheet feeding mechanism is connected to a drive source which is provided in the printer to advance the recording medium to the printing mechanism, the switching means is adapted to disconnect the sheet feeding mechanism from the power source in the printer, when the manual paper insertion mode is selected. If the sheet feeding mechanism is driven by a separate exclusive drive source provided in the paper feeding device, the switching means is adapted to inhibit the operation of that exclusive drive source.

Even in the presence of such switching means, there still exists a possibility of simultaneous supply of the two different recording media to the printing mechanism, due to erroneous manipulation of the switching means by the operator, or failure to manipulate the switching means.

Further, the provision of the switching means undesirably increases the number of components of the printer, and consequently pushes up the cost of manufacture of the printer as a whole.

The present invention was developed to solve the problem described above. It is accordingly an object of the present invention to provide a printing apparatus equipped with a paper feeding device, which is capable of automatically and manually loading the printer in a correct manner, without the provision of a switching means or mechanism as provided in the conventional printing apparatus.

The above object may be achieved according to the principle of the present invention, which provides a printing apparatus, comprising: a medium advancing mechanism for advancing a recording medium along an advancing path; a printing mechanism for printing on the recording medium; a sheet feeding mechanism for feeding sheets of paper one after another from a stack of the sheets to the advancing path; a paper insertion path along which a manually inserted medium is guided to the advancing path; sensing means for detecting the recording medium existing in the advancing path; and control means for activating the medium advancing mechanism in response to a command to load the printing mechanism with the recording medium. The control means is adapted to determine whether the sensing means has detected the manually inserted medium within a predetermined time after the activation of the medium advancing mechanism, or not. The control means activates the sheet feeding mechansim if the control means determines that the sensing means has not detected the manually inserted medium within the predetermined time.

In the printing apparatus of the present invention constructed as described above, the control means operates the medium advancing mechanism for the predetermined time, in response to a medium loading command. If the manually inserted recording medium is detected by the sensing means within this time period, this indicates that the manually inserted medium is advanced to the printing mechanism. In this case, therefore, the sheet feeding mechanism is not activated. If the manually inserted medium is not detected within the predetermined time period, this indicates that the paper insertion path is not loaded with a manually inserted recording medium. In this case, therefore, the sheet feeding mechanism is activated to automatically feed a cut sheet from the sheet stack to the printing mechanism of the printer.

In the instant printing apparatus equipped with the sheet feeding mechanism and the manual paper insertion path, either the cut sheets of the sheet stack or another type of recording medium can be suitably supplied to the printing mechanism, without the provision of a conventionally used switching mechanism. This eliminates cumbersome manipulation of such a switching mechanism by the operator, and prevents erroneous supply of the recording media due to operation failure or error of the switching mechanism. In this respect, the instant printing apparatus is practically advantageous over the conventional arrangement described above.

In one form of the invention, the medium advancing mechanism includes an advancing roll rotatable about an axis thereof and having a circumferential surface partially defining the advancing path, an advancing motor for rotating the advancing roll, and a downstream and an upstream pinch roll which are disposed adjacent to the circumferential surface of the advancing roll so as to press the recording medium against the circumferential surface of the advancing roll. The downstream and upstream pinch rolls are spaced apart from each other in a circumferential direction of the advancing roll along the advancing path. In this case, the sensing means is disposed between the downstream and upstream pinch rolls.

In another form of the invention, the control means includes a computer which operates to execute a step of determining whether the predetermined time has passed before the sensing means has detected the manually inserted medium, or not, and a step of activating the sheet feeding mechanism if the predetermined time has passed before the sensing means has detected the manually inserted medium. In this instance, the computer may be adapted to further execute a step of determining whether the predetermined time has passed after the deactivation of the sheet feeding mechanism, before the sensing means has detected the cut sheet, and a step of activating alarm means for informing a user of the printing apparatus of a trouble, if the predetermined time has passed before the sensing means has detected the cut sheet.

The above and optional objects, features and advantages of the present invention will be better understood by reading the following detailed description of a presently preferred embodiment of the invention, when considered in connection with the accompanying drawings, in which:

Fig. 1 is a fragmentary side elevational view in cross section of a printing apparatus embodying the present invention;

Fig. 2 is a schematic block diagram showing a control system of the printing apparatus of Fig. 1; and;

Fig. 3 is a flow chart illustrating an operation of the printing apparatus.

