

July 26, 1960

M. J. COLLINGWOOD ET AL
COUNTING AND DISPLACING APPARATUS FOR
PRINTING PRESS DELIVERY MECHANISMS

2,946,266

Filed June 7, 1957

2 Sheets-Sheet 1

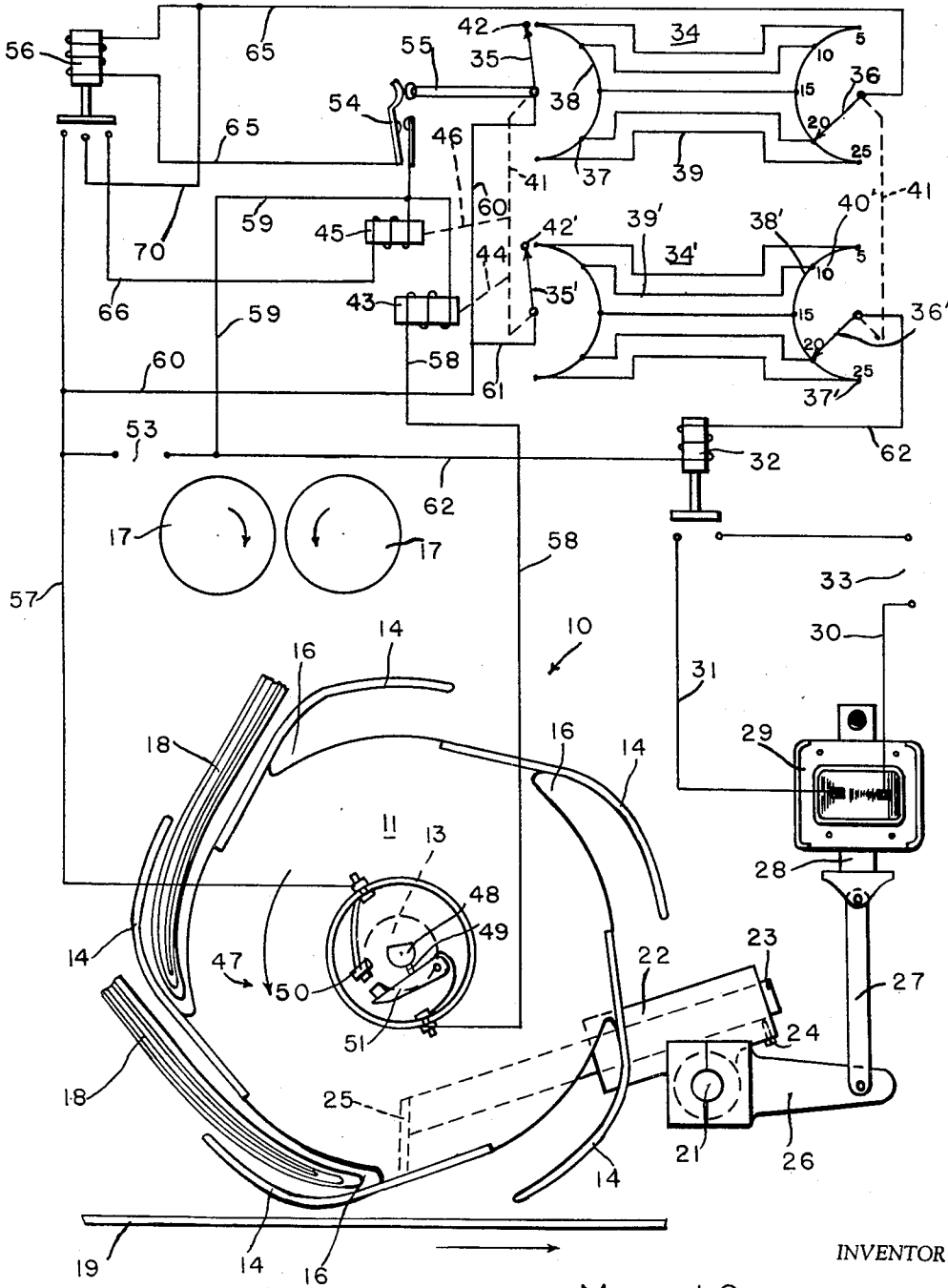


FIG. 1

INVENTOR

MERLE J. COLLINGWOOD

ALBERT C. CHAGNOT

BY

