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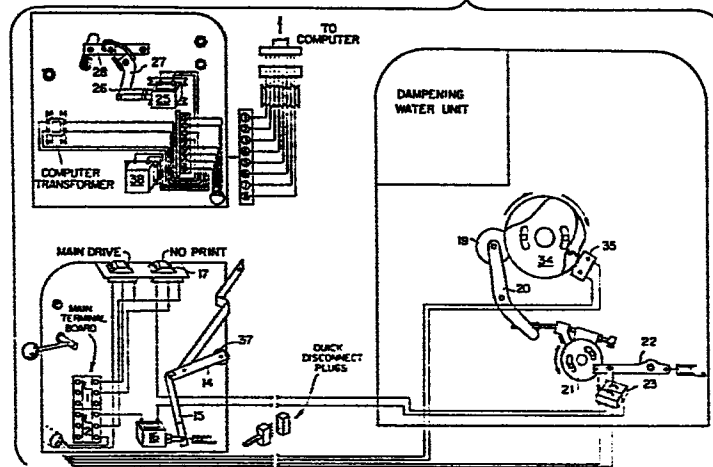
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(54) **Numbering attachment for off-set printing press.**

(57) A machine for printing both text and a number on a sheet of paper in a single run of the sheet of paper through the machine, the machine comprising:

text-printing means for continuously printing text on successive sheets of paper and numbering means for automatically alternately numbering repetitively or consequently such that each number is printed on a predetermined number of successive sheets of paper printed with text by the text-printing means; the numbering means including; number-printing means for printing one or more numbers on a sheet of paper which has been printed with text by the text-printing means, detent means for activating or deactivating the number-printing means, electronic computing means for counting sheets of paper passing through the machine and signalling when a predetermined number of sheets of paper have been counted, control means for simultaneously signalling the detent means to activate the number-printing means and the electronic computing means to start counting or simultaneously signalling the detent means to deactivate the number-printing means and the electronic computing means to discontinue counting, detection means for signalling the electronic computing means that a sheet of paper passed through the machine, and number-changing means for changing each number printed by the number-printing means to the next consecutive number upon receiving the signal from the electronic computing means that the predetermined number of sheets of paper have been counted.

FIG. 5.



1        NUMBERING ATTACHMENT FOR OFF-SET PRINTING PRESS.  
2        BACKGROUND OF THE INVENTION

3        The present invention relates to off-set printing  
4        presses. When using an off-set printing press it is  
5        often desirable to both print and number sheets of paper  
6        in a single run of the paper through the off-set printing  
7        press. For example, such a feature is useful in printing  
8        numbered invoices or tickets.

9        The prior art includes some relatively large  
10       devices which incorporate a numbering assembly within a  
11       conventional off-set printing press to permit printing  
12       and consecutively numbering printed sheets of paper in a  
13       single run of the paper through the off-set printing  
14       press. U.S. Patents Nos. 3,046,877; 3,216,347;  
15       3,420,163; 3,782,277; 4,068,582; 4,306,496. These  
16       devices are relatively expensive and thus cannot be used  
17       by most small commercial off-set printers. The prior art  
18       also includes a few relatively smaller and less expensive  
19       numbering attachments for off-set printing presses which  
20       enable the press to print and consecutively number  
21       printed sheets of paper in a single run of the paper  
22       through the off-set printing press. U.S. Patents Nos.  
23       3,985,073; 4,044,666.

24       All of these prior art devices, however, have  
25       significant limitations. In particular, none of these  
26       prior devices is sufficiently flexible to permit printing  
27       and automatically alternately numbering repetitively or  
28       consecutively such that each number is printed on a  
29       predetermined number of successive printed sheets of  
30       paper. Accordingly, these prior art devices cannot  
31       automatically number sets of multipage printed forms such  
32       that each page of each set has the same number thereon  
33       but the pages of consecutive multipage sets are  
34       consecutively numbered.

35       SUMMARY OF THE INVENTION

36       It is therefore a main object of the present  
37       invention to provide a numbering attachment for an

1 off-set printing device which overcomes the  
above-mentioned drawbacks.

It is a more specific object of the present  
invention to provide a numbering attachment for an  
5 off-set printing device which can automatically  
alternatingly number either repetitively or consecutively  
such that each number is printed on a predetermined  
number of successive printed sheets of paper.

A further object of this invention is to provide a  
10 numbering attachment for an off-set printing press which  
can automatically number sets of multiple page printed  
forms such that each page of each set has the same number  
thereon but the pages of consecutive multipage sets are  
consecutively numbered.

