United States Patent [19]

Miyasaka et al.

[11] **3,883,245**

[45] **May 13, 1975**

[54] **MECHANISM FOR STOPPING A CONTACT SCREEN AT A PREDETERMINED POSITION IN A PROCESS CAMERA**

[76] Inventors: **Eiji Miyasaka**, 489-1, Takamiya-cho; **Kenichi Yonemaru**, 480-1, Takamiya-cho; **Kojiro Henmi**, 148-2, Hirata-cho, all of Hikone, Japan

[22] Filed: **Oct. 1, 1973**

[21] Appl. No.: **402,209**

[30] **Foreign Application Priority Data**

Oct. 6, 1972 Japan 47-99793

[52] **U.S. Cl.** **355/71**; 355/73

[51] **Int. Cl.** **G03b 27/66**

[58] **Field of Search** 355/53, 71, 73, 76; 96/38, 96/44

[56] **References Cited**

UNITED STATES PATENTS

2,376,416	5/1945	Campbell	355/73 X
2,939,371	6/1960	Schutt et al.	355/73 X
3,068,748	12/1962	Schutt et al.	355/73
3,433,567	3/1969	MacPhee et al.	355/76
3,506,350	4/1970	Denner	355/71 X
3,593,228	7/1971	Miyauchi	355/73 X
3,758,206	9/1973	Inoue	355/71 X

Primary Examiner—Richard A. Wintercorn

Attorney, Agent, or Firm—Spensley, Horn and Lubitz

[57] **ABSTRACT**

The driving means of the sliders adapted to carry thereon and vertically move the contact screen retainer bar has play, and the driving of said sliders is suspended at the moment when said sliders reach a location slightly lower than the normal stoppage position, and then said sliders are raised up to said normal stoppage position by a rocker member, thereby to prevent impact on said contact screen retainer bar and driving means of said sliders.