Francis J. Klempf
ATTORNEY

July 26, 1960

M. J. COLLINGWOOD ET AL
COUNTING AND DISPLACING APPARATUS FOR
PRINTING PRESS DELIVERY MECHANISMS

2,946,266

Filed June 7, 1957

2 Sheets-Sheet 2

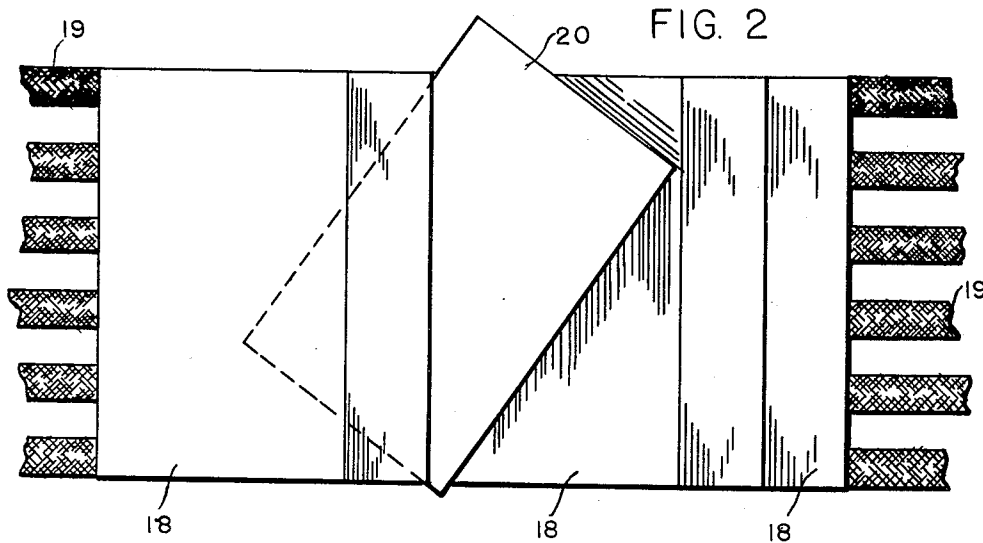
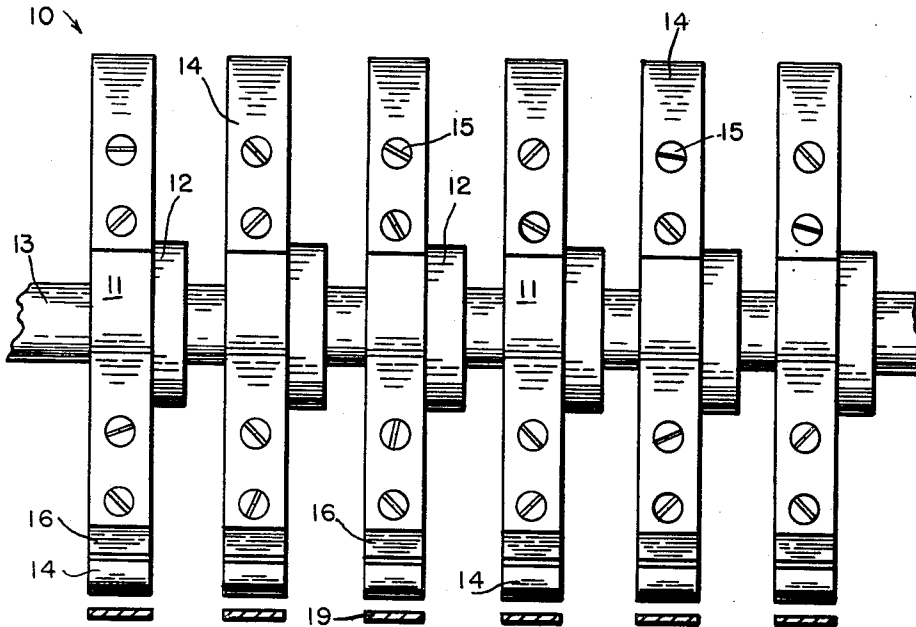