15 A still further object of this invention is to  
provide a portable, detachable, self-driven numbering  
attachment for an off-set printing press which is  
relatively small and inexpensive such that it can be used  
by small commercial off-set printers.

20 An additional object of the invention is to  
provide a portable, detachable, self-driven numbering  
attachment for an off-set printing press which is simple  
to attach to or detach from the off-set printing press.

Additional objects and advantages of the invention  
25 will be set forth in part in the description which  
follows, and in part will be obvious from the  
description, or may be learned by practice of the  
invention. The objects and advantages of the invention  
may be realized and obtained by means of  
30 instrumentalities and combinations particularly pointed  
out in the appended claims.

To achieve the objects and in accordance with the  
purpose of the invention, as embodied and broadly  
described herein, the invention comprises a machine for  
35 printing both text and a number on a sheet of paper in a  
single run of the sheet of paper through the machine, the  
machine comprising text-printing means for continuously

1 printing text on successive sheets of paper and numbering  
means for automatically alternately numbering  
repetitively or consecutively such that each number is  
printed on a predetermined number of successive sheets of  
5 paper printed with text by the text-printing means; the  
numbering means including number-printing means for  
printing one or more numbers on a sheet of paper which  
has been printed with text by the text-printing means,  
detent means for activating or deactivating the  
10 number-printing means, electronic computing means for  
counting sheets of paper passing through the machine and  
signalling when a predetermined number of sheets of paper  
have been counted, control means for simultaneously  
signalling the detent means to activate the  
15 number-printing means and the electronic computing means  
to start counting or simultaneously signalling the detent  
means to deactivate the number-printing means and the  
electronic computing means to discontinue counting,  
detection means for signalling the electronic computing  
20 means that a sheet of paper passed through the machine  
and number-changing means for changing each number  
printed by the number-printing means to the next  
consecutive number upon receiving the signal from the  
electronic computing means that the predetermined number  
25 of sheets of paper have been counted.

To further achieve the objects in accordance with  
the purpose of the invention as embodied and broadly  
described herein, the invention comprises a portable,  
detachable, self-driven numbering attachment for an  
30 off-set printing press capable of automatically  
alternately numbering repetitively or consecutively  
such that each number is printed on a predetermined  
number of successive sheets of paper printed with text by  
the off-set printing press, the numbering attachment  
35 comprising number-printing means for printing one or more  
numbers on a sheet of paper which has been printed with  
text by the off-set printing press, detent means for

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1 activating or deactivating the number-printing means,  
electronic computing means for counting sheets of paper  
passing through the off-set printing press and signalling  
when a predetermined number of sheets of paper have been  
5 counted, control means for simultaneously signalling the  
detent means to activate the number-printing means and  
the electronic computing means to start counting or  
simultaneously signalling the detent means to deactivate  
the number-printing means and the electronic computing  
10 means to discontinue counting, detection mean for  
signalling the electronic computing means that a sheet of  
paper passed through the off-set printing press and  
number-changing means for changing each number printed by  
the number-printing means to the next consecutive number  
15 upon receiving the signal from the electronic computing  
means that the predetermined number of sheets of paper  
have been counted.

The foregoing and other objects, features, and  
advantages of the present invention will be made more  
20 apparent from the following description of the preferred  
embodiments. The accompanying drawings, which are  
incorporated in and constitute a part of the  
specification, illustrate an embodiment of the present  
invention and, together with the description, serve to  
25 explain the principles of the invention.

#### BRIEF DESCRIPTION OF THE DRAWINGS

Figure 1 is a perspective front view of a portion  
of the preferred embodiment of the present invention  
particularly illustrating number-printing means in  
30 accordance with the present invention.

Figure 2 is a perspective side view of a portion  
of the preferred embodiment of the present invention  
particularly illustrating detent means in accordance with  
the present invention.

35 Figure 3 is a perspective side view of a portion  
of the preferred embodiment of the present invention  
viewed from the same side as is depicted in Figure 2

1 particularly illustrating control means in accordance  
with the present invention.

Figure 4 is a perspective side view of a portion  
of the preferred embodiment of the present invention from  
5 the side opposite the side depicted in Figures 2 and 3  
particularly illustrating number-changing means in  
accordance with the present invention.

Figure 5 is a schematic wiring diagram of the  
preferred embodiment of the present invention.

10 DESCRIPTION OF THE PREFERRED EMBODIMENTS.

Reference will now be made in detail to the  
present preferred embodiment of the invention, an example  
of which is illustrated in the accompanying drawings.  
This embodiment is particularly adopted to be attached to  
15 off-set printing presses produced by the ATF Davidson  
Corporation of Whitinsville, Massachusetts, particularly  
Model Nos. 221, 233, 241, 251, 500, 501, 502p, 700, 701,  
701p 702p and 900. The structure and mode of operation  
of such presses is well-known. Therefore, only the  
20 structure of the press which is necessary for the purpose  
of illustration of the invention is shown in the  
drawings.

