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(71) Applicant: Little, George J.
126 Markowitz Street
Carteret New Jersey 07008(US)

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(72) Inventor: Little, George J.
126 Markowitz Street
Carteret New Jersey 07008(US)

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(74) Representative: Fane, Christopher Robin King et al,
HASELTINE LAKE & CO. Hazlitt House 28 Southampton
Buildings Chancery Lane
London, WC2A 1AT(GB)

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

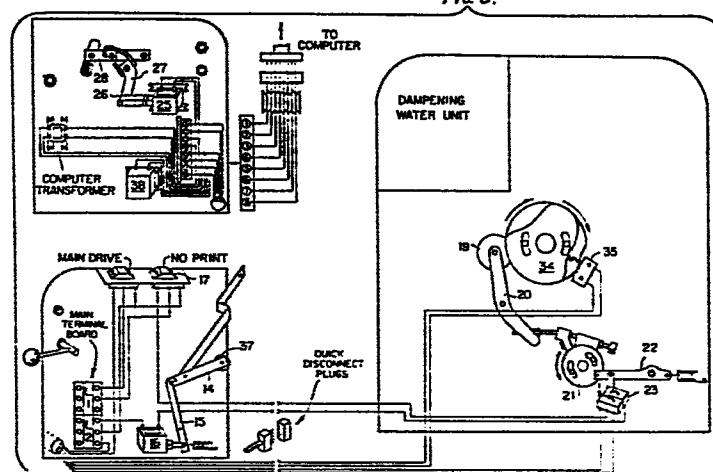
(57) A machine for printing both text and a number on a sheet of paper in a single run of the sheet of paper through the machine, the machine comprising:

text-printing means for continuously printing text on successive sheets of paper and numbering means for automatically alternatingly 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.

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FIG 5.



1 NUMBERING ATTACHMENT FOR OFF-SET PRINTING PRESS.5 BACKGROUND OF THE INVENTION

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

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

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

35 SUMMARY OF THE INVENTION

It is therefore a main object of the present 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 alternatingly 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
alternatingly 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,
2 electronic computing means for counting sheets of paper
3 passing through the off-set printing press and signalling
4 when a predetermined number of sheets of paper have been
5 counted, control means for simultaneously signalling the
6 detent means to activate the number-printing means and
7 the electronic computing means to start counting or
8 simultaneously signalling the detent means to deactivate
9 the number-printing means and the electronic computing
10 means to discontinue counting, detection mean for
11 signalling the electronic computing means that a sheet of
12 paper passed through the off-set printing press and
13 number-changing means for changing each number printed by
14 the number-printing means to the next consecutive number
15 upon receiving the signal from the electronic computing
16 means that the predetermined number of sheets of paper
17 have been counted.

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

BRIEF DESCRIPTION OF THE DRAWINGS

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

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

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

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

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

10 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
30 number of successive sheets of paper printed with text by
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

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

5 In operation, the off-set printing press is not turned on for operation until the no-print mode switch (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.

15 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 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.

35 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 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 and 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

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 laching 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 recall 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