5 Claims, 4 Drawing Figures

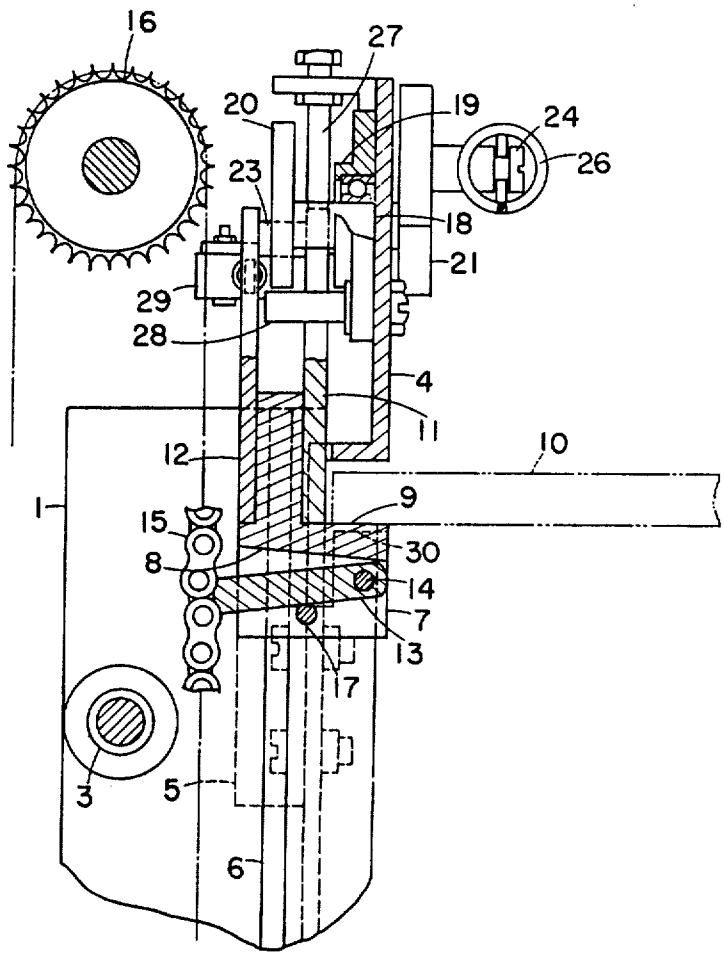


FIG. 1

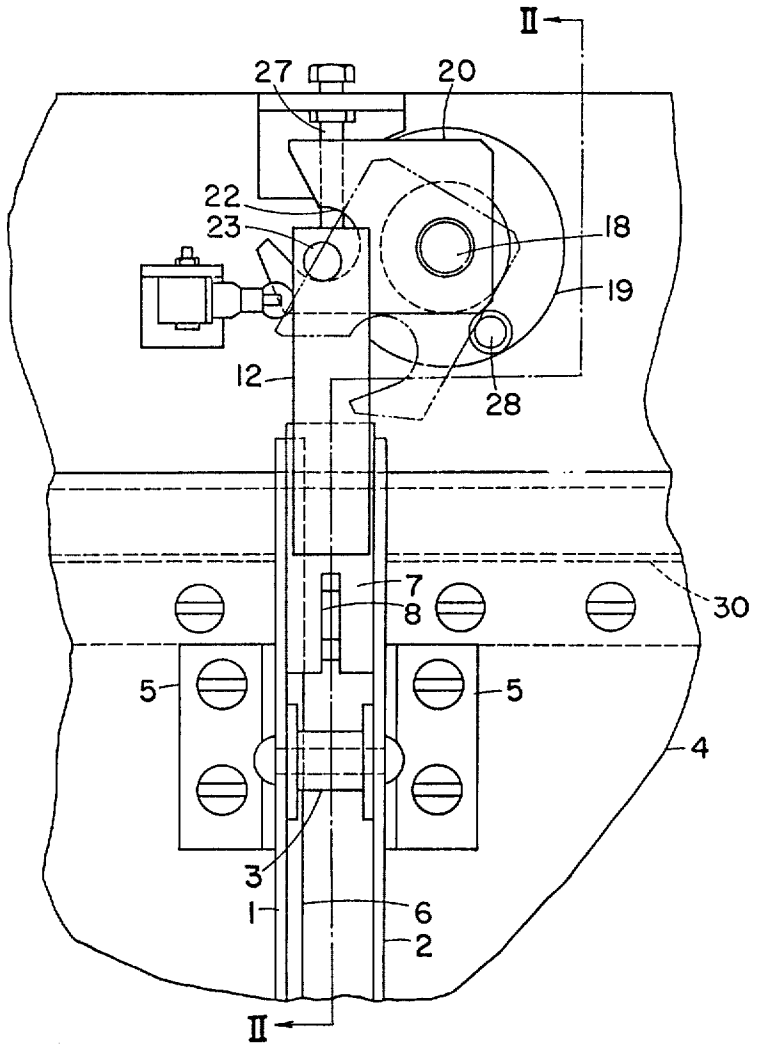


FIG.2

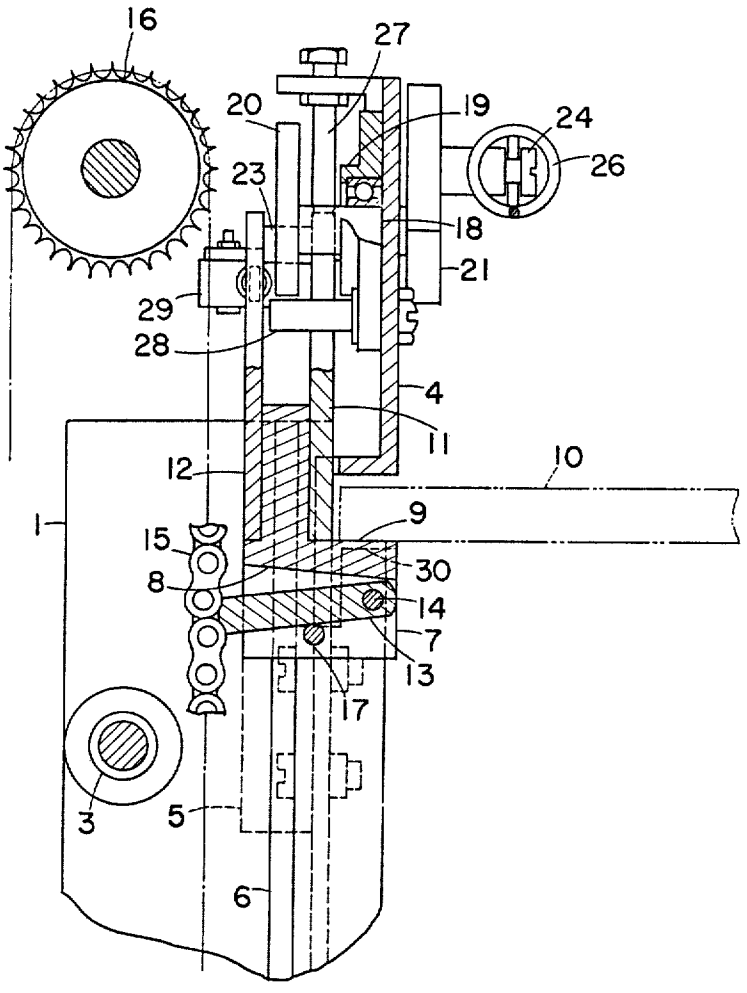


FIG. 3

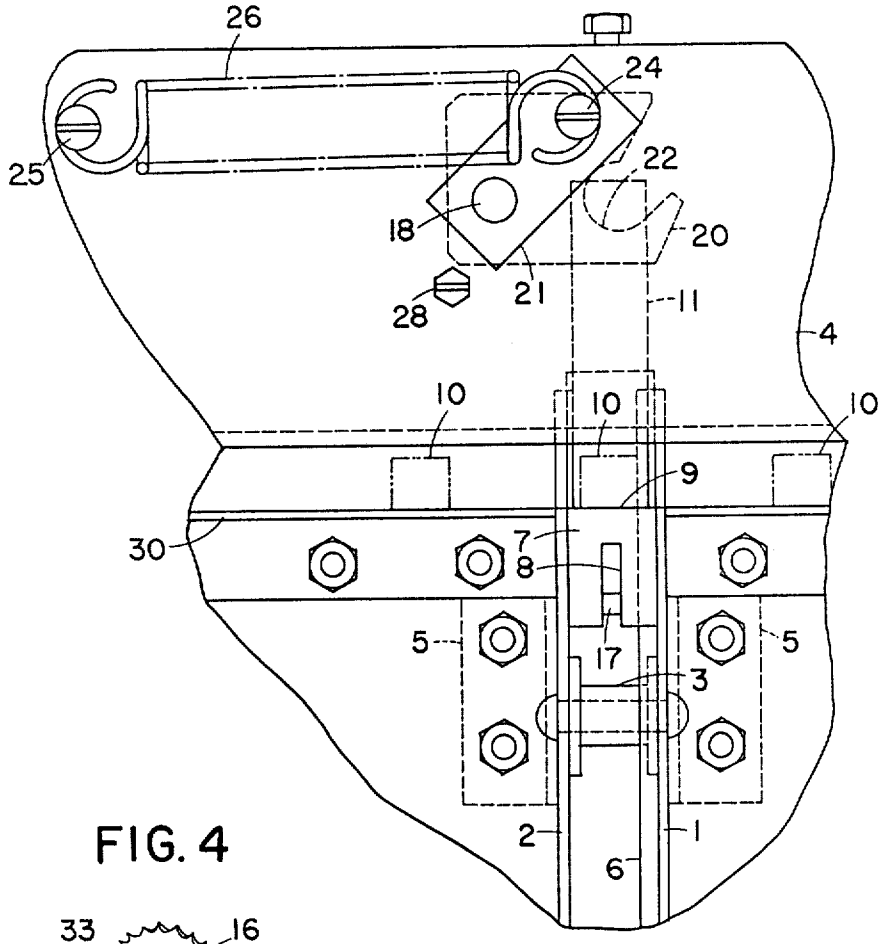
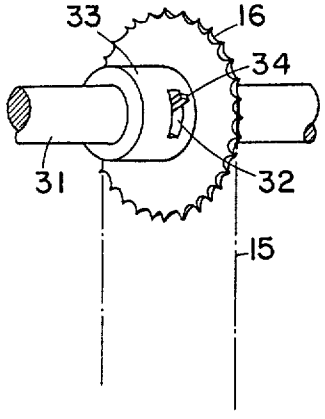

26
24
25
22
18
20
21
28
11
4
10
10
10
9
30
7
8
5
5
17
3
2
1
6

FIG. 4


33
16
34
31
32
15

MECHANISM FOR STOPPING A CONTACT SCREEN AT A PREDETERMINED POSITION IN A PROCESS CAMERA

The contact screens used for halftone photography in photomechanical process vary widely in type according to the difference in the screen ruling, screen angle, etc., and a suitable contact screen must be selected for each process work.