Referring first to Fig. 1, a planar platen 2 is disposed within a printer housing 1. Below the platen 2, there is disposed a medium advancing roll 3 which is supported by the frame 1 such that the advancing roll 3 is bidirectionally rotatable. As described below, the advancing roll 3 is adapted to advance a recording medium P in the form of a cut sheet P1 or a manually inserted cut sheet P2, to the platen 2. A paper guide 5 is disposed along a lower part of the circumferential surface of the advancing roll 3, so as to define therebetween a paper advancing path 4 leading to the platen 2. Adjacent to the lower part of the circumference of the advancing roll 3, there are disposed a pair of downstream pinch rolls 6a, and a pair of upstream pinch rolls 6b. These two pairs of pinch rolls 6a, 6b are spaced apart from each other along the advancing path 4, and are adapted to press the recording medium P (P1, P2) against the circumferential surface of the advanciang roll 3. With the advancing roll 3 rotated in one of opposite directions by a PAPER ADVANCING motor 7 (shown in Fig. 2), the recording medium P is moved in the forward or reverse direction.

On one side of the planar platen 2, there is provided a thermal print head 8 for printing on the recording medium P on the platen 2, via a thermal print ribbon (not shown). The thermal print head 8 is reciprocated along the platen 2. Above the platen 2, there are provided a feed roll 9 and a pinch roll 10 which are rotatably supported so as to further advance the recording medium P from the platen 2. The feed roll 9 is connected to the advancing roll 3 for synchronized rotation with the advancing roll 3. The pinch roll 10 is movable by a suitable drive mechanism (not shown), toward and away from the feed roll 9, so that the pinch roll 10 is pressed against the feed roll 10 only when the recording medium P is advanced from the platen 2 toward an ejection roll 31 (which will be described).

A first sheet sensor 11 is secured to the paper guide 5, for detecting the recording medium P while it is advanced along the advancing path 4. The sheet sensor 11 produces an electric signal indicative of the presence or absence of the recording medium P.

In the present embodiment, the advancing roll 3, pinch rolls 6a, 6b, feed and pinch rolls 9, 10 and paper advancing motor 7 constitute a medium advancing mechanism F for advancing the recording medium P along the advancing path 4. Further, the platen 2 and thermal print head 8 constitute a printing mechanism M for printing on the recording medium P.

There will next be described a paper loading device generally indicated at S in Fig. 1. The paper loading device S is adapted to automatically feed the cut sheets P1 or manually insert the cut sheet P2. The loading device S has a frame 15 which is substantially L-shaped in cross section as viewed in Fig. 1 and is secured to a rear upper corner of the printer housing 1. The frame 15 has a support plate 16 mounted in its almost middle portion, so as to extend obliquely in a rear upward direction, for supporting a stack of the cut sheets P1. Above the lower or inner end portion of the support plate 16, there is rotatably supported a feed roll 17 for feeding the cut sheets P1 from the support plate 16. The feed roll 17 has a large-diameter portion 17a, and a small-diameter portion 17b.

The support plate 16 is formed with a pair of sheet separator pieces 18 provided at its lower end corners, for separating the uppermost cut sheet P1 from the remainder of the stack P1 when the uppermost cut sheet P1 is fed by the feed roll 17. The support plate 16 has a recess 19 formed at its lower end portion. A presser member 20 is movably accommodated in the recess 19, and is biased by a suitable spring for urging the lower end portion of the sheet stack P1 against the sheet separator pieces 18. When the feed roll 17 is rotated by one full turn by a SHEET FEEDING motor 21 (shown in Fig. 2) in the direction indicated by arrow in Fig. 1, the large-diameter portion 17a comes into frictional engagement with the surface of the uppermost cut sheet P1 on the support plate 16, thereby applying a

forward feeding force to the uppermost cut sheet P1, whereby the uppermost cut sheet P1 is separated from the second cut sheet P1 by the sheet separator pieces 18 and is fed toward the advancing roll 3. More specifically, one rotation of the feed roll 17 causes the cut sheet P1 to be fed until the leading edge of the sheet P1 reaches a pressure nip 40 between the advancing roll 3 and the downstream pinch rolls 6a.

In the present embodiment, the support plate 16, feed roll 17 and SHEET FEEDING motor 21 constitute a sheet feeding mechanism T for feeding the cut sheets P1 to the nip 40 of the rolls 3, 6a.