In accordance with the present invention, as  
embodied herein, there is provided a portable,  
25 detachable, self-driven numbering attachment for an  
off-set printing press capable of automatically  
alternatingly numbering repetitively or consecutively  
such that each number is printed on a predetermined  
number of successive sheets of paper printed with text by  
30 the off-set printing press, the numbering attachment  
comprising number-printing means for printing one or more  
numbers on a sheet of paper which has been printed with  
text by the off-set printing press, detent means for  
activating or deactivating the number-printing means,  
35 electronic computing means for counting sheets of paper  
passing through the off-set printing press and signalling  
when a predetermined number of sheets of paper have been

1 counted, control means for simultaneously signalling the  
detent means to activate the number-printing means and  
the electronic computing means to start counting or  
simultaneously signalling the detent means to deactivate  
5 the number printing means and the electronic computing  
means to discontinue counting, detection means for  
signalling the electronic computing means that a sheet of  
paper passed through the off-set printing press and  
number-changing means for changing each number printed by  
10 the number-printing means to the next consecutive number  
upon receiving the signal from the electronic computing  
means that the predetermined number of sheets of paper  
have been counted.

With reference to Figure 1, in accordance with the  
15 present invention as embodied herein, there is provided  
number-printing means for printing one or more numbers on  
a sheet of paper which has been printed with text by the  
off-set printing press. The number-printing means  
includes an ink fountain (1) and a series of rollers (2,  
20 3, 4, 5, 6 and 7) which transport ink from the ink  
fountain to one or more number printers (8) mounted on a  
number printer shaft (9). Preferably, the series of  
rollers include a hard rubber ink fountain roller' (2), a  
soft rubber ink ductor roller (3), a hard rubber ink  
25 intermediate roller (4), a hard rubber ink occulator  
roller (5), a soft rubber ink stabalizer roller (6) and  
complimentary rubber ink form roller(s) (7) for each  
number printer (8). Each number printer comprises an  
ordinal series of printing wheels (10), each wheel (10)  
30 having a digital set of printing type (11).  
Complimentary to each number-printer is an impression  
roller (12) mounted on impression roller shaft (13). The  
number of complimentary number printers (8), ink form  
rollers (7) and impression rollers (12) may vary. Each  
35 complimentary number printer (8), ink form roller (7) and  
impression roller (12) is responsible for the printing of  
a number on each sheet of paper from the off-set printing



1 press.

In operation, the series of rollers are driven by a drive means (38) (Figure 4) separate from the off-set printing press drive means to transport ink from the ink fountain (1) to the ink form roller(s) (7) which come into contact with and ink the face of the number printer(s) (8). Paper coming from the off-set printing press passes between the inked number printer(s) (8) and the complimentary impression roller(s) (12). When impression roller shaft (13) is in a print position as is described in greater detail below. The impression roller(s) (12) impress the paper against the inked number printer(s) (8) and the paper is printed with a number. The paper is then ejected into a sheet catcher or a receding stacker with dolly (not shown).

With reference to Figure 2, in accordance with the present invention as embodied herein, there is provided detent means for activating or deactivating the number-printing means. The detent means includes a two-position detent lever (14) which moves in the bearing (37) supporting the impression roller shaft (13) into either a no-print or a print position. The detent lever (14) is connected to locking lever (15) which is connected to an electric solenoid (16). When the electric solenoid is energized it moves the locking lever (15) which in turn engages the detent lever (14) which moves in the bearing (37) supporting the impression roller shaft (13) into the no-print position thereby deactivating the number printing means. This position is called the no-print mode. When the electric solenoid (16) is deenergized it moves the locking lever (15) which in turn disengages the detent lever (14) which moves in the bearing (37) supporting the impression roller shaft (13) into the print position thereby activating the number printing means. This position is called the print mode. The electric solenoid (16) is connected to a no-print mode switch (17) which must be switched to the

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1 on position in order for the off-set printing press to be  
turned on.

In operation, the off-set printing press is not  
turned on for operation until the no-print mode switch  
5 (17) is switched on. When the no-print mode switch (17)  
is turned on, the electric solenoid (16) is activated  
moving locking lever (15) into the engaged position  
detent lever (14) which moves in the bearing (37) -  
supporting impression roller shaft (13) into the no print  
10 mode position.