FIG. 3

INVENTOR

MERLE J. COLLINGWOOD
ALBERT C. CHAGNOT

BY

Francis J. Klemm
ATTORNEY

1

2,946,266

COUNTING AND DISPLACING APPARATUS FOR PRINTING PRESS DELIVERY MECHANISMS

Merle J. Collingwood, 338 Afton Ave., Youngstown, Ohio, and Albert C. Chagnot, 905 Mosier Road, Girard, Ohio

Filed June 7, 1957, Ser. No. 664,244

6 Claims. (Cl. 93—93)

This invention relates generally to certain improvements in counting and displacing apparatus for printing press delivery mechanisms, particularly fly or fan deliveries of the type used in newspaper printing plants, for example.

As will be understood by those skilled in the printing art, printed newspapers are delivered to a rotary fly which deposits the same in successive overlapped relation on conveyor means for delivery to other working stations. In order to relieve the operators at the other working stations from having to count the papers it has heretofore been suggested to employ counting and displacing apparatus between the rotary fly and the other working stations for shifting or displacing certain of the newspapers from their normal overlapped position whereby the same are easily identified. Such apparatus includes counting means for actuating the displacing means in a periodic manner after a certain number of overlapped papers have passed a certain point so that the shifted or displaced papers indicate the count of the papers. As an example, if every tenth paper is shifted the displaced sheets will indicate there are ten papers between successive shifted papers while if the apparatus is operative to alter every twenty-fifth paper it will indicate there are twenty-five papers between successive altered sheets.

It is the primary or ultimate object of the present invention to provide improved counting and delivery apparatus for printing press delivery mechanism, especially of the type employed with newspaper printing presses.

A further object of the invention is to provide counting and displacing apparatus embodying improved displacing means. As will be hereinafter more fully explained, the displacing means comprises a solenoid operated kicking foot which is positioned forwardly of the rotary fly, or other similar delivery mechanism, and operative to displace predetermined sheets as the same are delivered by the rotary fly.

Another object of the present invention is to provide counting and displacing apparatus embodying improved counting means for actuating the solenoid of the displacing means in response to the delivery of a predetermined number of papers. The counting means is actuated directly in response to the rotation of the rotary fly whereby an accurate and precise count of the papers is afforded. In connection with this object of the invention it is a further object of the invention to provide counting means which is adjustable so that successive altered or shifted papers indicate a predetermined and preselected number of papers therebetween.

Yet another object of the present invention is to provide counting means for counting and displacing apparatus which includes ganged stepping switches actuated in response to the rotary fly or other delivery mechanism. The invention also provides an improved, simplified but yet extremely rugged electrical circuit for actuating the stepping switches and the displacing means as well as improved means for re-setting the counting means upon

2

actuation of the displacing means. The re-setting apparatus is operative and actuated a predetermined time interval after the displacing means is actuated thereby insuring that a paper is properly displaced before the counting apparatus is returned to its initial position.

These, as well as other objects and advantages of the present invention, will become apparent upon consideration of the following specification and accompanying drawing wherein there is described and shown a preferred embodiment of the invention.

In the drawing:

Figure 1 is a fragmentary side view of printing press delivery mechanism embodying counting and displacing apparatus, including a schematic electrical circuit, constructed in accordance with the teachings of the present invention;

Figure 2 is a front view showing particularly the structure and disposition of the printing press delivery mechanism; and

Figure 3 is a plan view showing an arrangement of newspapers on the conveyor means produced by the counting and displacing apparatus of the present invention.

Referring now to the drawing, wherein like reference numerals indicate like parts, the reference numeral 10 designates generally delivery mechanism of a type commonly employed with a newspaper printing press.