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 alternatingly 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 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.
 - 30
2. A portable, detachable, self-driven numbering attachment for 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 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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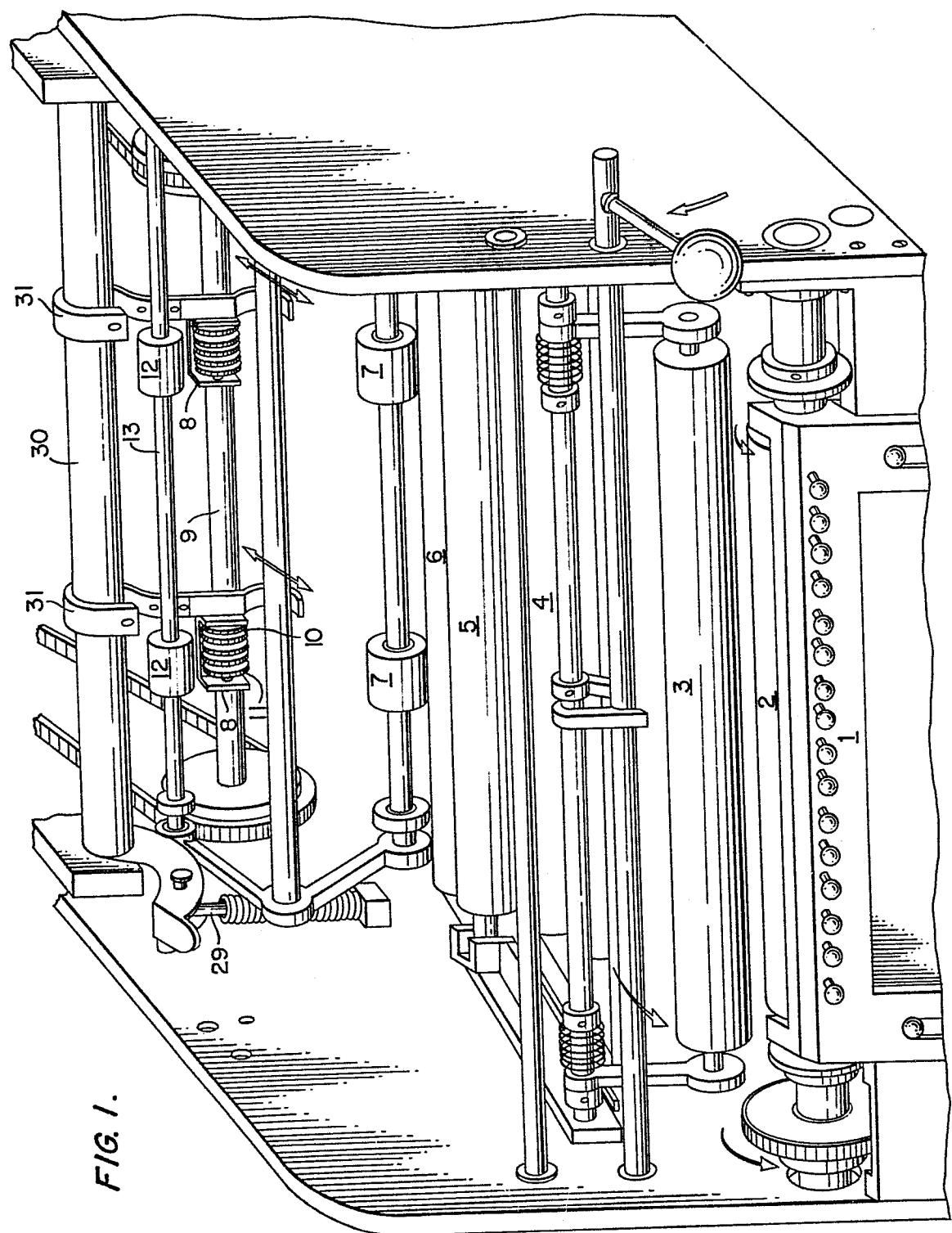


FIG. 2.