No numbering can be performed in the no print mode  
position. To start numbering the detent means must  
activate the number-printing means by moving it into the  
print mode position. This is accomplished by the sending  
15 of a signal (described below) which deactivates the  
electric solenoid (16) which in turn moves locking lever  
(15) which in turn disengages from the detent lever (14)  
which in turn moves bearing (37) supporting impression  
roller shaft (13) into the print mode position.

20 In accordance with the present invention as  
embodied herein, there is provided electronic computing  
means for counting sheets of paper passing through the  
off-set printing press and signalling when a  
predetermined number of sheets of paper have been  
25 counted. The electric computing means is an ordinary  
mini-computer (not shown). Mounted in the computer is a  
selector knob (not shown) which can be set for any amount  
of repeat numbers or remain on consecutive numbering.  
Also mounted on the counter is a reset button to allow  
30 reset of the sequence if the sequence has been disturbed.

In accordance with the present invention as  
embodied herein, there is provided control means for  
simultaneously signalling the detent means to activate  
the number-printing means and the electronic computing  
35 means to start counting or simultaneously signalling the  
detent means to deactivate the number printing means and  
the electronic computing means to discontinue counting.

1 With reference to Figure 3, there is shown such a control  
means particularly adapted to be used with the paper  
detection component of the aforementioned ATF Davidson  
off-set printing press. As the first sheet of paper  
5 passes down the ATF Davidson paper conveyor (not shown)  
it passes under the ATF Davidson sheet detector (not  
shown) which activates throw out cam assembly (19) which  
moves throw out cam lever (20) which in turn pivots  
cylinder hub assembly (21). When cylinder hub assembly  
10 (21) pivots, latching lever (22) moves upwards and trips  
two micro switches mounted in tandem -- an inner micro  
switch (23) and an outer micro switch (24). The inner  
micro switch (23) sends a signal deactivating electric  
solenoid (16) (Figure 2) which causes locking lever (15)  
15 to disengage from the detent lever (14) to move bearing  
(37) supporting impression roller shaft (13) into the  
print mode position thereby activating the  
number-printing means. Outer micro switch (24) signals  
the electronic computing means to start counting the  
20 sheets of paper passing through the off-set printing  
press.

In accordance with the present invention as  
embodied herein, there is provided detection means for  
signalling the electronic computing means that a sheet  
25 of paper passed through the off-set printing press. With  
reference to Figure 3, sheets of paper passing through  
the off-set printing press are detected by special trip  
cam assembly (34) and sheet counter micro-switch (35).  
Special trip cam assembly (34) rotates once for each  
30 piece of paper passing through the off-set printing  
press. Each such rotation activates the sheet counter  
micro-switch (35) which sends a signal to the electronic  
computing means to count another sheet of paper as having  
passed through the off-set printing press.

35 The numbering and counting operations remain in  
effect as long as paper is running through the off-set  
press. When the suction feed switch (not shown) of the

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1 off-set printing press is shut off, paper no longer feeds  
through the press and the paper detection means described  
above pivots the cylinder hub assembly (21) to its  
inactive position. Movement of the cylinder hub assembly  
5 (21) causes the latching lever (22) to disengage thereby  
deactivating inner and outer micro switches (23 and 24).  
Deactivation of inner and outer micro switch (23)  
activates electric solenoid (16) (Figure 2) which causes  
locking lever (15) to engage the detent lever (14) to  
10 move in the bearing (37) supporting impression roller  
shaft (13) into its no-print mode position. Deactivation  
of outer micro switch (24) signals the electronic  
computing means to discontinue counting.

In accordance with the present invention as  
15 embodied herein, there is provided number-changing means  
for changing the number printed by the number-printing  
means to the next consecutive number upon receiving the  
signal from the electronic computing means that the  
predetermined number of sheets of paper have been  
20 counted. With reference to Figure 4, every time the  
predetermined number of sheets of paper is counted by the  
electronic computing means the electronic computing means  
sends a signal which energizes electric solenoid (25)  
pulling block (26) which in turn pulls pivot lever (27)  
25 down and forces locking block assembly (28) into a  
position which forces recoil shaft (29) (Figure 1)  
downward. As illustrated in Figure 1, the downward  
movement of recoil shaft (29) pivots trip lever shaft  
(30) thereby deflecting trip lever(s) (31) downward so  
30 that they come into contact with printing type of the  
number printer(s) (8) such that the printing type (11) is  
changed to the next consecutive printing type (11). Trip  
lever shaft (30) includes one trip lever (31) mounted  
thereon for each number printer (8).

35 Electric solenoid (25) is returned to its original  
position by return spring (32) mounted in return spring  
bracket (33) which thereby returns block (26), pivot

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1 lever (27), block assembly (28), recoil shaft (29), trip  
lever shaft (30), and trip levers (31) to their original  
position in preparation for the next number change.

