

April 10, 1934.

R. S. HOPKINS

1,954,318

DOCUMENT CONVEYING AND PHOTOGRAPHING MACHINE

Filed Dec. 29, 1928

3 Sheets-Sheet 1

FIG. 1.

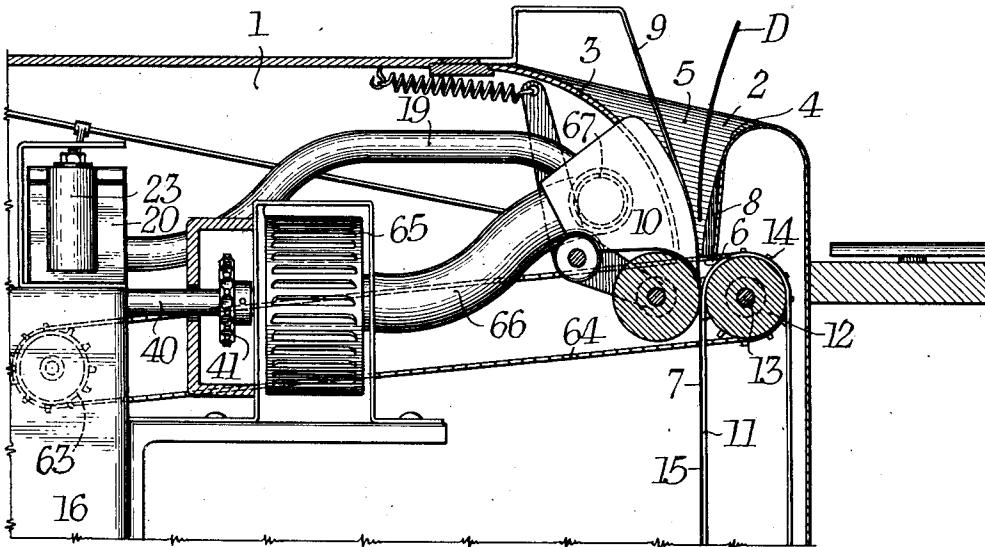


FIG. 2.

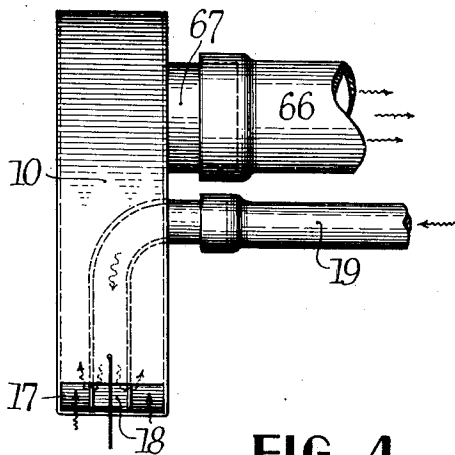


FIG. 3.

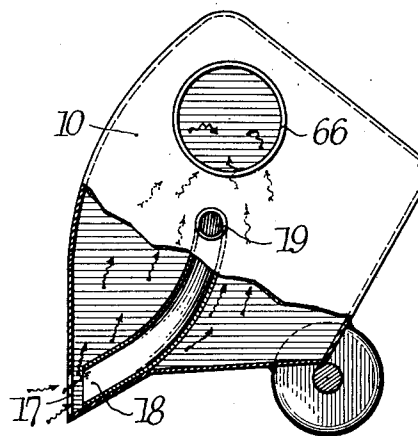
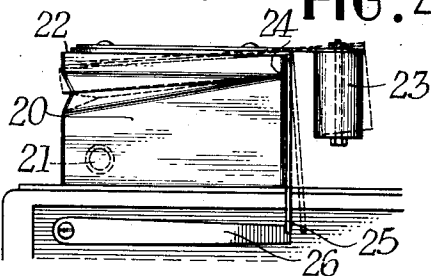


FIG. 4.



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FIG. 5.