A low-friction disc 34 is rotatably supported in coaxial relation with the feed roll 17. The disc 34 is adapted to engage the trailing edge of the cut sheet P1 and thereby prevent the cut sheet P1 from engaging the feed roll 17, when the sheet P1 is moved in the reverse direction toward the sheet feeding mechanism T.

The printer housing 1 has a first aperture 22 formed in its rear wall, while the frame 15 of the paper loading device S has a second aperture 23 formed in its front wall, such that the first and second apertures 22, 23 are substantially aligned with each other. The cut sheet P1 fed from the support plate 16 is fed along a sheet feeding path 24 leading to the second aperture 23. Between the printer housing 1 and the frame 15, there is formed a paper insertion path 25 which extends from the first and second apertures 22, 23 and which is open upward at its upper end. The paper insertion path 25 merges at its lower end with the sheet feeding path 24. An elastic sheet member 26 formed of a synthetic resin is attached at its upper end to the front wall of the frame 15 through which the second aperture 23 is formed. The sheet member 26 normally closes the second aperture 23, but is elastically yieldable to permit the cut sheet P1 to be fed toward the nip 40 of the advancing and pinch rolls 3, 6a.

When the cut sheet P1 is fed along the sheet feeding path 24 by the sheet feeding mechanism T, the elastic sheet member 26 elastically yields toward the first aperture 22 of the printer housing 1, whereby the lower end of the second aperture 23 is opened leading to the first aperture 22. Thus, the cut sheet P1 is permitted to pass through the second and first apertures 23, 22 toward the nip 40 of the rolls 3, 6a. When the recording medium P (P1 or P2) is moved in the reverse direction toward the paper loading device S, the trailing end of the medium P abuts on the elastic sheet member 26, and the medium P is guided into the paper insertion path 25.

The above-indicated paper insertion path 25 is used for manually loading the printer with the desired recording medium in the form of the cut sheet P2 different from the cut sheets P1. Described more specifically, the cut sheet P2 is inserted into the paper insertion path 25 through its upper open end 25a, until the leading edge of the cut sheet P2 reaches the nip 40 of the advancing and pinch rolls 3, 6a. The cut sheet P2 inserted in the path 25 is advanced toward the printing mechanism M when the advancing roll 3 is rotated in the forward direction.

Below the lower end portion of the support plate 16, there is provided a two-arm sensing member 27 which is pivotally supported at its intermediate portion. A second sheet sensor 28 consisting of a photoelectric switch is provided adjacent to one end of the sensing member 27. Normally, the other end of the sensing member 27 is placed in its upper position so as to lie on the sheet feed path 24, as indicated in solid line in Fig. 1. In this condition, the signal produced by the second sheet sensor 28 indicates the absence of the cut sheet P1 in the feeding path 24. When the cut sheet P1 is fed by the feed roll 17, the leading end of the cut sheet P1 abuts on the above-indicated other end of the sensing member 27, and the sensing member 27 is pivoted to its operated position as indicated in broken line in Fig. 1. In this condition, the signal produced by the sensor 28 indicates the presence of the cut sheet P1 in the sheet feeding path 24.

The frame 15 has a tray 30 pivotally supported at a portion thereof above the rear portion of the upper wall of the printer housing 1. The tray 30 is pivoted at its one end between an operated position indicated in solid line in Fig. 1, and a non-operated position indicated in broken line in the same figure. The cut sheets P which have been ejected through a paper outlet 29 above the printing mechanism M are received on the tray 30 placed in the operated position.

Adjacent to the pivotally connected end of the tray 30, there is disposed the ejection roll 31 rotatably supported by the frame 15, for engaging the recording medium P which has been fed through the paper outlet 29. The frame 15 also has a guide 32 pivotally supported adjacent to the ejection roll 31. The guide 32 is biased by a spring 33 toward its advanced position shown in Fig. 1, in which the guide 32 is held in abutment on a part of the frame 15. When the recording medium P is ejected through the paper outlet 29, the recording medium P is guided along a guide surface 32a of the guide 32 while being curved along the guide surface 32a, whereby the medium P is ejected onto the tray 30. When the medium P is a medium difficult to be curved, such as a postcard, the medium P is guided onto the tray 30 while the guide 32 is pivoted toward its retracted position against a biasing action of the spring 33.