To summarize the overall operation of the off-set  
5 printing press numbering attachment of the present  
invention. Turning on the off-set printing press  
activates the detent means to place the number-printing  
means into the no-print mode. Upon detection of paper in  
the off-set printing press the control means  
10 simultaneously signals the detent means to place the  
number-printing means into the print mode and the  
electronic computing means to start counting. The  
number-printing means then repetitively prints the same  
number of each sheet of paper passing through the press.  
15 As each sheet of paper passes through the press the  
detection means signals the electronic computing means to  
count another sheet of paper. When the predetermined  
number of sheets of paper have been counted, the  
electronic computing means signals the number-changing  
20 means to change the number printed by the number  
printing-means to the next consecutive number. The  
number-printing means then repetitively prints this new  
number on each sheet of paper until the electronic  
computing means again counts the predetermined number of  
25 sheets of paper and again signals the number-changing  
means to change the number to the next consecutive  
number. The machine continues operating like this until  
no paper is detected passing through the off-set printer.  
Upon detection of no paper, the control means  
30 simultaneously signals the detent means to place the  
number-printing means into the no-print mode and the  
electronic computing means to discontinue counting. When  
the job is finished, the separate drive motors of the  
off-set printing press and the numbering attachment are  
35 turned off. Turning the machine back on starts the  
procedure all over again.

The numbering attachment of the present invention

1 is a portable detachable, self-driven unit. Preferably,  
the numbering attachment is connected to the press by a  
quick disconnect plug assembly and the wiring is as  
illustrated in Figure 5.

5 The inking unit of the numbering attachment is  
preferably made in modular form and can be removed from  
the main body of the number attachment by simply lifting  
upward. This affords easy access to the number printers  
when hand resetting is required as well as easy  
10 maintenance, cleaning and replacement of the  
number-printing means also instant changing of colors.

It will be apparent to those skilled in the art  
that various modifications and variations can be made in  
the present invention without departing from the scope or  
15 spirit of the invention. Thus, it is intended that the  
present invention cover the modifications and variations  
of this invention provided that they come within the  
scope of the appended claims and their equivalents.

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1 What Is Claimed Is:

1. A machine for printing both text and a number on a sheet of paper in a single run of the sheet of paper through the machine, the machine comprising:

5 text-printing means for continuously printing text on successive sheets of paper and numbering means for automatically alternately numbering repetitively or consecutively such that each number is printed on a predetermined number of successive sheets of paper

10 printed with text by the text-printing means; the numbering means including: number-printing means for printing one or more numbers on a sheet of paper which has been printed with text by the text-printing means, detent means for activating or deactivating the

15 number-printing means, electronic computing means for counting sheets of paper passing through the machine and signalling when a predetermined number of sheets of paper have been counted, control means for simultaneously signalling the detent means to activate the

20 number-printing means and the electronic computing means to start counting or simultaneously signalling the detent means to deactivate the number-printing means and the electronic computing means to discontinue counting, detection means for signalling the electronic computing

25 means that a sheet of paper passed through the machine, and number-changing means for changing each number printed by the number-printing means to the next consecutive number upon receiving the signal from the electronic computing means that the predetermined number

30 of sheets of paper have been counted.

2. A portable, detachable, self-driven numbering attachment for off-set printing press capable of automatically alternately numbering repetitively or consecutively such that each number is printed on a

35 predetermined number of successive sheets of paper printed with text by the off-set printing press, the numbering attachment comprising: number-printing means

1 for printing one or more numbers on a sheet of paper  
which has been printed with text by the off-set printing  
press detent means for activating or deactivating the  
number-printing means, electronic computing means for  
5 counting sheets of paper passing through the off-set  
printing press and signalling when a predetermined number  
of sheets of paper have been counted, control means for  
simultaneously signalling the detent means to activate  
the number-printing means and the electronic computing  
10 means to start counting or simultaneously signalling the  
detent means to deactivate the number-printing means and  
the electronic computing means to discontinue counting,  
detection means for signalling the electronic computing  
means that a sheet of paper passed through the off-set  
15 printing press, and number-changing means for changing  
each number printed by the number-printing means to the  
next consecutive number upon receiving the signal from  
the electronic computing means that the predetermined  
number of sheets of paper have been counted.