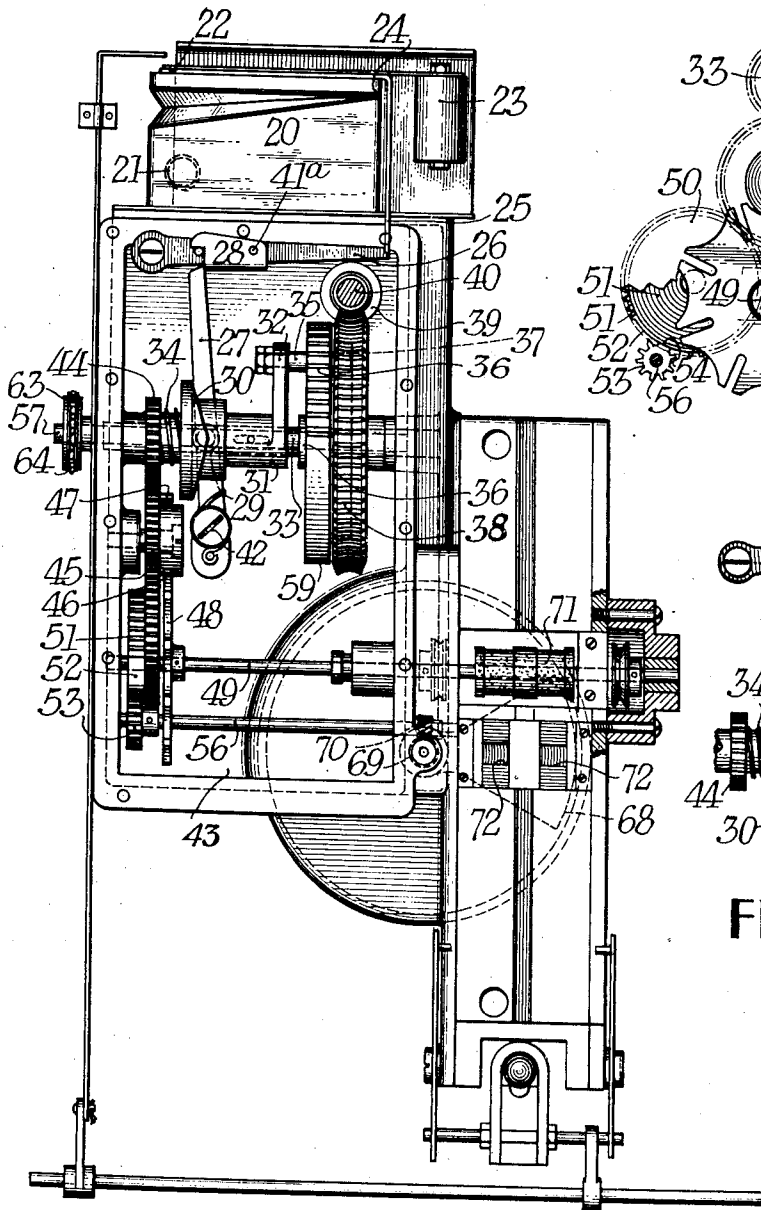


FIG. 6.

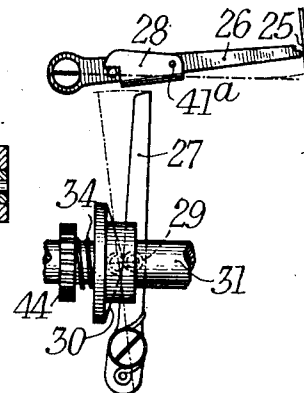
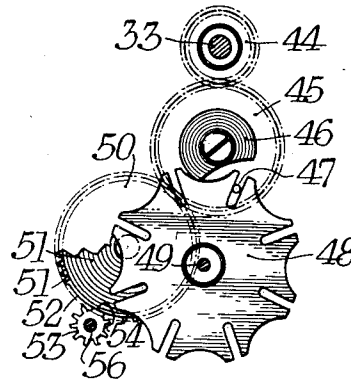


FIG. 7.

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3 Sheets-Sheet 3

FIG. 8.