The instant printer is controlled by a control system as shown in Fig. 2. The control system includes control means in the form of a central processing unit (CPU) 35, a read-only memory (ROM) 36, and a random-access memory (RAM) 37. The ROM 36 stores a control program as illustrated in the flow chart of Fig. 3, for controlling the operation of the printer. The CPU 35 receives the signals produced by the first and second sheet sensors 11, 28 described above, and applies drive signals to the PAPER ADVANCING motor 7 and the SHEET FEEDING motor 21 via motor drivers 38, in response to the signals from the sensors 11, 28 and according to the control program stored in the ROM 36.

There will next be described the operation of the printer constructed as described above.

When the CPU 35 receives a command from a keyboard to load the printer with a recording medium while the small-diameter portion 17b of the feed roll 17 faces the stack of cut sheets P1 as indicated in Fig. 1, the CPU 35 executes a control routine of the flow chart of Fig. 3. Initially, the control flow goes to step S1 to turn on the PAPER ADVANCING motor 7, and thereby rotate the advancing roll 3 in the forward direction. Then, the control flow goes to step S2 to determine whether the first sheet sensor 11 has produced a signal indicative of the presence of the medium P in the advancing path 4, or not, that is, whether the first sheet sensor 11 has detected the medium P. If a negative decision (NO) is obtained in step S2, step S3 is executed to determine whether or not a predetermined time t1 has passed after the PAPER ADVANCING motor 7 was activated. As long as a negative decision (NO) is obtained in step S3, steps S2 and S3 are repeatedly executed. The predetermined time t1 is determined so as to allow time for the recording medium P (P2) to be fed by the operation of the PAPER ADVANCING MOTOR 7, from the nip 40 of the rolls 3, 6a until the leading edge of the medium P (P2) reaches a nip 41 between the advancing roll 3 and the upstream pinch rolls 6b. If the cut sheet P2 is properly inserted in the paper insertion path 25 as indicated in Fig. 1, a sufficient time is provided for the leading edge of the cut sheet P2 to reach the first sheet sensor 11. Consequently, an affirmative decision (YES) is obtained in step S2, and the control flow then goes to steps S4 and S5 to keep operating the PAPER ADVANCING motor 7 for a time period necessary to feed the cut sheet P2 from the first sheet sensor 11 to the printing mechanism M, and then turn off the motor 7. Thus, the manually inserted cut sheet P2 can be advanced to the printing mechanism M.

If an affirmative decision (YES) is obtained in step S3, namely, if the first sheet sensor 11 has not detected the recording medium P (P2) within the first predetermined time t1 after the motor 7 was activated, this indicates that the cut sheet P2 was not manually inserted in the paper insertion path 25. Consequently, the control flow goes to step S6 to operate the SHEET FEEDING motor 21 for rotating the feed roll 17 by one full turn. As a result, the uppermost cut sheet P1 of the sheet stack on the support plate 16 is fed until the leading edge of the cut sheet P1 reaches the nip 40. Then, step S7 is executed to determine whether the first sheet sensor 11 has produced the signal indicative of the presence of the recording medium P (P1) in the advancing path 4, or not. If a negative decision (NO) is obtained in step S7, the control flow goes to step S8 to determine whether the above-indicated predetermined time t1 has passed after the SHEET FEEDING motor 21 was turned off, i.e, after the cut sheet P1 has reached the nip 40. Steps S7 and S8 are repeatedly executed until an affirmative decision (YES) is obtained in step S8. Normally, the cut sheet P1 which has reached the nip 40 by the rotation of the feed roll 17 can be advanced to the nip 41 within the predetermined time t1, like the manually inserted cut sheet P2. If an affirmative decision (YES) is obtained in step S7 within the time period t1 after the motor 21 was turned off, the control flow goes to steps S4 and S5 to keep operating the PAPER ADVANCING motor 7 until the leading edge of the cut sheet P1 reaches the printing mechanism M.

If an affirmative decision (YES) is obtained in step S8, that is, if the first sheet sensor 11 has not detected the cut sheet P1 within the predetermined time t1 after the motor 21 was turned off, this indicates that no cut sheets P1 are present on the support plate 16, or the uppermost cut sheet P1 has not been correctly fed to the nip 40 or advanced to the first sheet sensor 11. In this case, therefore, the control flow goes to step S9 to turn off the PAPER ADVANCING motor 7, and step S10 in which a suitable alarm device is activated to inform the operator of a trouble associated with the loading of the cut sheet P1.