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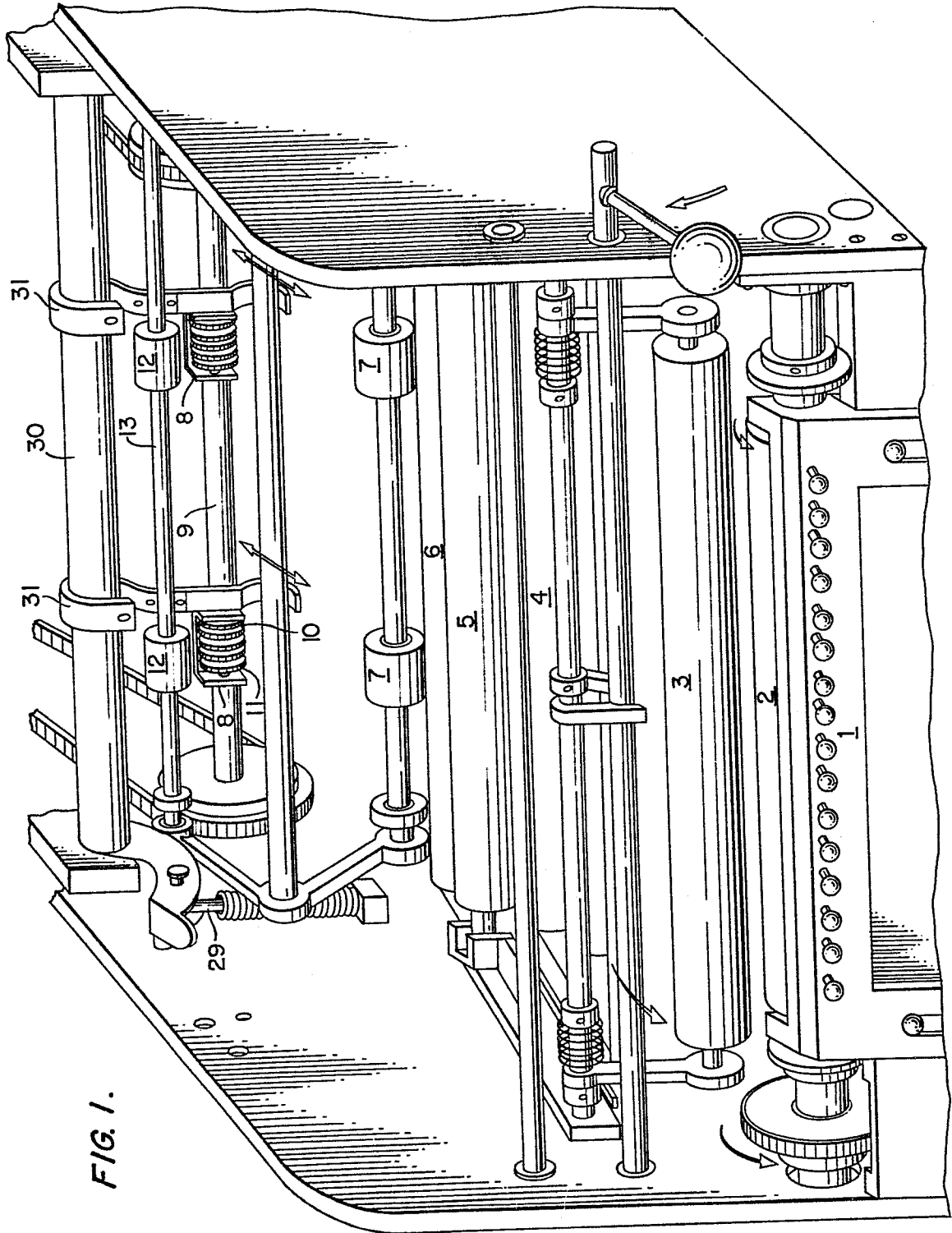


FIG. 2.