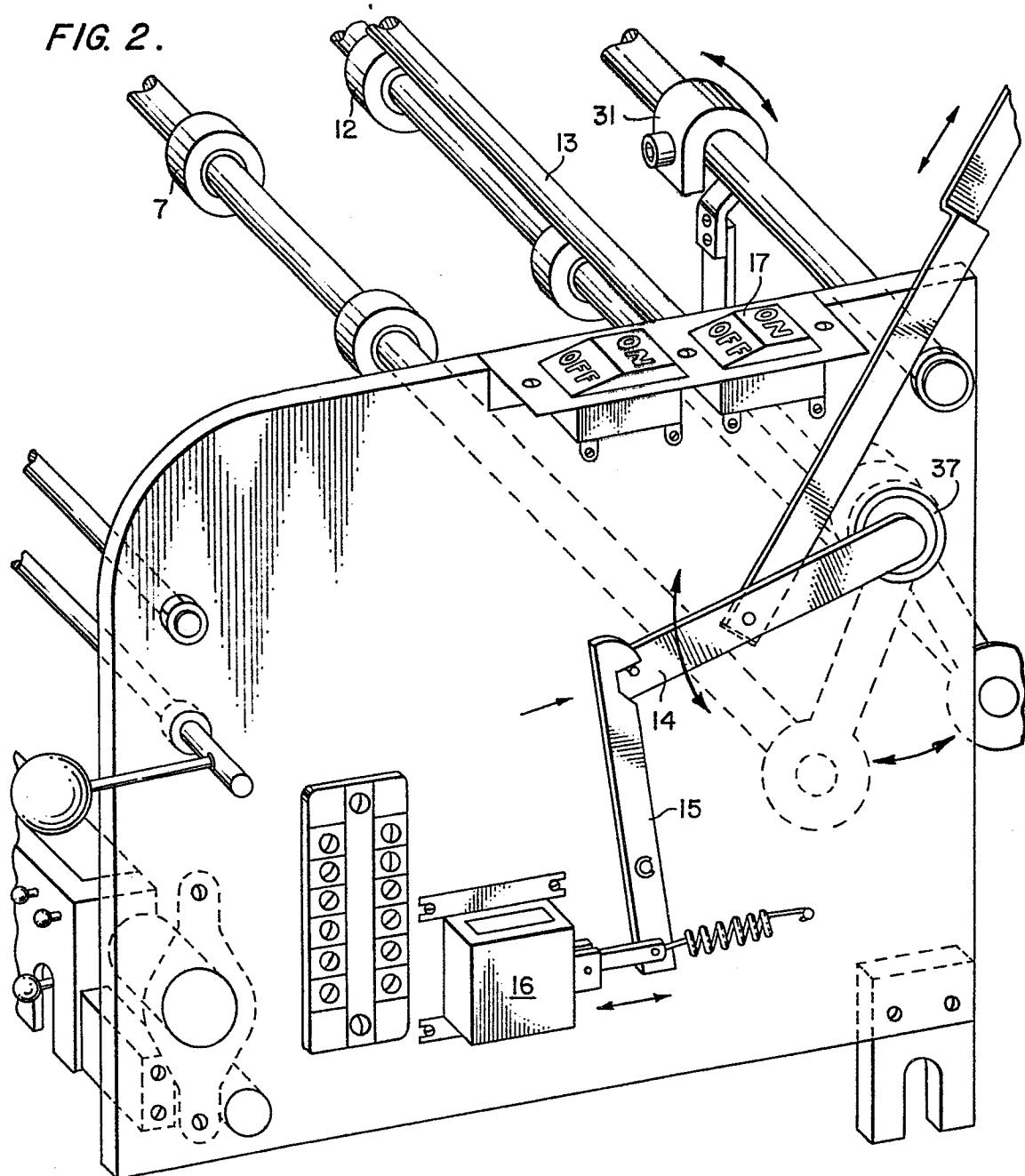


FIG. 3.

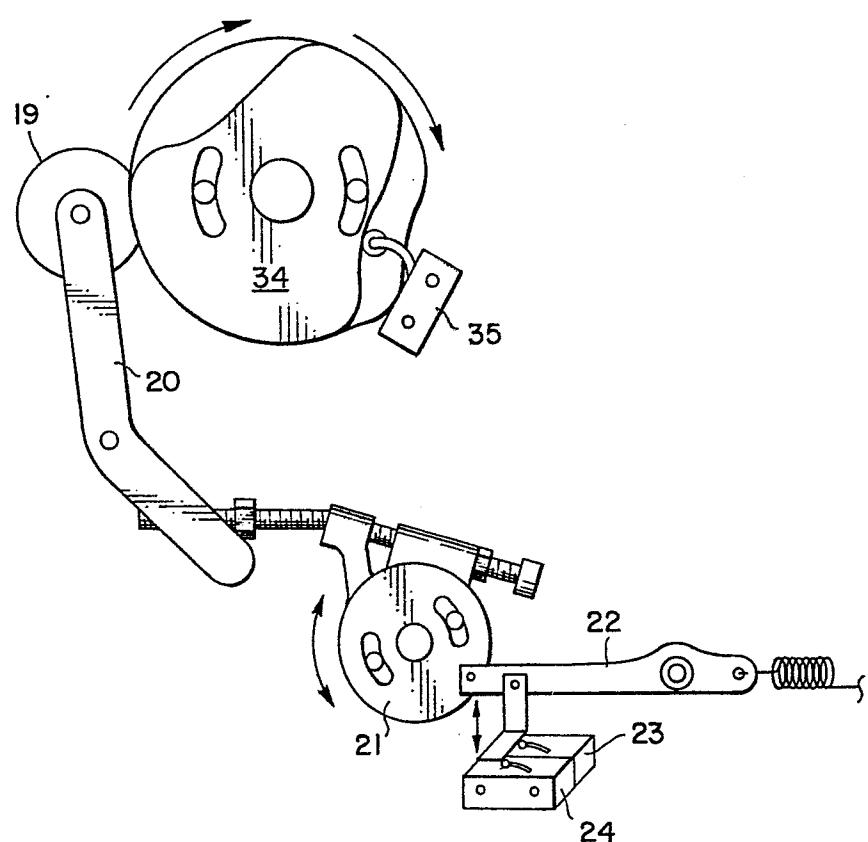


FIG. 4.