The delivery mechanism 10 comprises a plurality of rotary flies 11 which are mounted in spaced relation by collars 12 on a transversely extending shaft 13 and are adapted to be rotated therewith. Each of the rotary flies 11 is somewhat circular in side elevation and has a plurality of vanes 14, preferably five, attached thereto by any convenient attachment means, such as the screws 15, for example, at equally spaced points about its outer periphery. The vanes 14 associated with each of the rotary flies 11 extend outwardly and circumferentially to define pockets 16 for the reception of newspapers delivered from a printing press, not shown, by suitable apparatus indicated schematically by a pair of opposed delivery rolls 17 in Figure 1 of the drawing.

As is readily apparent in Figure 2 of the drawing, the rotary flies 11 are of relatively thin axial dimension and are transversely spaced on the shaft 13. The shaft 13 is disposed at the output of a newspaper printing press and rotated in synchronism therewith by suitable drive means, not shown, whereby a newspaper 18 coming from delivery rolls 17 is received in the aligned pockets 16 of the plurality of flies 11. Although there are shown six rotary flies 11 mounted on the shaft 13 it will be understood that any number of these members may be employed depending upon the size of the printed product, etc. Upon continued rotation of the shaft 13 the newspaper 18 is deposited on continuously moving tapes 19 forming conveyor means for delivery to other working stations, not shown. It will be noted that as each successive plurality of aligned pockets 16 is rotated into a position under the delivery rolls 17 a newspaper is deposited therein so that upon each complete rotation of the shaft 13 five newspapers, corresponding to the number of pockets 16 associated with each fly, will be deposited on the tapes 19. The tapes 19 are moved at such a speed that the delivered papers are partially overlapped in staggered relation in the manner illustrated by the three papers on the right side of Figure 3.

As hereinbefore indicated, it is desired to shift or alter predetermined ones of the newspapers 18 from their normal or overlapped relation to indicate the count of the newspapers. A newspaper designated by the reference numeral 20 in Figure 3 is skewed with respect to the other of the overlapped papers and is easily recog-

3

nized for indicating the count. Apparatus for shifting or altering the newspaper 20 to the position shown will now be described.

Mounted forwardly of the shaft 13 in parallel relation therewith is a shaft 21 which is journaled by means, not shown, for rotative movement. The shaft 21 is approximately the same length of the shaft 13 and therefore extends across the flies 11 and the tapes 19. Mounted in rigid relation on the shaft 21 intermediate the ends thereof is a tubular fixture 22 which is adapted to receive a rearwardly extending rod 23. The rod 23 is held in the tubular fixture 22 by a clamping screw 24, or other convenient means, and mounts a kicking foot 25 at the rear end thereof. The fixture 22, as recited above, is mounted intermediate the ends of the shaft 21 but to one side of the center line of the newspapers deposited on the tapes 19 in such a manner that the kicking foot extends between adjacent ones of the rotary flies. Thus, when the shaft 21 is rotated, the kicking foot 25 will be forced downwardly to engage the rear end of a newspaper as the same is deposited on the tapes 19 thereby causing the same to be altered into the skewed position shown in Figure 3.

For rotating the shaft 21 at predetermined times we have provided adjacent one end thereof an encircling clamping fixture 26 having an extending arm which is pivotally attached to one end of a link 27. The other end of the link 27 is attached to a movable core 28 of a heavy duty solenoid 29 whereby when the solenoid is properly energized the core 28 will be retracted to cause movement of the fixture 26 and rotative movement of the shaft 21 as is readily apparent. The terminals of the winding of the solenoid 29 are connected by conductors 30 and 31 and the normally open contacts of relay 32 with a source of electrical energy 33. Thus, upon proper actuation of the relay 32 the solenoid will be actuated and as a result the paper being deposited by the rotary flies on the tapes at this time will be altered or shifted to a skewed position. It will be noted that the shifting of the selected paper is completed while the same is the last paper on the tapes—i.e. there are no other papers on top thereof in overlapped relation—so that only the selected paper is shifted and there is no disturbance of preceding or succeeding newspapers. In addition, since only one sheet is altered, only a small force is required and the solenoid 29 is therefore of reasonable size and capacity.