In an automated process camera, a contact screen storage section is provided above the photographing section and a suitable screen is selected from said storage section and lowered to the photographing position. This screen is then closely attached to the film and the original image is projected to thereby perform the halftone photography.

For returning the contact screen to the storage position after completion of exposure, it has been generally practiced to drive a contact screen retaining section upwardly and then, after ceasing its drive by a switch disposed at a fixed position in front of a return position, attract said retaining section by a magnet provided at the return position.

This conventional method, however, has involved difficulties in positional adjustment of the switch to stop the drive. If the switch position is deviated slightly upwardly, said contact screen retaining section would hit against and rebound from the magnet, while if the switch position is slightly off downwardly, said retaining section would stop before reaching the magnet. Thus, even a slight aberration of the switch position would result in the contact screen retaining section not stopping at the designated position where it should be stopped, inviting troubles in selection of the contact screen for the next photographing.

Also, the impact developed by hitting of said retaining section against the magnet would be propagated to the driving source, and hence, in the case of a chain driving system, the chains would be elongated in short-time use.

The present invention is aimed at providing an improved contact screen stopping mechanism which is free of the above-said defects and which is capable of stopping the contact screen retainer correctly and surely at a predetermined position and whereby any impact is prevented from being propagated to the driving source and other parts.

Now, the invention is described in detail by way of an embodiment thereof with reference to the accompanying drawings, in which:

FIG. 1 is an external side view showing an embodiment of the present invention, with chains omitted from the drawing;

FIG. 2 is a vertical sectional front view taken along the line II—II of FIG. 1;

FIG. 3 is a side view of the section of FIG. 1 as viewed from the inside; and

FIG. 4 is a perspective view of another embodiment of the invention for providing a play in the driving mechanism.

A pair of vertical guide plates 1 and 2 are retained parallel to each other longitudinally by a suitable number of spacers 3 and secured to a side plate 4 by fixturing means 5, and a vertical streak-like protuberance 6 is formed integrally on the inner one 1 of said guide plates.

Between said guide plates 1 and 2 is provided a pair of sliders 7 each of which is vertically slidable with a part thereof being engaged with said protuberance 6. In the underside of each said slider 7 is formed an up-faced recess 8, and a horizontal step 9 for sustaining a side of a contact screen retainer bar 10 is formed in the inside middle portion of said slider 7. Also, at the top of each said slider 7 are provided the up-faced inner and outer supporting pieces 11 and 12 arranged parallel to each other.

At an inner end portion of said recess 8 is pivotally secured the inner end of an operating member 13 by a horizontal shaft 14 extending in the longitudinal direction. The outer end of said operating member 13 is secured to a chain 15 which is passed round the sprocket wheels 16 disposed in opposition at the upper and lower positions respectively.

At a pertinent part of the recess 8 is provided a stopper 17 adapted to regulate downward movement of the outer end of said operating member 13.

A transversely extending shaft 18 is pivotally secured to a bearing 19 provided fixedly in a pertinent upper part of the side plate 4 in front of the chain 15, and a rocking member 20 and an arm 21 are secured to said shaft 18 on the outer and inner sides of the side plate 4, respectively. In the rear part of said rocking member 20 is formed a recess 22 into which a pin 23 is provided between said up-faced supporting pieces 11 and 12 is received when the sliders 7 rise up to a certain predetermined level.

Between a pin 24 secured to the top end of the arm 21 and a pin 25 secured to a pertinent part of the side plate 4 is stretched a tension spring 26 which gives a rotational force to the rocker member 20 such that its recessed portion 22 will be raised up. However, a stopper 27 is provided at a pertinent upper end part of the side plate 4 so that said rocker member 20 will be stopped with its recessed portion 22 staying substantially horizontally. Also, when said rocker member 20 turns through a certain angle in the direction of lowering the recessed portion 22, the axial line of the tension spring 26 passes the center of the shaft 18 to impart a downward rotational force to the rocker member 20.

The downward turn of the rocker member 20 is regulated by a stopper 28.

At a pertinent upper part of the side plate 4 is provided a limit switch 29 arranged such that when the rocker member 20 turns upwardly, said limit switch is operated to stop movement of the chain 15.

