Jan. 1, 1935. F. L. CROSS 1,986,253

SIDE REGISTERING MECHANISM

Filed March 3, 1933

Fig. 1.

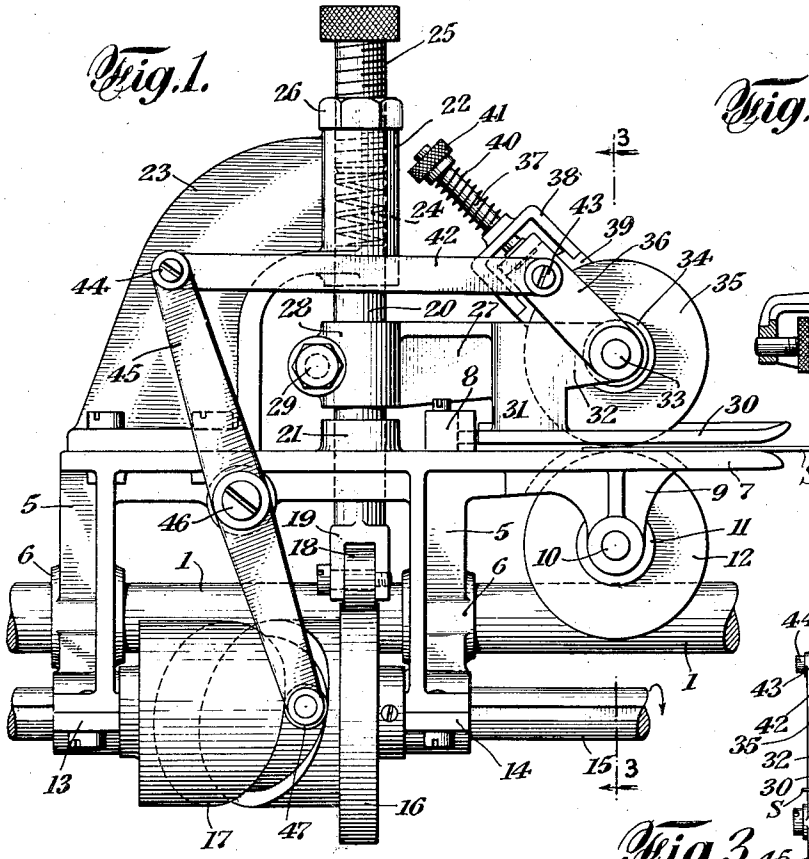


Fig. 4.

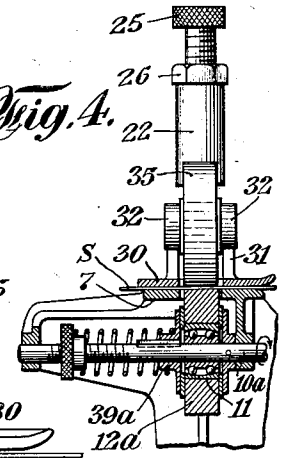


Fig. 3.

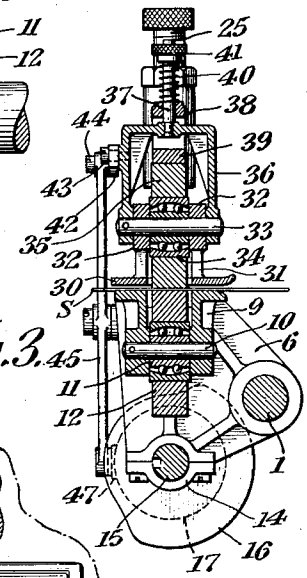
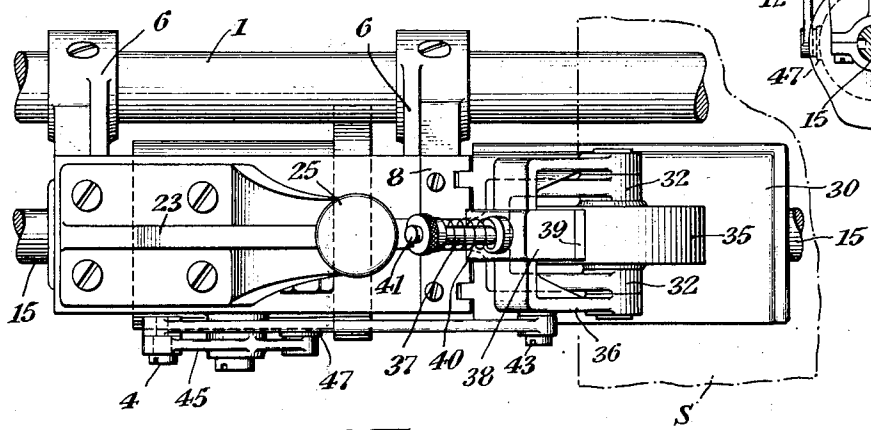