In order to properly actuate the relay 32 to energize the solenoid 29 for shifting a paper there is provided counting means including a pair of ganged stepping switches 34 and 34' which are identical and, to avoid unnecessary repetition in the specification, only one of these switches will be described in detail while identical parts of the other switch are indicated by primed reference numerals. The switch 34 comprises a pair of movable pointers 35 and 36, the pointer 35 being movable in response to the deposit of papers on the tapes 19 in a manner to be later described while the pointer 36 is manually positioned in a preset position. Each of the pointers 35 and 36 is adapted to engage contact portions 37 during their travel over banks of contacts 38 associated therewith. Corresponding contact portions 37 of each of the banks 38 are interconnected by parallel conductors 39. As shown in the drawing, the contact bank 38 associated with the wiper and pointer 36 is provided with reference indicia 40 corresponding to the desired number of papers between successive shifted or altered sheets while the contact bank associated with pointer 35 is provided with a "home" station 42. The arrangement is such that the operator initially sets the pointer or wiper 36 to the contact 37 corresponding to the desired number of papers between altered or shifted papers while the pointer 35 moves around the contact bank 38 associated therewith in response to the number of newspapers deposited on the tapes 19 until it engages contact 37 corresponding to the

4

contact 37 engaged by the pointer 36 to complete a circuit through the conductor 39 connecting these two contacts and the pointers 35 and 36. The pointers 35 and 35', as well as the pointers 36 and 36', of the switches 34 and 34' are mechanically or electrically interconnected as indicated by the broken lines 41 so that movement of one of the pointers of one of the switches causes a like movement of the corresponding pointer associated with the other of the switches. In effect, the ganged switches 34 and 34' provide separate parallel current conductive paths when a predetermined and preselected number of newspapers have been counted for reasons which will be hereinafter more fully explained.

For actuating the pointers 35 and 35' there is provided a stepping relay 43 which operates through suitable means, indicated by the broken line 44, such as a pawl and ratchet mechanism, for example, to move the pointers 35 and 35' from one set of contacts 37 to another set of adjacent contacts 37 each time it is operated. Also associated with the stepping switches 34 and 34' is a return relay 45 which is operative, via interconnecting means 46, to return the pointers or wipers 35 and 35' to their home or start positions after the electrical circuits have been completed through the ganged switches 34 and 34'.

For actuating the stepping relay 43 in response to the number of papers deposited on the tapes 19 there is provided a rotary limit switch 47 mounted on one end of the shaft 13 which comprises a cam 48 rotatable with the shaft 13, a cam follower 49, a stationary contact member 50 and a movable spring loaded contact member 51. The cam follower 49 is mounted on the spring loaded contact member 51 and engages the cam 48, said cam being shaped in such a manner that the contacts carried by the contact members 50 and 51 close once every revolution of the shaft 13. The closure of these last mentioned contacts connected the stepping relay 43 with a source of electrical energy 53 in a manner to be further explained so that the pointers 35 and 35' move from one set of contacts 37 and 37' to another for each revolution of the shaft 13. It will be remembered that each of the rotary flies 11 has five pockets 16 so that five papers are deposited on the tapes 19 for each revolution of the shaft 13. Thus, each step of the pointers 35 and 35' corresponds to five papers being deposited on the tapes 19.

The apparatus of the present invention also includes other control instrumentalities such as a resetting switch 54 operated by a lever 55 attached to and movable with the pointer 35 and a homing relay 56. The utilization of these components, as well as the other apparatus disclosed, will perhaps best be understood in connection with the operation of the apparatus as described below:

In the operation of the counting and displacing apparatus the operator sets the pointers 36 and 36' to the contact portions 37 and 37' corresponding to the desired number of papers between successive altered or shifted papers. In the illustrated embodiment of the invention these pointers are set on the contacts 37 and 37' corresponding to twenty papers between altered or shifted sheets. Initially the pointers 35 and 35' are in their home positions 42 and 42'.