Numeral 30 designates a guide for the contact screen retainer bar 10 secured to a pertinent part on the inner face of the side plate 4, said guide 30 being arranged such that its upper surface will be flush with said horizontal step 9 when the sliders 7 stay at their lower position shown in the drawings. Said contact screen retainer bar 10 is arranged movable sidewise on said guide 30 by suitable selection mechanism, not shown, to allow selection of a desired contact screen. Also, although not shown, the contact screen retainer bar moving mechanism are provided in pair on both right and left sides of said retainer bar 10 and arranged movable up and down while carrying both right and left ends of said retainer bar 10 on a pair of sliders 7.

Now, the operation of the above-described mechanism of the present invention is discussed.

When the photographing is completed at the photographing position, the sprocket wheels 16 are rotated

to raise up the sliders 7 through the chain 15 and operating member 13 to move the contact screen retainer bar 10 upwardly. During this operation, the operating member 13 remains contacted with the upper face of said recess 8.

As the sliders 7 are raised up and the rocker member 20 is pushed up by the pin 23 to a position beyond the dead center, the chain 15 is deactuated by the limit switch 29 and is stopped. Consequently, the rocker member 20 is pulled and rotated by the tension spring 26 to hitch the pin 23 and let the slider 7 turn upwardly until they hit against the stopper 27 and are stopped thereat.

The operating member 13 is rotatable about the horizontal shaft 14 and has play within the range of its rotation, so that the sliders 7 alone are raised up by the rocker member 20.

For changing the contact screen to perform the next photographing, the desired retainer bar 10 on the guide member 30 is selected and placed on the horizontal steps 9 of the sliders 7, and then the chain 15 is driven downwardly to lower the sliders 7 to the photographing position.

Thus, according to the present invention, the contact screen retainer bar 10 need not be adjusted so strictly as required in the conventional devices. Also, there is no possibility that the driving members such as chain and belt be elongated by the impact produced by impingement against the stopper.

Further, in the conventional mechanisms, one of the sliders could fail to return perfectly to the original position due to elongation of the driving means such as chains or aberration between the right and left pitches, but according to the present invention, if the right and left devergence of the driving members is within the scope of the play of said operating member 13, both sliders 7 can be returned perfectly by adjusting the position of the limit switch 29.

In the embodiment shown and described above, the operating member 13 with play allows the sliders 7 to rise up free of influence by the driving source such as motor after the chain has been stopped, but it is possible to provide such play in other driving means or other parts of the driving means.

FIG. 4 shows an example where a play is provided between each sprocket wheel 16 and its rotating shaft 31. An arcuate opening 32 is provided in the boss 33 of the sprocket wheel 16 and a pin 34 is secured to the shaft 31 through said opening 32 to thereby rotate the sprocket wheel 16.

Even if the sliders 7 are raised up by chain driving and the driving source is stopped by the limit switch 29, the sprocket wheel 16 can still turn freely within the scope defined by the arcuate opening 32, allowing the chain 15 to move with the sliders 7.

While the present invention has been described by way of an embodiment thereof, it will be apparent that the present invention is not limited to such particular embodiment. For instance, above-said operating member may have play by using a spring at a part of the chain.

We claim:

1. A mechanismm for stopping a contact screen in a process camera correctly at a predetermined position, comprising sliders arranged movable up and down while carrying a contact screen retainer bar thereon, driving means with play for driving said sliders, a switch to deactuate said driving means and a rocker member and further characterized in that when said sliders are raised up and said rocker member is accordingly pushed up by a part thereof to a point beyond the dead center, said rocker member is turned additionally by a spring, and during this additional turn said rocker member engages a part of said sliders with parts of said sliders to move the latter to their stoppage position.

2. The mechanism according to claim 1, wherein said driving means is a chain passed round a pair of upper and lower sprocket wheels.

3. The mechanism according to claim 2, wherein when a driving member provided at a part of the chain is tilted through a certain angle with movement of said chain, said driving member is engaged with the sliders to move the latter, whereby to provide play in said driving means.

4. The mechanism according to claim 2, wherein a spring is a part of the sprocket wheel construction to thereby provide play in said driving means.

5. The mechanism according to claim 2, wherein play is provided between each sprocket wheel and its rotating shaft to thereby afford play to said driving means.

* * * * *