Dec. 26, 1933. C. B. COTTRELL, 3D 1,941,248

SHEET REGISTERING DEVICE

Filed Feb. 6, 1932 2 Sheets-Sheet 1

Fig. 1.

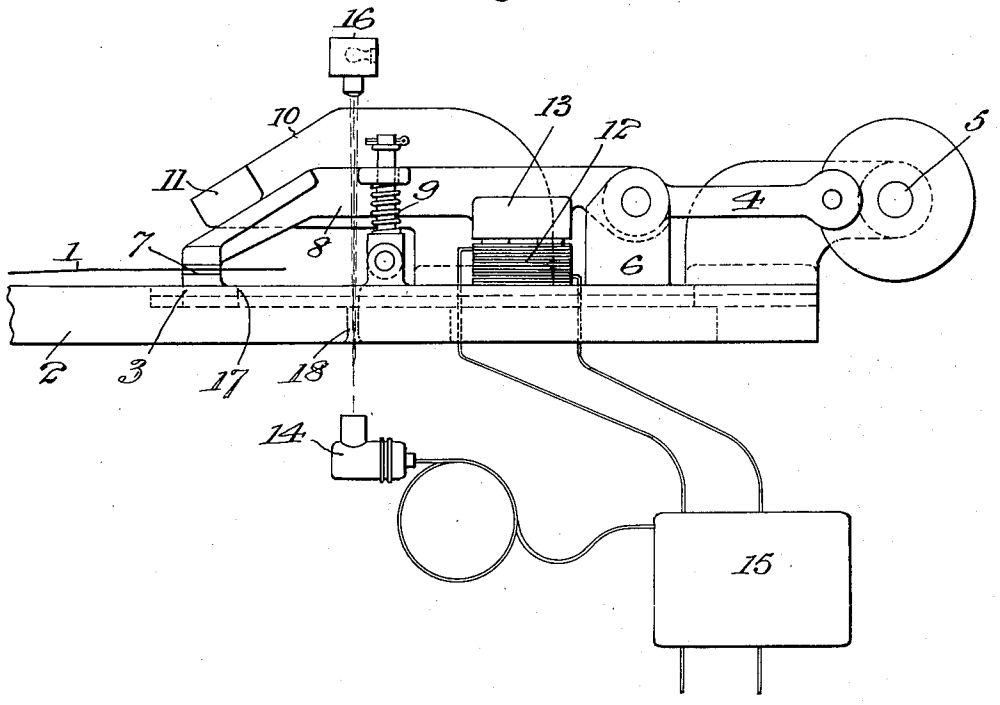
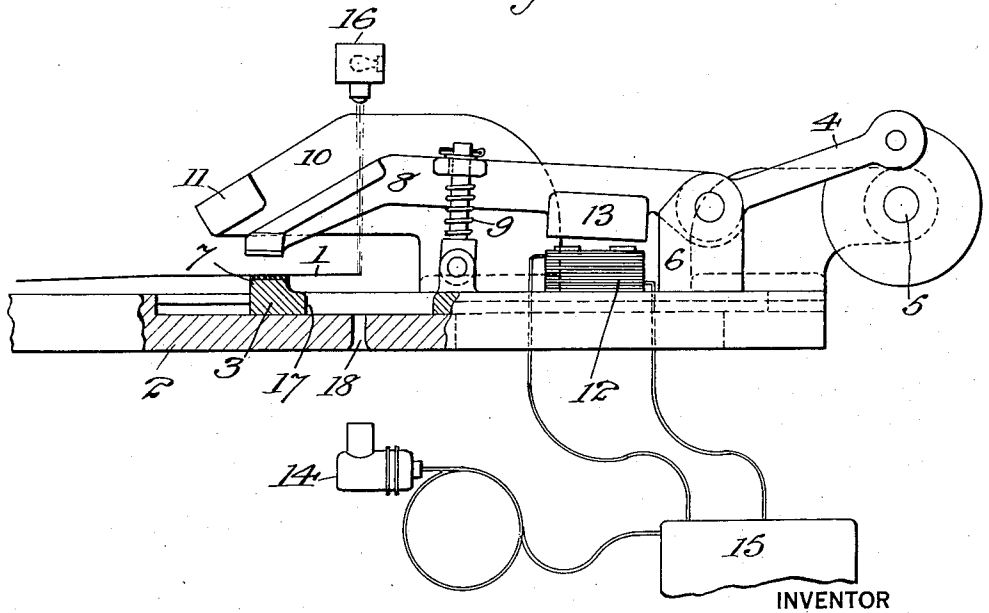



Fig. 2.