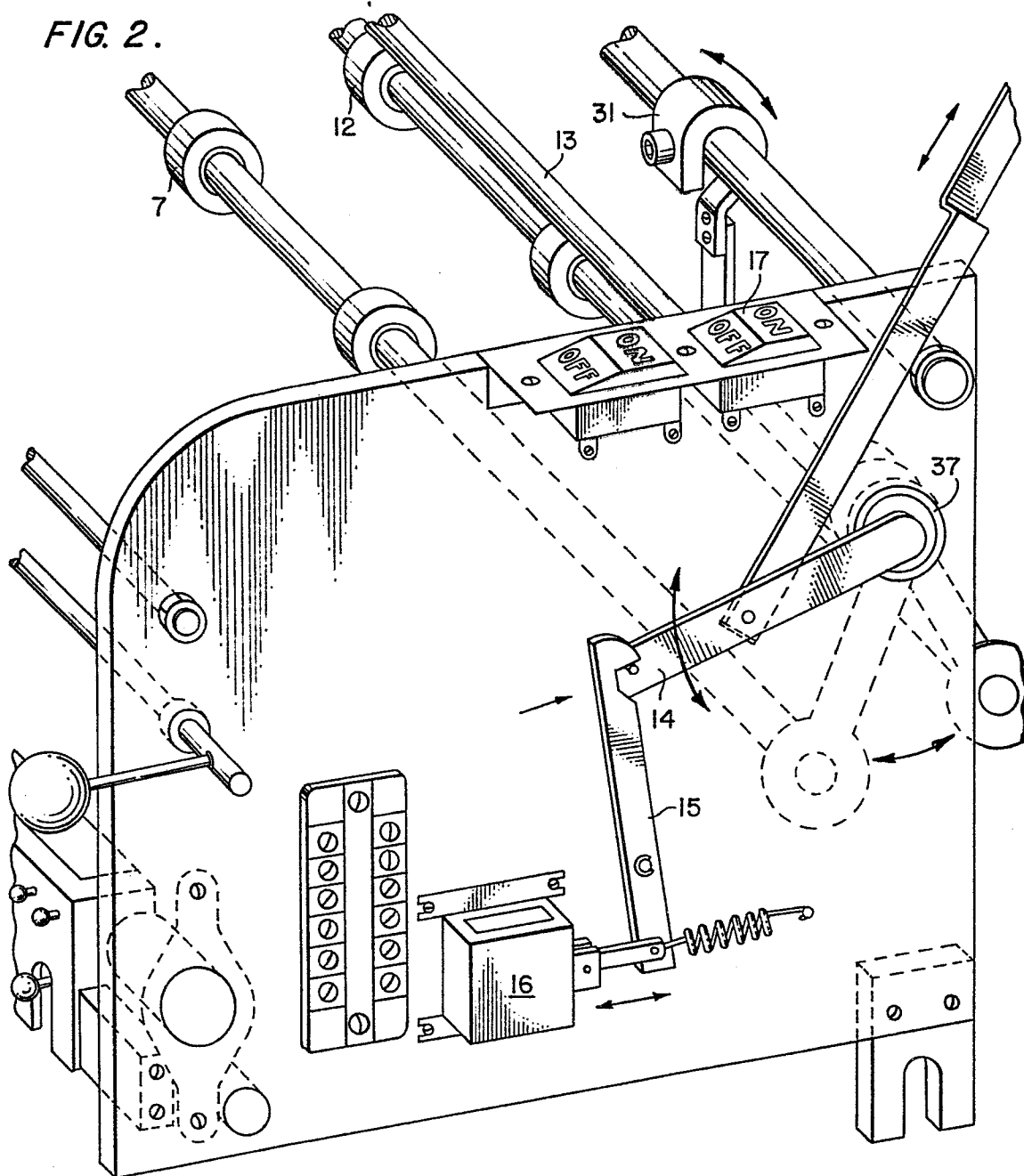
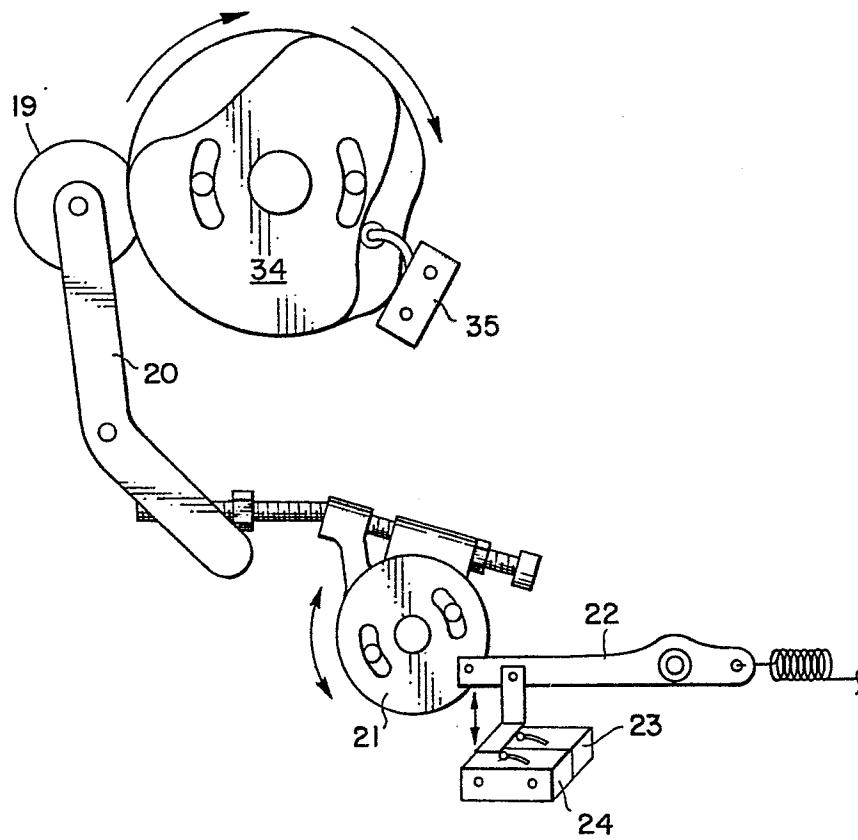


FIG. 3.