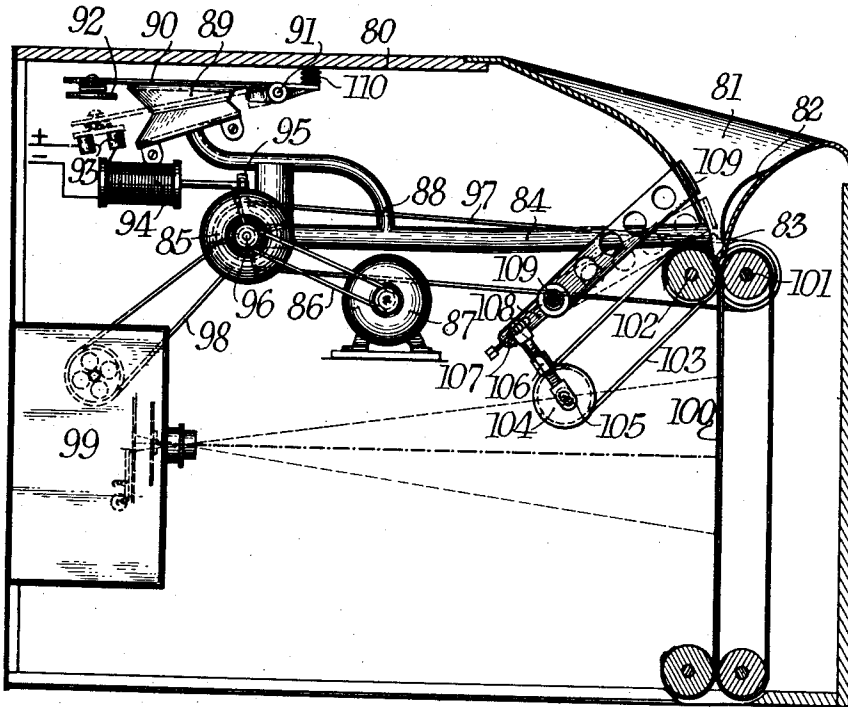
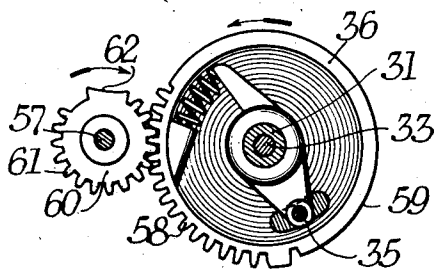


FIG. 9.



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UNITED STATES PATENT OFFICE

1,954,318

DOCUMENT CONVEYING AND PHOTOGRAPHING MACHINE

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Application December 29, 1928, Serial No. 329,143

5 Claims. (Cl. 88—24)

This invention relates to document-recording machines and particularly to machines for making a photographic record of a series of individual documents or sheets which vary considerably in size. In machines of this type, it has heretofore been necessary for the operator to perform a conscious and intended manipulation of one of the parts of the mechanism, in addition to inserting the check in order for the camera to function and for the conveyer to carry a check to be photographed into the field of view of the camera. The object of the present invention is to control the operation of the camera and of the conveyer in timed relation through the instrumentality of the check which is to be photographed. This is accomplished by including in the chute through which the check passes to the conveyer an instrumentality operated by the check and in turn controlling the camera and conveyer. This combination as a whole is novel and exceedingly useful.

Coming now to the drawings wherein like reference characters denote like parts throughout,—

Fig. 1 is a fragmentary side elevation, partly in section, of a document-recording machine constructed in accordance with and embodying a preferred form of my invention;

Fig. 2 is a front elevation of a portion of the pneumatic clutch trip removed from the machine;

Fig. 3 is a side elevation, partly in section, of the device shown in Fig. 2;

Fig. 4 is a fragmentary side elevation of the bellows which forms a part of the clutch-tripping mechanism;

Fig. 5 is an end elevation, partially in section, showing the document-recording photographing apparatus operating mechanism;

Fig. 6 is a side elevation showing a portion of the gearing used in the mechanism housing of Fig. 5;

Fig. 7 is a fragmentary showing of the clutch-operating mechanism also used in the housing included in Fig. 5;

Fig. 8 is a part section, part side elevation of still another embodiment of my invention; and

Fig. 9 is a side elevation of the conveyer-operating mechanism used in the embodiment of my invention shown in the first seven figures.

Broadly speaking, the function of the document-recording machine is as follows: Separate documents, such as checks, letters, deeds, or other papers, may be photographically recorded by merely dropping the document into a document-

directing device. This automatically actuates a conveyer which moves the document into the field of a photographing apparatus, holds the document still momentarily, actuates the camera to make a picture of the document while so held, moves down a fresh area of film in the camera into position for exposure and moves the document from the recording position. If the document is of greater length than can be made by a single exposure, the machine functions one or more times, as may be necessary, the conveyer being automatically actuated through a series of steps.