While the present embodiment uses the SHEET FEEDING motor 21 exclusively provided for the sheet feeding device T, it will be understood that the principle of the present invention may be practiced even where the sheet feeding device T is driven by the PAPER ADVANCING motor 7, through a suitable power transmission line which includes suitable clutch means such as a solenoid-operated clutch, for disconnecting the sheet feeding device T from the motor 7.

In the case where the recording medium P is present in the paper advancing path 4 upon generation of a paper loading command, that is, if the first sheet sensor 11 is on when the CPU 35 receives the paper loading command, the medium P is advanced and ejected according to a suitable control routine different from that shown in Fig. 3.

While the present invention has been described in its presently preferred embodiment by way of example only, it is to be understood that the invention is not limited to the details of the illustrated embodiment, but may be embodied with various changes, modifications and improvements, which may occur to those skilled in the art, without departing from the spirit and scope of the invention defined in the following claims.

Claims

1. A printing apparatus, including (a) a medium advancing mechanism (F) for advancing a recording medium (P1, P2) along an advancing path (4), (b) a printing mechanism (M) for printing on the recording medium, (c) a sheet feeding mechanism (T) for feeding sheets of paper (P1) one after another from a stack of said sheets to said advancing path, and (d) a paper insertion path (25) along which a manually inserted medium (P2) is guided to said advancing path, characterized in that:
sensing means (11) is provided for detecting the recording medium (P1, P2) existing in said advancing path; and
control means (35, 36, 37) is provided for

activating said medium advancing mechanism (F) in response to a command to load said printing mechanism (M) with a recording medium (P1, P2), said control means determining whether said sensing means (11) has detected said manually inserted medium (P2) within a predetermined time (t1) after the activation of said medium advancing mechanism, or not, and activating said sheet feeding mechansim (T) if said control means determines that said sensing means has not detected said manually inserted medium within said predetermined time.

2. A printing apparatus according to claim 1, wherein said medium advancing mechanism (F) includes an advancing roll (3) rotatable about an axis thereof and having a circumferential surface partially defining said advancing path (4), means (7) for rotating said advancing roll, and a downstream and an upstream pinch roll (6a, 6b) which are disposed adjacent to said circumferential surface of said advancing roll so as to press said recording medium (P1, P2) against said circumferential surface of said advancing roll, said downstream and upstream pinch rolls being spaced apart from each other in a circumferential direction of said advancing roll along said advancing path, and wherein said sensing means (11) is disposed between said downstream and upstream pinch rolls (6a, 6b).

3. A printing apparatus according to claim 1 or 2, wherein said control means (35, 36, 37) includes a computer which operates to execute a step (S2, S3) of determining whether said predetermined time (t1) has passed and whether said sensing means (11) has detected said manually inserted medium (P2), or not, and a step (S6) of activating said sheet feeding mechanism (T) if said predetermined time has passed and said sensing means has not detected said manually inserted medium.

4. A printing apparatus according to claim 3, wherein said computer (35, 36, 37) operates to further execute a step (S7, S8) of determining whether said predetermined time (t1) has passed after said sheet feeding mechanism (T) is deactivated, before said sensing means (11) has detected said cut sheet (P1), and a step (S10) of activating alarm means for informing a user of the printing apparatus of a trouble, if said predetermined time has passed before said sensing means has detected said cut sheet.