Fig. 2.



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SIDE REGISTERING MECHANISM

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3 Claims. (Cl. 271—59)

The object of the present invention is to produce an improved sheet registering mechanism in which a suitable sheet moving instrument will positively engage a sheet to move it into position against a registering gage under the action of driving mechanism including an adjustable slip friction which has just sufficient power to carry the sheet into registered position and will then stop and slip.

The advantage of this improved sheet registering device is that there will be no marring of the sheet because the sheet engaging member will not slip on or upon the sheet, and, while in engagement with the sheet it will move only with the sheet and will stop when the sheet is stopped by reaching the registering gage.

The frictional slip device or clutch is arranged between the sheet moving instrument and the moving power, which latter may be intermittent or constant and capable of more or less of an active stroke, since the friction clutch permits the moving instrument to stop when the sheet reaches the registering gage.

In one form of the mechanism there are upper and lower feed rolls, one of which is in the form of a drop roller and one of which is engaged by an intermittently actuated friction clutch to impart a sheet moving stroke. In another form one of the feed rolls may be freely mounted upon a constantly rotating shaft with a friction clutch arranged between the shaft and the roll to impart a feeding stroke which is limited by the engagement of the sheet with the registering gage, the clutch slipping when the sheet reaches its registered position. In any form the slip clutch must be between the sheet moving instrument and its driving power so as to have any slip or yield in action take place outside of the engagement of the instrument with the sheet.

In order that the invention may be fully understood, it will first be described with reference to the accompanying drawing and the novelty afterwards pointed out more particularly in the annexed claims.

In said drawing

Figure 1 is an end elevation of the improved side registering mechanism;

Figure 2 is a plan view of the same;

Figure 3 is a vertical longitudinal sectional view taken on the line 3—3 of Figure 1;

Figure 4 is a similar view, partly in section, of a modified form of mechanism embodying the present invention.

The improved side registering mechanism has been primarily designed for mounting upon the conveyor frame leading from an automatic feeding machine to a printing press. Such conveyor frame includes one or more transverse frame bars such as indicated at 1 on which the mechanism of the present improvement has been mounted for illustration.

The main lower bracket 5 is provided with bracket arms 6 which encompass and are adjustably mounted upon one of the conveyor frame bars 1. This lower bracket 5 carries the guide plate 7 supported just beneath the plane of feed of sheets on the ordinary conveyor frame. The side registering gage block 8 is mounted upon the sheet supporting lower plate 7 at one side of the line of travel of sheets.

Projecting beneath the plate 7 are the bearing ears or brackets 9 in which is carried a short bearing pin 10 supporting the anti-friction bearing 11 of a lower feed roll 12 which rotates freely upon said bearing with its periphery in the plane of the upper surface of the lower plate 7.

The bracket 5 also supports the bearings 13 and 14 in which rotates a constantly driven shaft 15 upon which are adjustably mounted the combined edge cam 16 and barrel cam 17, said cams being adjustably splined upon the shaft 15 between the bracket bearings 13 and 14.