In the preferred form of my invention shown in Figs. 1 to 7 inclusive, the recording machine may consist of a housing 1 of any suitable type, in which there is mounted a document-directing device 2, which preferably consists of a chute having a tapering rear wall 3, a tapering front wall 4 and side walls 5 which direct a document D toward the narrow opening 6 through which the documents may pass to a conveyer designated broadly as 7.

In order to confine a central portion of the document to a narrow path, a web or fin 8 is placed on the wall 4 and a guiding strip 9 lies over the central portion of the rear wall 3. Thus, any document dropped into the chute will have the central portion of the document brought close to the control box 10.

Since the conveyer is similar to the conveyer shown in my copending application, Serial No. 237,467, filed December 3, 1927 for Document photographing apparatus, it need not be here fully described except to say that it may consist of a belt 11 passing over a roller 12 which is power driven through shaft 13 by a sprocket 14 and which is provided with wires 15 for holding the documents against the conveyer.

The structure of the conveyer is immaterial, as the present invention relates to a means for automatically actuating the conveyer, as will be hereinafter more fully described.

The conveyer 7 moves the documents step by step into the field of view of a photographing apparatus, which is broadly designated at 16 and which may be a camera similar to that shown in my above mentioned application. The method of operating the camera and the mechanism for accomplishing the desired result is different from my above mentioned application and forms a part of the subject matter of this invention.

The means for moving the conveyer 7 will be first described. The control box 10, as best shown in Figs. 2 and 3, may consist of a hollow chamber having an air opening 17 of elongated

shape behind which the end 18 of an air pipe 19 is placed. This pipe leads to a bellows 20, being attached thereto at 21.

The bellows, as indicated in Fig. 4, has a movable top plate 22 and a balance weight 23 normally turns this top plate about a hinge 24 so that the parts lie in the full-line position in Fig. 4. When, however, air is drawn through pipe 19, this moves from the full to the broken-lined position, thus causing an arm 25 to slip away from arm 26 which, as best shown in Fig. 7, permits the clutch-tripping member 27 to move past a latch 28 and to permit a clutch to function in the following manner.

Arm 27 carries a roller 29 riding on the cam 30. This cam, together with the sleeve 31 and arm 32, may slide along a shaft 33 and these parts are normally impelled by a spring 34 to the right of this figure.

When the arm 27 is released, the spring thrusts arm 32 to the right and causes pin 35, which passes through an aperture in gear 36 and thence to enter into a tooth of a clutch face 37 on the inside of gear 38, this gear being continuously driven by power through the worm 39, shaft 40 and sprocket 41, which is attached by a chain to a suitable source of power, such as an electric motor.

So long as the arm 26 does not catch behind arm 25, it is free to move up and down, and during this period of time, arm 27 will move back and forth between the two positions indicated in Fig. 7, this back and forth movement being caused by the roller 29 following the curved face 30 of the cam. When, however, the arm 26 is held in its lowermost position, arm 27 will slide behind the end of latch 28, which is pivoted at 41a to arm 26 and will thus be held in the position shown in Fig. 5. When in this position, as the high part of the cam 30 reaches the roller 29, the clutch arm 35 will be withdrawn from the gear 38 and the mechanism carried by shaft 33, as will be hereinafter more fully described, will cease to move. Arm 27 is pivoted at 42 to the gear box 43.

As above explained, gear 38 rides idly on shaft 33, this shaft being turned by the sleeve 31 which is mounted to slide on this shaft, but to turn with it. Shaft 33 also carries a gear 44. Referring to Fig. 6, gear 44 meshes with a gear 45 which carries a slide 46 and a pin 47 which, with the star wheel 48, forms a Geneva gear. The Geneva 48 may drive a shaft 49. Gear 45 meshes with a similar gear 50 to one side of which there is mounted a second gear 51 having teeth and having a smooth periphery 52 between the teeth for intermittently driving a small gear 53, which is provided with a slide 54 and which is mounted on a shaft 56.

As shown in Fig. 9, shaft 33 lies in front of a second shaft 57. Gear 36 is provided with teeth 58 and a slide 59 for intermittently operating a gear 60 which is provided with teeth at 61 and a slideway at 62. Thus, one operation of shaft 57 is obtained to each operation of gear 36, although the first-mentioned shaft moves during half the time required for the movement of gear 36.