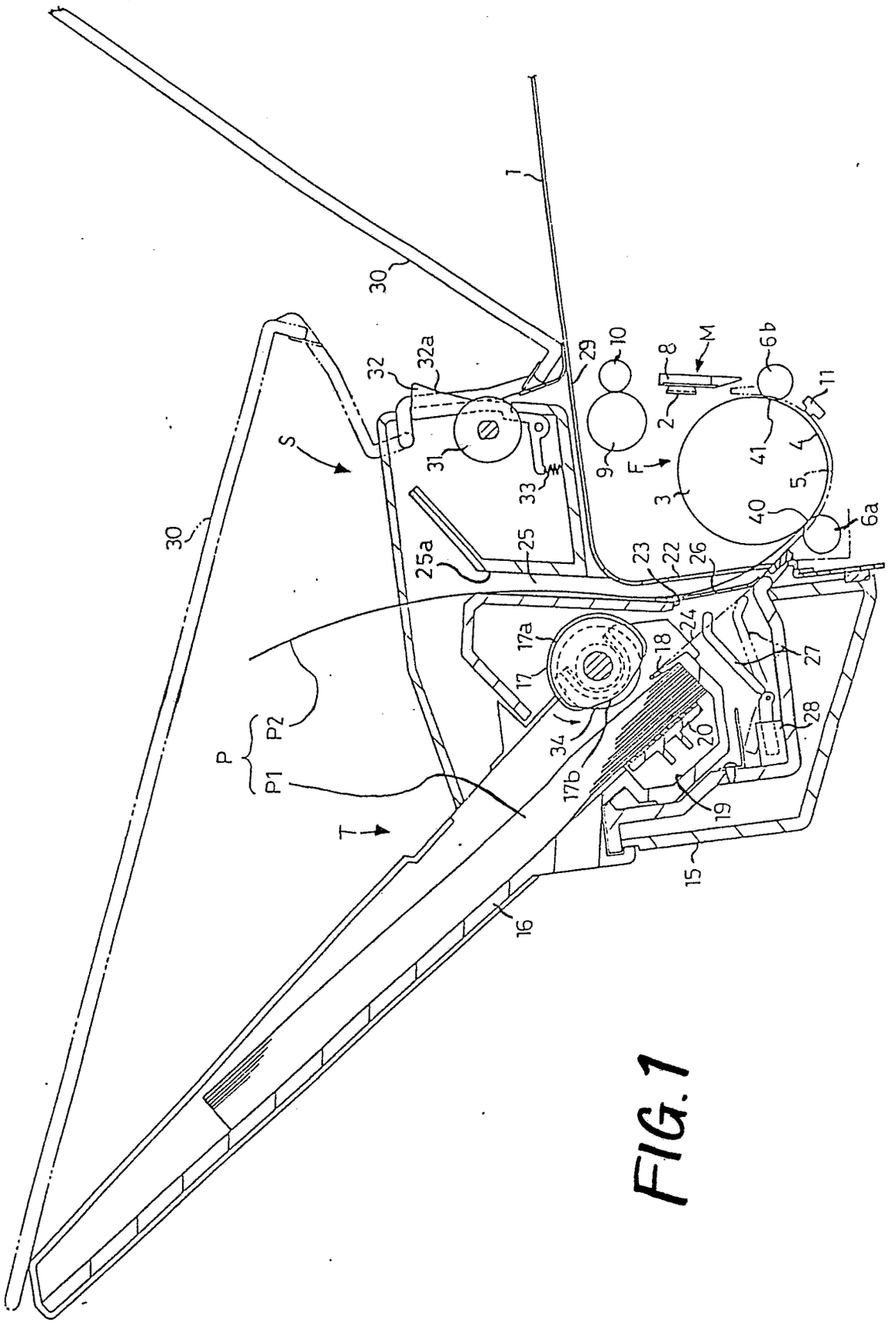

1
30
29
10
8
M
6b
11
32
32a
2
41
4
S
31
9
F
5
3
33
40
6a
30
25a
25
23
22
26
17a
18
24
27
17
28
P
P2
P1
34
20
17b
19
T
15
16