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Fig. 3.

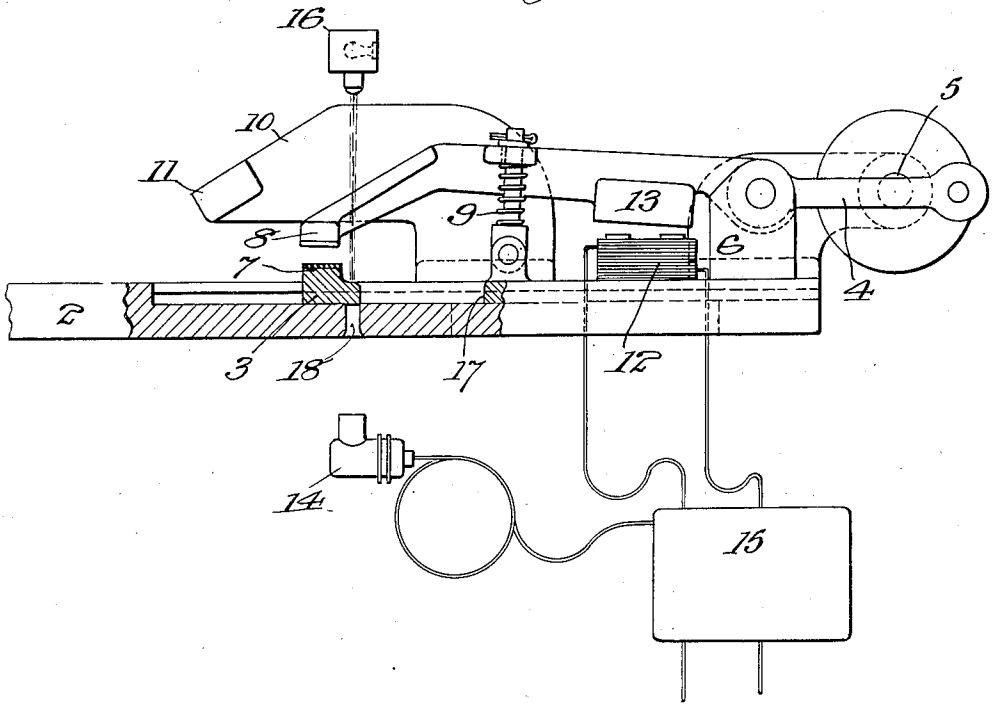
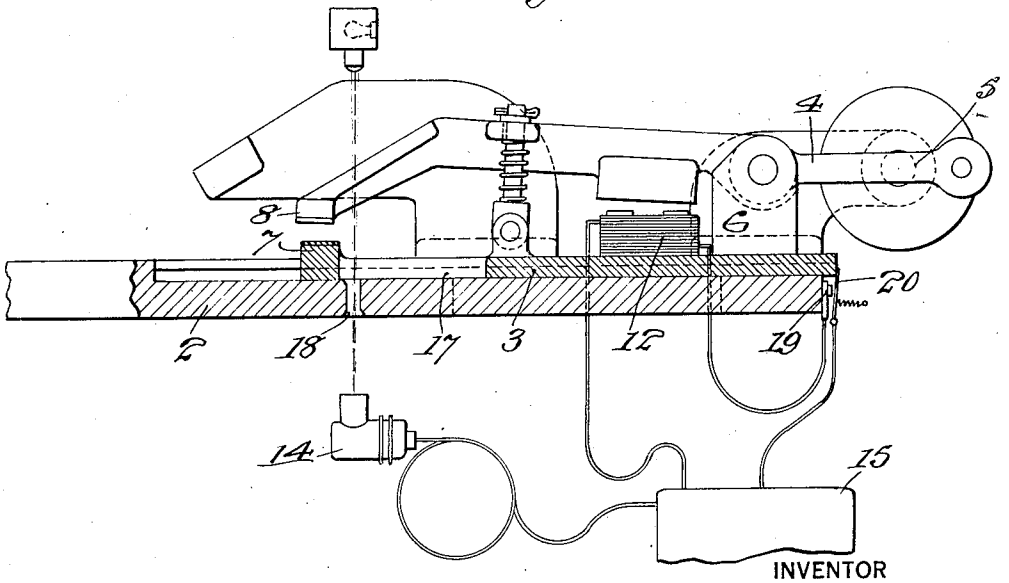



Fig. 4.