When the delivery mechanism of the printing press is actuated the shaft 13 will begin to rotate and the rotary flies 11 will deposit five papers of the conveyor for each revolution of the shaft 13. For each revolution of the shaft 13 the contacts carried by contact members 50 and 51 closes once and this completes a circuit from one terminal of source 53 through conductor 57, the rotary switch 47, conductor 58, the winding of stepping relay 43 and conductor 59 to the other terminal of the source 53. The completion of this electrical circuit energizes the stepping relay 43 which acts through the mechanical interconnection 44, a pawl and ratchet mechanism, for example, to move the pointers 35 and 35'

from the home stations to the first set of contacts 37 and 37'. It will be noted that the initial movement of the pointer 35 also causes arcuate movement of the lever 55 attached thereto so that the contacts of the resetting switch 54 are allowed to close but it will also be noted that the closure of this switch does not complete any electrical circuit due to the open contacts of homing relay 56.

The operation of the counting and displacing apparatus continues with the pointers 35 and 35' being moved across the contact banks 38 and 38', each moving from one contact to another in response to one revolution of the shaft 13 and five papers being deposited on the tapes 19, until they reach the contacts corresponding to the contacts engaged by the preset pointers 36 and 36'. When this condition is reached it means that the pre-selected number of papers, in this case twenty, have been deposited on the tapes 19 and the next paper should be altered or shifted. When the pointer reaches the contact corresponding to the one engaged by pointer 36' an electrical circuit is completed from one side of source 53 through conductor 57, conductor 60, conductor 61, pointer 35', one of the conductors 39', pointer 36', the winding of relay 32, and conductor 62 to the other terminal of the source 53. This causes the actuation of the relay 32 to close the contacts thereof thereby completing the energizing circuit for the solenoid 29. And, as heretofore explained, energization of the solenoid 29 causes rotation of shaft 21 and movement of kicking foot 25 to shift or alter the sheet being deposited on the tapes.

It is, of course, necessary to provide means for resetting the pointers 35 and 35' of the ganged stepping switches to their home positions 42 and 42' but yet the solenoid must remain energized a sufficient time to insure that the desired paper is shifted or altered. To accomplish these ends a second electrical circuit is completed when the pointers 35 and 35' reach the contacts corresponding to the contacts engaged by the preset pointers 36 and 36' from the source 53. This circuit can be traced from one terminal of source 53 through conductor 57, conductor 60, pointer 35, one of the conductors 39, preset pointer 36, conductor 65, the winding of homing relay 56, resetting switch 54 (whose contacts are closed at this time) and the conductor 59 to the other terminal of source 53.

The completion of this last mentioned circuit energizes the winding of relay 56 to close the three contacts thereof. These contacts close to complete two electrical circuits, the first of which energizes the return relay and can be traced from one terminal of source 53 via conductor 57, the closed contacts of homing relay 56, conductor 66, the winding of return relay 45 and conductor 59 to the other terminal of the source 53. The second electrical circuit completed by the closure of the contacts of the homing relay 56 is a holding circuit therefor which insures continued energization of this relay once the contacts thereof are initially closed. This circuit includes source 53, conductor 57, closed contacts of the homing relay 56, conductor 70, winding of relay 56, conductor 65, resetting switch 54 (which is closed at this time) and the conductor 59. It is thus apparent that the homing relay 56, after once being energized to close its contacts, will remain energized through the above described holding circuit irrespective of the position of the pointer 35 until the resetting switch 54 is opened.