As shown in Fig. 5, shaft 57 projects out to one side of the gear box 43 and carries a sprocket wheel 63, which is connected by a chain 64 to a sprocket 14 carried by a shaft 13, which actuates the conveyer.

The conveyer is, with the mechanism above described, moved one step at each actuation of gear 36. The movement occurs during approximately a half of a revolution of the gear 36, so that the

conveyer moves and stands still through a single actuation of this gear.

Documents automatically actuate the mechanism above described in the following manner: A document D, as in Fig. 1, is dropped into the document-directing device and because of the fin 8, has a portion thereof brought close to the opening 17 in box 10. This interrupts the passage of air into this box, since there is a suction in box 10 created by a blower 65 which sucks air through pipe 66 attached at 67 to box 10. As soon as the opening 17 is closed by a document, air is drawn through a pipe 19, causing bellows 20 to function and causing arm 25 to release arm 26, which permits the clutch arm 35 to enter the gear 37. The bottom of the document is caught by the conveyer and is moved downwardly and as long as a portion of the document covers up the opening 17, the arm 25 will be held in the broken-lined positions, Fig. 4. When, however, the document passes the opening 17, the weight 23 will draw arm 25 back to its original position, so that arm 27 will be held in its position in Fig. 5. The mechanism will then continue to function until the cam 30 is drawn to the left by means of wheel 29.

In other words, this clutch can be operated at each revolution of gear 36 or any multiple of a revolution of gear 36, and for each revolution of gear 36 the conveyer will move down a predetermined distance and stop for a predetermined time. For this reason a series of single narrow documents, such as checks, may be successively photographed one after another, one at a time, or longer documents, such as letters, deeds, and the like, may be photographed in a number of sections equivalent to the amount that the conveyer moves at each actuation. It is, of course, possible to photograph a long endless band, in which case the clutch would remain in during the entire operation and would be released only when the end of the document had passed the control box 10.

During the pause of the conveyer 7, the documents held against the conveyer by the wires 15 may be photographed with any suitable camera which is operated in the proper time relation to the conveyer. Referring to Fig. 5, such a camera may include a shutter having a blade 68 operated by the worm and gear 69 and 70, the latter being affixed to shaft 56 which, as above described, is intermittently rotated by the mutilated gears 51 and 53. This shutter is so timed that it will open and make an exposure only while a document remains stationary in the field of exposure.

Film may be moved by means of a rubber roller 71 which is mounted on shaft 49, this shaft being driven by the Geneva 47-48, as above described. This action, of course, is timed so that the film will be moved only when the exposure apertures 72 are covered by means of the shutter 68. The camera and a magazine for holding film are described in an application filed herewith, Serial No. 329,144, for Photographic camera magazine construction, filed December 29, 1928.

With the document-recording apparatus, as above described, it is only necessary to drop the separate documents into the document-directing device in order to move them down into the field of the camera, photograph them and wind up a fresh area of film into place. The document conveyer as well as the camera are entirely automatic in their operation and except for loading the camera, no attention is required from an operator.

While I have described a preferred embodiment

of my invention, obviously many changes can be made which will come within the scope of my invention, one of such embodiments being shown in Fig. 8.

5 In this figure the document recorder may comprise a housing 80 having a document conveyer or chute 81 into which documents may be fed. This chute may be similar to that shown in Figs. 1 and 2, except that I have shown here a wire
10 guide 82 for directing a part of the document against an opening orifice 83.

83 constitutes the end of a tubular member 84 leading to a blower 85; this blower can be operated through a belt 86 from a motor 87.

15 Tube 84 is provided with a branch 88 leading to a bellows 89 attached to an arm 90 hinged at 91 and carrying a switch member 92 adapted to make a contact with the posts 93, so as to actuate a solenoid 94.

20 This solenoid may operate a clutch arm 95 so that a shaft parallel to shaft 96 may be power driven by means of the motor 87. This clutch, therefore, permits the belts 97 and 98 to be driven to actuate the camera mechanism 99 and the
25 conveyer mechanism 100. So far as these two mechanisms go, reference may be had to my co-pending application, Serial No. 237,467, above identified for the details of this construction.