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# UNITED STATES PATENT OFFICE

1,941,248

## SHEET REGISTERING DEVICE

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Application February 6, 1932. Serial No. 591,366

19 Claims. (Cl. 271—59)

My invention comprises a novel device for side registering sheets as they are fed from any standard sheet feeder to a printing press. A photo-electric unit is employed as a side guide. This unit controls the side gripper to cause it to open the instant the sheet reaches the side registry point.

My invention further comprises a device of the above character in which a mechanical means is employed for closing the gripper onto the sheet and an electro-magnet is employed for holding the gripper closed during its sheet registering movement; the electro-magnet being de-energized by the photo-electric unit to release the gripper as the sheet reaches the registry point.

My invention further comprises means whereby the side gripper is caused to open beyond its side registry point upon the failure of the gripper to take a sheet.

A practical embodiment of my invention is represented in the accompanying drawings in which:

Fig. 1 represents my improved side registering device for sheets, in side elevation with the parts in the positions they assume when the gripper has closed onto the sheet at the end of its forward movement;

Fig. 2 represents a similar view showing the positions of the parts as the sheet reaches the side registry point;

Fig. 3 represents a similar view showing the gripper opened at the end of the sheet registering movement, when the gripper has failed to take a sheet; and

Fig. 4 represents a detail view showing a different means than that illustrated in Figs. 1, 2 and 3 for causing the opening of the side gripper at the end of its registering movement should a sheet fail to be fed into position to be grasped by said gripper.

The sheet to be side registered is denoted by 1 and the side gripper support by 2. The side gripper is mounted upon a slide 3 which is reciprocated in the support 2. In the present instance the slide is reciprocated by providing a pitman 4 which connects the rotary crank shaft 5 with an uprising lug 6 of the gripper slide 3. This shaft may be driven at the desired speed from any suitable power source not shown herein. The relatively fixed lower jaw 7 of the side gripper is located on the slide 3 in position to be moved forwardly underneath the sheet 1. The relatively movable upper jaw 8 of the side gripper is pivoted to the lug 6 on the slide 3 and is movable with the slide to a position over the sheet 1.

A spring 9 is interposed between the gripper slide 3 and the upper gripper jaw 8 for normally holding the jaw in its raised or open position.

A stationary overhanging arm 10 uprises from the gripper support 2 and it is provided with a cam member 11 arranged in position to be slidably engaged by the upper gripper jaw 8 for closing the jaw onto the sheet as the gripper slide reaches the limit of its forward movement. Means such as an electro-magnet 12 mounted on the gripper slide 3 coacts when energized with its armature 13 on the movable upper gripper jaw 8 to hold the gripper closed during its rearward or sheet registering movement. It is to be understood that the upper gripper jaw 8, when held in its raised position by the spring 9, is not acted upon by the electro-magnet 12 as the said magnet is only of sufficient strength to hold the said gripper jaw closed after it has been closed by the cam member 11.

The photo-electric unit which is controlled by the sheet as it reaches the side registry point in the lateral movement of the sheet for releasing the sheet, generally comprises the following elements: A photo-electric tube 14 is electrically connected to a photo-electric relay 15 of any well known or approved form, which relay is in turn electrically connected to the electro-magnet 12. The photo-electric tube 14 is positioned beneath the gripper slide 3 and its support 2 in the path of a beam of light projected from the lamp 16, which beam of light is shown as passing through an elongated slot 17 in the gripper slide 3 and a slot 18 in the gripper support 2. This beam of light is the sheet side registry point. In normal operation, as the gripper moves forwardly to embrace the side edge of the sheet to be registered the open upper jaw 8 of the gripper will slidably engage the cam member 11 and be closed thereby onto the sheet. This closing movement of the upper gripper jaw will bring the armature 13 down into contact with its energized electro-magnet 12, which electro-magnet will hold the grippers closed during the rearward or sheet registering movement. As the edge of the sheet in its lateral movement reaches its side registry point the sheet will cut off the beam of light from the lamp 16 to the photo-electric tube 14, thereby causing the relay 15 to de-energize the electro-magnet 12, thus permitting the gripper jaw spring 9 to act to open the gripper jaw and release the sheet.