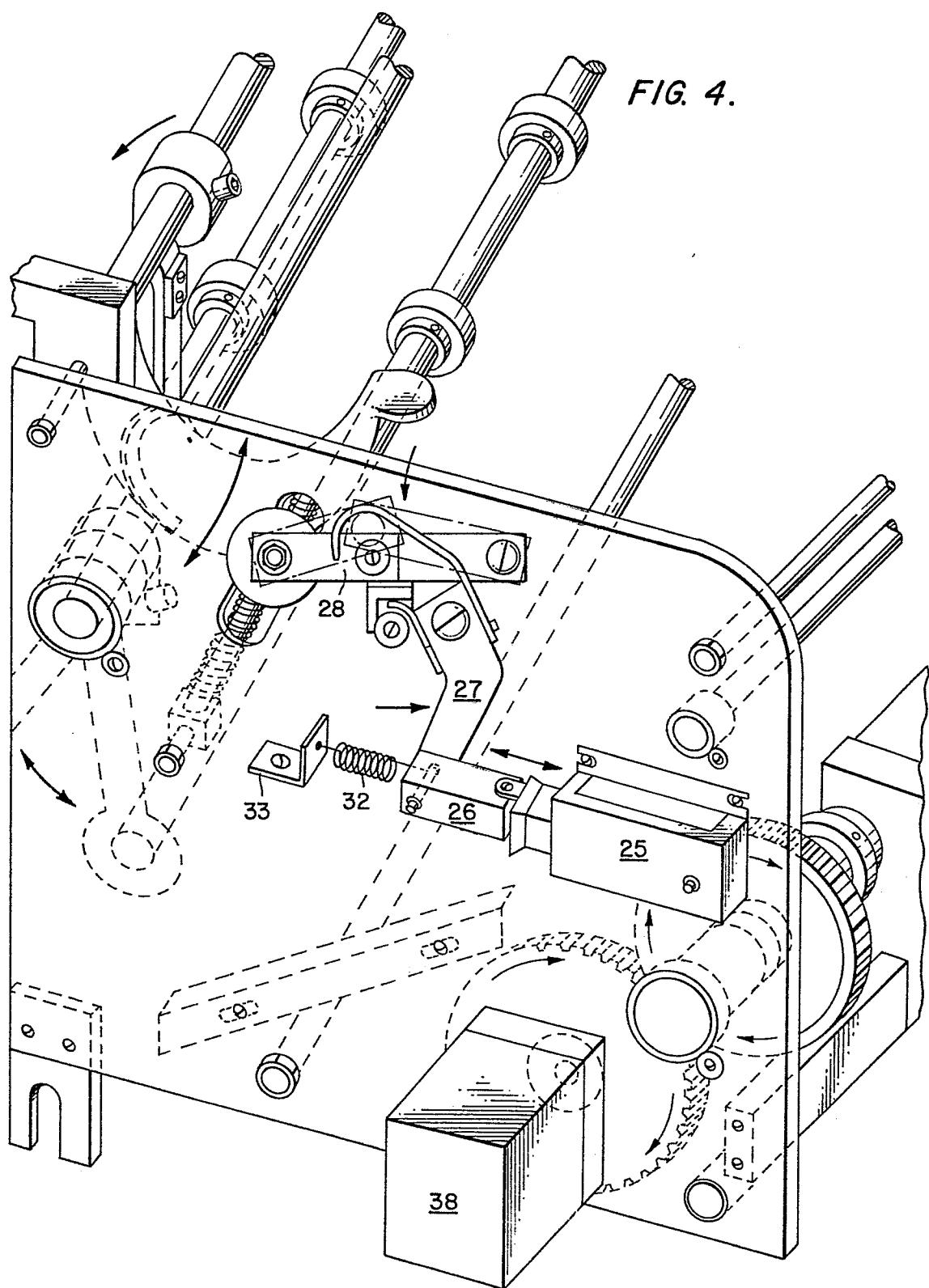


FIG. 5.