FIG. 1

FIG. 2

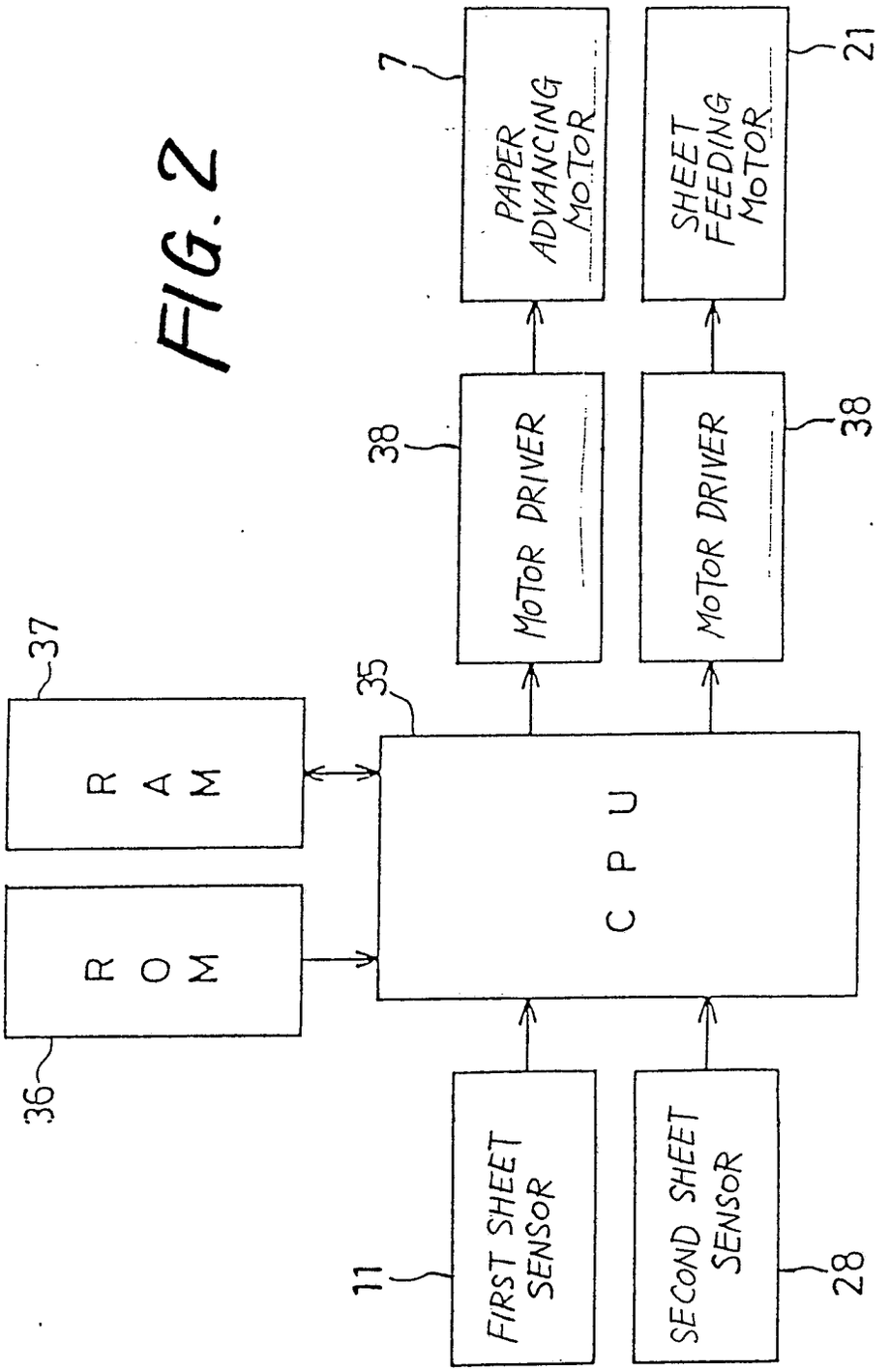
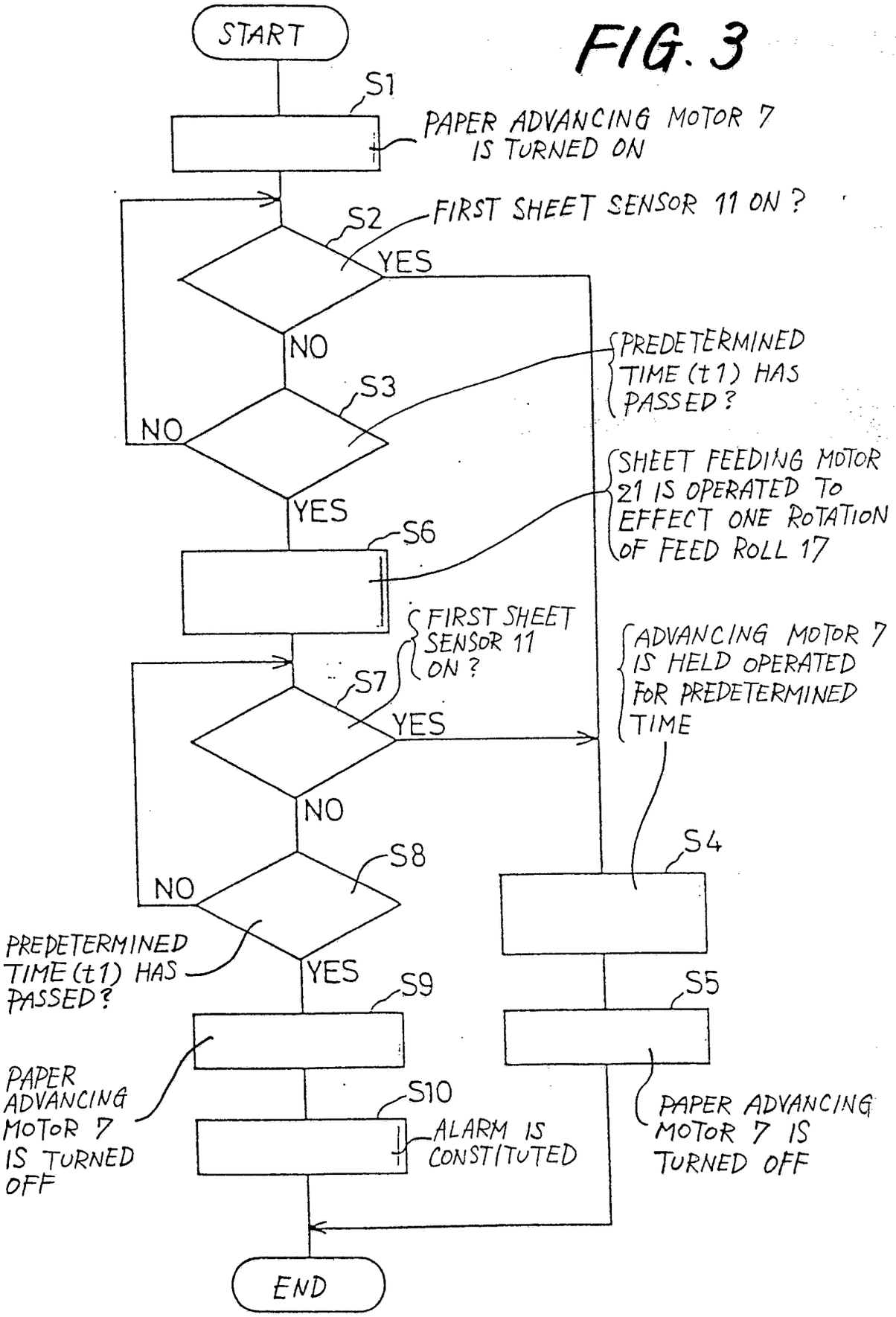