The energization of the winding of return relay 45 when the counting pointers 35 and 35' reach the pre-selected contacts 37 and 37' is operative to condition the ganged switches 34 and 34' so that these pointers 35 and 35' will return to their home stations 42 and 42'. However, even though energized, the return relay 45 and the interconnecting means 46, are not operative until the contact members 50 and 51 are separated since when these contact members are closed the stepping relay 43

is energized and the pawl and ratchet mechanism 44 prevents the return relay 45 from resetting the counting pointers. This arrangement is particularly important since it will be understood that while the contact members 50 and 51 are closed and the circuit is completed through the stepping switch 34' the solenoid 29 will be energized to lower the kicking foot 25. Further, and perhaps the most important aspect of the present invention, it will be noted that the time period for which the solenoid 29 is energized is the same as the time period in which the contact members 50 and 51 are closed. The time period in which the contact members 50 and 51 are closed will depend upon the shape of the cam 48 and the speed at which the shaft 13 is rotated.

It is therefore contemplated that the contact members 50 and 51 will be closed for appreciable portions of each revolution of the shaft 13 and the rotary flies 11 carried thereby so that when the circuit is completed through the stepping switch 34' the solenoid 29 is energized a sufficient time to shift or alter the proper paper irrespective of the speed of the shaft 13 and rotary flies 11. It will be appreciated by those skilled in the art that printing press delivery mechanisms must be capable of variable speed operation and as a consequence so must the kicking and displacing apparatus employed therewith. Thus, when the shaft 13 is rotating at a relatively slow speed the contact members 50 and 51 will be closed during relatively long periods of time and when the solenoid 29 is energized the kicking foot 25 will be held in the lowered position for a sufficient length of time to alter or shift the desired sheet. However, when the speed of rotation of shaft 13 is increased the kicking foot 25 will be lowered for a shorter time interval to properly displace the desired sheet.

When the contact members 50 and 51 do open, however, the circuits through the ganged stepping switches 34 and 34' are immediately opened and the return relay 45 (previously energized as above described) gains control to start the return of counting pointers 35 and 35' to their home positions 42 and 42'. The relay 56 is still energized through its associated holding circuit and remains energized until the pointer 35 reaches its home position when the lever 55 opens the contacts of resetting switch 54 to open the holding circuit for the homing relay and causing all contacts thereof to open.

The apparatus is now ready for further counting and displacing operations, the same cycle as set forth above being repeated so that every twentieth paper is shifted or altered with respect to the other newspapers on the tapes 19. It will be understood that if it is desired to shift every tenth paper, or some other multiple of five, the pointers 36 and 36' would be set to the contacts 37 and 37' corresponding to the desired number of papers and the foot would be actuated to alter or shift every tenth paper. Obviously the contact banks 38 and 38' of the ganged stepping switches can be provided with as many contacts as desired to allow the shifting of the proper papers to indicate the count thereof.

The counting and displacing apparatus of the present invention is especially applicable to newspaper printing plants. The shaft 13 and the rotary flies 11 are usually rotated at appreciable rates of speed and the arrangement of stepping the switches in response to every fifth paper deposited on the tapes (one revolution of the flies 11) allows the switching apparatus to be operated at reasonable speeds. However, the versatility of the counting and displacing apparatus is not adversely affected since it is usually desired to indicate the count of the papers by some multiple of five. The actuation of the switches once for every five papers also provides a sufficient time interval to kick or shift the desired paper and yet return the pointers to their home positions prior to the succeeding actuation of the rotary switch.

Although we have shown and described an illustrated embodiment of the invention, it should be apparent that

many changes may be made therein. As an example, the ganged stepping switches may be combined in a single switch mechanism providing two parallel electrical paths between the counting pointer and the preset pointer if desired. Thus, reference should be had to the following appended claims in determining the true scope of the invention.