In Figs. 1, 2 and 3 I have shown a means for causing the electro-magnet 12 to be de-energized

as the gripper reaches the end of its registry movement to cause the gripper to open should a sheet fail to be fed into position to be grasped by the gripper at the end of its forward movement. This means comprises the positioning of the forward end of the elongated slot 17 in the gripper slide 3 with respect to the slot 18 in the support 2 so that as the gripper reaches the end of its registering movement the slide 3 will close the slot 18 and cut off the beam of light from the lamp 16 to the photo-electric tube 14.

In Fig. 4 I have shown another means for causing the de-energization of the electro-magnet 12 at the end of the registering movement of the gripper should a sheet fail to be fed into position to be grasped by the gripper, said means in this instance comprising a switch in the circuit between the relay 15 and the said electro-magnet 12. This switch would conveniently have a fixed contact 19 and a normally closed movable contact 20, which contact 20 is arranged in position to be engaged by the gripper slide 3 to move the contact 20 away from the contact 19 as the gripper slide reaches the end of its sheet registry movement. In this form the opening of the gripper is ensured without interrupting the beam of light from the lamp 16 to the photo-electric tube 14.

It will be understood that the electro-magnet is not strong enough to pull down the upper jaw but will be strong enough to hold it down after the jaw has been mechanically depressed, so long as the electro-magnet is energized, thus permitting the electro-magnet after it has been de-energized, to be again energized as soon as the beam of light is uninterrupted and the circuit through the electro-magnet is complete.

From the above description it will be seen that I have provided means for side registering a sheet without bringing the edge of the sheet against a side stop of any character, the movement of the sheet being stopped the moment it interrupts the light beam. This arrangement obviates the danger of the edge of the sheet being curled up against a registry stop, which curling would affect the sheet registry.

It is evident that various changes may be resorted to in the construction, form and arrangement of the several parts without departing from the spirit and scope of my invention, and hence I do not intend to be limited to the particular embodiment herein shown and described.

What I claim is:

1. A side register for sheets including a normally open reciprocating gripper, means for closing the gripper onto the sheet as the gripper reaches the end of its non-registering movement, means for holding the gripper closed during its registering movement, and a photo-electric unit controlled by the sheet being registered, to permit the gripper to be opened to release the sheet as is reaches its side registry point.

2. A side register for sheets including a normally open reciprocating gripper, means for closing the gripper onto the sheet as the gripper reaches the end of its non-registering movement, an electro-magnet for holding the gripper closed during its registering movement, and a photo-electric unit controlled by the sheet being registered, to deenergize the electro-magnet, for permitting the gripper to be opened to release the sheet as it reaches its side registry point.

3. A side register for sheets including a normally open reciprocating gripper having relatively fixed and movable jaws, a cam member arranged to engage the movable jaw for closing it onto the sheet as the gripper reaches the end of its non-registering movement, an electro-magnet for holding the movable jaw closed as the sheet moves toward its side registry, and a photo-electric unit controlled by the sheet being registered, to deenergize the electro-magnet, for permitting the movable gripper jaw to open to release the sheet as it reaches its side registry point.

4. A side register for sheets including a reciprocating gripper, a photo-electric unit controlled by the sheet being registered to cause the gripper to release the sheet at its side registry point and means operable to cause the gripper to open beyond the sheet registry point upon the failure of the gripper to take a sheet.

5. A side register for sheets including a reciprocating gripper, a photo-electric unit controlled by the sheet being registered to cause the gripper to release the sheet at its side registry point and means for controlling the photo-electric unit to cause the gripper to open beyond the sheet registry point upon the failure of the gripper to take a sheet.

6. A side register for sheets including a reciprocating gripper, a photo-electric unit controlled by the sheet being registered to cause the gripper to release the sheet at its side registry point and means independent of the operation of the photo-electric unit for causing the gripper to open beyond the sheet registry point upon the failure of the gripper to take a sheet.

7. A side register for sheets including a reciprocating gripper, gripper operating means, a photo-electric unit controlled by the sheet being registered to actuate the gripper operating means to cause the gripper to release the sheet at the sheet registry point and means operable to cause the gripper to open beyond the sheet registry point upon the failure of the gripper to take a sheet.