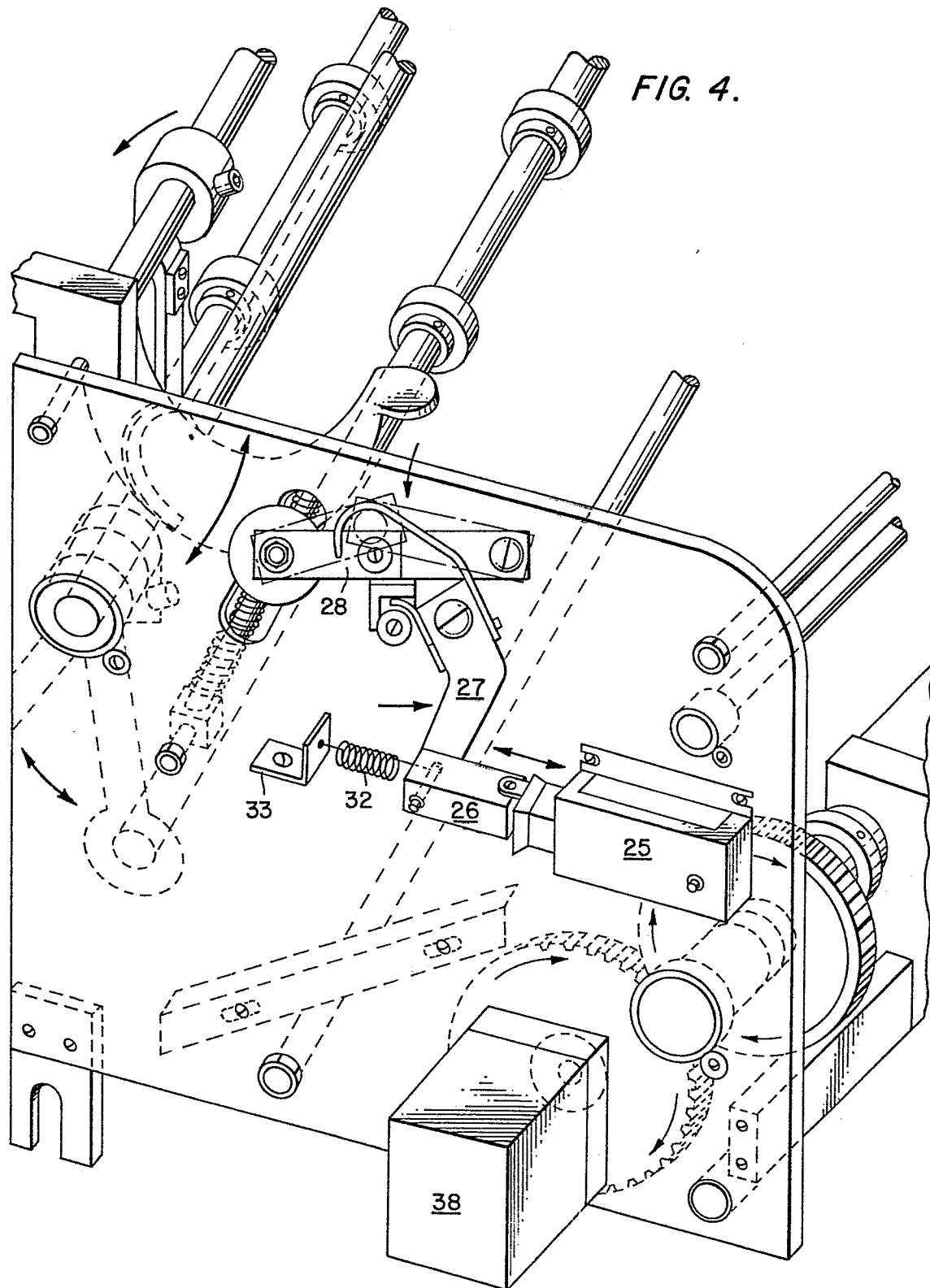


FIG. 5.