We claim:

1. In a printing press installation the combination of sheet delivery means, conveyor means, said sheet delivering means depositing sheets on said conveyor means in overlapped relation, means for acting on certain of said sheets as the same are deposited on said conveyor means to indicate a count of said sheets, means for controlling said means for acting, said means for controlling being operated in response to said sheet delivering means, said means for controlling comprising at least one stepping switch having a presettable pointer and a counting pointer, banks of contacts associated with each of said pointers, conductor means connecting corresponding contacts of said banks of contacts, rotary switch means connected with said sheet delivering means, said rotary switch means being actuated upon predetermined movement of said sheet delivery means for a predetermined time that is less than the time interval required to complete said predetermined movement, means interconnecting said rotary switch means with said counting pointer whereby said counting pointer is moved from one contact to another contact of said bank of contacts associated therewith in response to each actuation of said rotary switch means, said means for acting comprising a kicking foot, a solenoid for actuating said kicking foot, said stepping switch completing an electrical circuit for energizing said solenoid when said presettable pointer and said counting pointer engage corresponding contacts of said banks of contacts associated therewith, said means for controlling further comprising means for returning said counting pointer to its initial position, said last mentioned means including the normally open contacts of a homing relay, means for energizing the winding of said homing relay when said solenoid is energized to close said contacts, a holding circuit for said winding of said homing relay, said holding circuit including normally open contacts of said homing relay and being operative to maintain said winding of said homing relay energized after said means for energizing has been rendered inoperative, a resetting switch in said holding circuit, and said resetting switch being opened when said counting pointer is returned to its initial position.

2. Counting and displacing apparatus for printing press delivery mechanism comprising stepping switch means having a plurality of individual contact portions, presettable contact means connecting with a predetermined one of said contact portions, current conductive means adapted to have electrical communication with said contact portions in successive one-at-a-time relation, means for completing said electrical communication in successive one-at-a-time relation in response to a plurality of equal predetermined movements of said delivery mechanism, means for acting on certain of the articles delivered by said delivery mechanism to indicate a count of said articles, said means for acting being actuated when said current conductive means is in electrical communication with the contact portion engaged by said presettable contact means, means to return said current

conductive means to communication with its initial contact portion, said last mentioned means being operated a predetermined time following the actuation of said means for acting, and said predetermined time being of shorter duration than the time involved for said delivery mechanism to complete one of said predetermined movements.

3. Counting and displacing apparatus for printing press delivery mechanism comprising a stepping switch having a presettable pointer and a counting pointer, a bank of contacts associated with each of said pointers, conductor means interconnecting corresponding contacts of said banks of contacts, means to move said counting pointer from one contact to another contact of said bank of contacts associated therewith in response to a predetermined movement of said delivery mechanism in a continuous step-by-step manner, means for acting on certain of the articles delivered by said delivery mechanism to indicate a count of said articles, means for actuating said means for acting when said counting pointer and said presettable pointer engage corresponding contacts of said banks of contacts associated therewith, means to return said counting pointer to its original position after actuation of said means for acting, and said means to return being actuated a predetermined time after said means for acting, and said predetermined time being of shorter duration than the time involved for said delivery mechanism to complete said predetermined movement.

4. Apparatus according to claim 3 further characterized in that said means to return comprises the normally open contacts of a homing relay, means to energize the winding of said homing relay when said means for acting is actuated, and said means to return being operative to return said counting pointer to its initial position a predetermined time after said winding of said homing relay is energized.

5. Apparatus according to claim 4 further characterized in that said means to energize said winding of said homing relay comprises a second stepping switch, said second stepping switch having its pointers interconnected with and movable with said pointer of said first mentioned stepping switch, and said second stepping switch providing an electrical circuit for energizing the winding of said homing relay.

6. Apparatus according to claim 5 further characterized in that said means for acting comprises a solenoid, an energizing circuit for said solenoid including the normally open contacts of a relay, and the winding of said relay being in a circuit including said first mentioned stepping switch whereby said relay is energized when said pointers of said first stepping switch engage corresponding contacts of said banks of contacts.

References Cited in the file of this patent

UNITED STATES PATENTS

2,048,765	Wood	July 28, 1936
2,143,779	Kaufman	Jan. 10, 1939
2,161,033	Foster	June 6, 1939
2,277,579	Burger	Mar. 24, 1942
2,403,062	Edwards	July 2, 1946
2,570,306	Battersby	Oct. 9, 1951
2,576,220	Griffins	Nov. 27, 1951
2,629,300	Smith	Feb. 24, 1953
2,707,275	Loft	Apr. 26, 1955