8. A side register for sheets including a reciprocating gripper, gripper operating means, a photo-electric unit controlled by the sheet being registered to actuate the gripper operating means to cause the gripper to release the sheet at the sheet registry point and means for controlling the photo-electric unit to cause the gripper to open beyond the sheet registry point upon the failure of the gripper to take a sheet.

9. A side register for sheets including a reciprocating gripper, gripper operating means and a photo-electric unit controlled by the sheet being registered to actuate the gripper operating means to cause the gripper to release the sheet at the sheet registry point and means acting upon the gripper operating means to cause the gripper to open beyond the sheet registry point upon the failure of the gripper to take a sheet.

10. A side register for sheets including a reciprocating gripper, gripper releasing means, a photo-electric unit controlled by the sheet being registered to actuate the gripper releasing means to cause the gripper to release the sheet at the sheet registry point and means operable to cause the gripper to open beyond the sheet registry point upon the failure of the gripper to take a sheet.

11. A side register for sheets including a reciprocating gripper, gripper releasing means, a photo-electric unit controlled by the sheet being registered to actuate the gripper releasing means to cause the gripper to release the sheet at the

sheet registry point and means for controlling the photo-electric unit to cause the gripper to open beyond the sheet registry point upon the failure of the gripper to take a sheet.

12. A side register for sheets including a reciprocating gripper, gripper releasing means, a photo-electric unit controlled by the sheet being registered to actuate the gripper releasing means to cause the gripper to release the sheet at the sheet registry point and means acting upon the gripper releasing means for causing the gripper to open beyond the sheet registry point upon the failure of the gripper to take a sheet.

13. A side register for sheets including a reciprocating gripper, means for closing the gripper onto the sheet, means for normally holding the gripper closed during its sheet registering movement, a photo-electric unit controlled by the sheet being registered to cause the gripper to release the sheet at its side registry point and means operable to cause the gripper to open beyond the sheet registry point upon the failure of the gripper to take a sheet.

14. A side register for sheets including a reciprocating gripper, means for closing the gripper onto the sheet, means for normally holding the gripper closed during its sheet registering movement, a photo-electric unit controlled by the sheet being registered to cause the gripper to release the sheet at its side registery point and means for controlling the photo-electric unit to cause the gripper to open beyond the sheet registry point upon the failure of the gripper to take a sheet.

15. A side register for sheets including a reciprocating gripper, means for closing the gripper onto the sheet, means for normally holding the gripper closed during its sheet registering movement, a photo-electric unit controlled by the sheet being registered to cause the gripper to release the sheet at its side registry point and means independent of the operation of the photo-electric unit for causing the gripper to open beyond the sheet registry point upon the failure of the gripper to take a sheet.

16. A side register for sheets including a reciprocating gripper for moving the sheets laterally into side register, a stationary element for closing the gripper onto the sheet on its non-registering movement, an electro-magnet for normally holding the gripper closed during its sheet registering movement and a photo-electric unit acting as a side guide for the sheet, said unit being controlled by the sheet being registered to cause the gripper to release the sheet as it reaches its registry point.

17. A side register for sheets including a reciprocating gripper, a stationary element for closing the gripper onto the sheet, an electro-magnet for normally holding the gripper closed during its sheet registering movement, a photo-electric unit controlled by the sheet being registered to cause the gripper to release the sheet as it reaches its registry point and means operable to cause the gripper to open beyond the sheet registry point upon the failure of the gripper to take a sheet.

18. A side register for sheets including a reciprocating gripper, a stationary element for closing the gripper onto the sheet, an electro-magnet for normally holding the gripper closed during its sheet registering movement, a photo-electric unit controlled by the sheet being registered to cause the gripper to release the sheet as it reaches its registry point and means for controlling the photo-electric unit to cause the gripper to open beyond the sheet registry point upon the failure of the gripper to take a sheet.

19. A side register for sheets including a reciprocating gripper, a stationary element for closing the gripper onto the sheet, an electro-magnet for normally holding the gripper closed during its sheet registering movement, a photo-electric unit controlled by the sheet being registered to cause the gripper to release the sheet as it reaches its registry point and means for de-energizing the electro-magnet for causing the gripper to open beyond the sheet registry point upon the failure of the gripper to take a sheet.

CALVERT B. COTTRELL, 3D.