In order to actuate the solenoid control clutch
30 95, a document may be dropped into a chute so that the guide 82 will thrust a portion of the document over the orifice 83, causing the suction through pipe 84 and pipe 88 to move down the bellows 89 and operate the switch 92—93. In
35 order to be sure that the clutch is released, the following mechanical device is provided: Shaft 101 is power driven through the chain 97 and is geared to shaft 102 so that the latter shaft is likewise moved. A chain 103 connects shaft 102
40 with a wheel 104 carrying an eccentric stud 105. This stud by means of a crank 106 is adjustably connected at 107 to a rocker arm 108.

Arm 108 is pivoted at 109 so that it may oscillate between full and broken-lined positions, Fig.
45 7, once for each downward movement of the conveyer 100. Arm 108 is provided with an offset head 109 which moves partially over the orifice 83, so that after a document has closed this orifice, the offset head 109 is moved down so as to
50 position the document from the orifice, allowing air to again enter. This, of course, releases the pressure in pipe 88 and permits the bellows to again move to its uppermost position under the influence of a spring 110. Since, however, the
55 offset head 109 only momentarily remains over the orifice 108, and again moves to its full-line position, another document or another portion of the same document may cause the clutch to again function.

60 In practice, this machine is somewhat better suited to smaller-sized documents, such as checks, since there is some strain on the document due to being struck by the arm 109. It will, however, successfully operate with long documents requiring two or three exposures, although for this
65 purpose the first-described embodiment of my invention is to be preferred.

Like the first described embodiment of my invention, it is only necessary to drop one document
70 after another into the guiding device and as soon as a portion of the document closes or partially closes an orifice adjacent the document conveyer, the conveyer will be automatically caused to move through a fixed path. If the length of the docu-
75 ment is such that it is not entirely drawn from

the orifice by the conveyer, the conveyer will be again operated, and may be operated intermittently if a continuous strip is to be intermittently and photographically recorded. Both mechanisms automatically actuate a conveyer in timed
80 relation to a camera, both the film, documents and the conveyer being held still during the time the shutter of the recording camera is open. These functions are accomplished without attention
85 from an operator.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent is:

1. In a document recorder, the combination with a camera, of a document conveyer positioned to convey documents through the field of the camera, a device for directing a document to the conveyer, means for moving the conveyer a predetermined distance including a throw-out clutch and motor, mechanism for winding film and making an exposure as one cycle of operation in the camera, connections between the camera and motor operable through said throw-out clutch for operating the camera through a cycle of operations in timed relation with moving the conveyer
90 a predetermined distance, and a clutch-operating trip, control means for the trip positioned in the directing device whereby the trip is adapted to be actuated by a document fed into the directing device.
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2. In a document recorder, the combination with a camera adapted to move through a cycle of operations to make an exposure and wind a film, of a document conveyer positioned to convey documents through the field of the camera,
100 said conveyer having a cycle of movement in which it may move a document a predetermined distance, a power drive for moving the camera and conveyer through a cycle of movement, and a pneumatic control for the power drive including
105 an airport in the path of a document being fed toward the conveyer.

3. In a document recorder, the combination with a camera adapted to move through a cycle of operations to make an exposure and wind a film, of a document conveyer positioned to convey documents through the field of the camera,
110 said conveyer having a cycle of movement in which it may move a document a predetermined distance, a power drive for moving the camera and conveyer through a cycle of movement, and a pneumatic control for the power drive including an opening adjacent said document conveyer, said opening being positioned so that a document fed
115 towards the conveyer would alter air pressure in the pneumatic control.

4. In a document recorder, the combination with a camera adapted to move through a cycle of operations to make an exposure and wind a film, of a document conveyer positioned to convey documents through the field of the camera,
120 said conveyer having a cycle of movement in which it may move a document a predetermined distance, a power drive for moving the camera and conveyer through a cycle of movement, and a pneumatic control for the power drive including a pipe leading to a position adjacent the document conveyer in which a document fed towards the conveyer may contact therewith.
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5. In an apparatus for photographing documents, a camera, a document conveyer positioned to convey documents through the field of the camera, a power drive, connections including a clutch from the power drive to the conveyer and to the camera for operating them in timed rela-
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tion, a device for directing to the conveyer a document inserted therein, a pneumatic clutch actuating means including an opening through which air may pass, and a control for the actuating means associated with the directing device and in the path of an inserted document and con-

trollable by an inserted document, whereby the mere insertion of documents in the directing device controls the timed operation of the camera and of the conveyer.

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