7
PAPER ADVANCING MOTOR
21
SHEET FEEDING MOTOR
38
MOTOR DRIVER
38
MOTOR DRIVER
37
R A M
35
C P U
R O M
36
11
FIRST SHEET SENSOR
SECOND SHEET SENSOR
28

FIG. 3


START
S1
PAPER ADVANCING MOTOR 7 IS TURNED ON
S2
FIRST SHEET SENSOR 11 ON ?
YES
NO
S3
PREDETERMINED TIME (t1) HAS PASSED ?
NO
YES
S6
SHEET FEEDING MOTOR 21 IS OPERATED TO EFFECT ONE ROTATION OF FEED ROLL 17
FIRST SHEET SENSOR 11 ON ?
S7
YES
ADVANCING MOTOR 7 IS HELD OPERATED FOR PREDETERMINED TIME
NO
S8
NO
PREDETERMINED TIME (t1) HAS PASSED ?
YES
S4
S9
S5
PAPER ADVANCING MOTOR 7 IS TURNED OFF
S10
ALARM IS CONSTITUTED
PAPER ADVANCING MOTOR 7 IS TURNED OFF
END

European Patent Office

EUROPEAN SEARCH REPORT

Application number

DOCUMENTS CONSIDERED TO BE RELEVANT

EP 88309113.4

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl.4)
X	EP - A1 - 0 204 452 (OKI ELECTRIC) * Fig. 2; abstract *	1-3	B 41 J 13/00
Y		4	
	--		
Y	PATENT ABSTRACTS OF JAPAN, unexamined applications, M field, vol. 7, no. 24, January 29, 1983, THE PATENT OFFICE JAPANESE GOVERNMENT page 5 M 189 * Kokai-no. 57-176 187 (RICOH K.K.)	4	

TECHNICAL FIELDS SEARCHED (Int. Cl.4)

B 41 J
G 06 K

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
VIENNA	30-12-1988	MEISTERLE

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
Y : particularly relevant if combined with another document of the same category
A : technological background
O : non-written disclosure
P : intermediate document

T : theory or principle underlying the invention
E : earlier patent document, but published on, or after the filing date
D : document cited in the application
L : document cited for other reasons

& : member of the same patent family, corresponding document

EPO Form 1503 03.82