Operating upon the edge cam 16 is an anti-friction roller 18 journalled in the lower bifurcated end 19 of a vertically reciprocating plunger 20 which has bearings at 21 in the bracket 5 and at 22 in the upwardly extending bracket arm 23. The upper end of the plunger 20 is engaged by an expansion spring 24 supported in the bearing 22 and engaged by an adjusting screw bolt 25 threaded into the upper end of bearing 22 and held in the desired adjusted position by a lock nut 26 threaded upon bolt 25 and engaging bearing 22.

Adjustably mounted upon the plunger 20 between bearings 21 and 22 is a horizontal bracket arm 27 with a rear split yoke 28 embracing plunger 26 and clamped thereon by screw bolt 29. This bracket 27 projects inwardly to a point above the lower feed wheel 12. An upper sheet guiding plate or surface 30 is connected by means of arms 31 with the bracket arm 27, the parts being adjusted to present the lower face of guide plate 30 in close relation to the upper face of lower guide plate 7, the spacing being just sufficient to permit the free movement of sheets S between plates 7 and 30 with reference to side gage 8.

Bracket arm 27 has a bifurcated inner end constituting spaced bearings 32 in which is freely journalled the bearing pin 33 carrying ball bear-

ing 34 on which is freely journalled the upper feed roll 35. The movement of plunger 20 causes the roll 35 to move toward and away from the lower feed roll 12 like a drop roller mechanism, the upper guide plate or surface 30 being moved toward and away from the lower guide plate 7 by the same operation.

Secured upon the pin 33 just outside of the bearing arms 32 is an oscillatory yoke 36 carrying an outwardly projecting guide rod 37 upon which reciprocates a U-shaped member 38 carrying a slip clutch block 39 which is mounted between the arms of member 38 beneath the yoke 36 and rests in peripheral engagement with the upper drop roller 35. A spiral spring 40 surrounds the pin 37 and is adjustably confined in engagement with the member 38 by means of an adjustable screw nut 41. By adjusting the nut 41 the spring pressure upon member 38 will cause the clutch block 39 to engage the periphery of drop roller 35 with more or less pressure.

A link 42 is pivoted to the yoke 36 at 43 and is pivotally connected at its outer end 44 with the upper end of a lever 45 pivoted to the bracket 5 at 46 and carrying at its lower end an anti-friction roller 47 which operates in the groove of the barrel cam 17.

The operation will be clear from the following explanation.

The side registering mechanism having been adjusted upon the conveyor frame to the desired position and the drop roller 35 and upper pressure plate 30 together with the spring pressure of the brake block having been adjusted within the required range of operation, the sheets are fed upon the conveyor frame in the usual manner to cause each sheet to pass at one edge between the lower guide plate 7 and upper guide plate 30. As each sheet is arrested at the press front gages the drop roller 35 and upper pressure plate 30 are lowered upon the sheet and as the sheet is gripped between the upper and lower rollers (35, 12) the yoke 36 carrying the slip clutch is oscillated inwardly causing the upper roller to turn on its bearings and by reason of its engagement with the sheet against the lower roller positively feed the sheet outwardly until the edge of the sheet engages the side gage 8 by which the sheet is arrested in registered position. In this operation the sheet is confined by the upper and lower plates or surfaces 7 and 30. When the sheet engages the gage 8 the continued movement of the yoke 36 causes the clutch block 39 to slide upon the periphery of the drop roller 35 to the completion of the stroke, the upper and lower rollers in the meantime resting stationarily upon the sheet. In this action the strength of the sheet between the grip of the rollers and the side registering gage is sufficient to overcome the frictional engagement of the clutch block with the periphery of the drop roller. When the sheet is completely registered the drop roller and upper guide plate are raised and the oscillating yoke and brake return to normal position.

In Figure 4 of the drawing I have shown a slight modification in which the lower feed roller 12*a* is loosely mounted upon a constantly rotating supporting shaft 10*a* with an adjustable slip clutch 39*a* interposed between the shaft and the roller. The upper or drop roller 35 is freely journalled in its supporting bracket arm which operates as in the preferred form to time the engagement of the rolls with a sheet. The roll 35 in this modified form serves only to engage a sheet against the lower roller, the lower roller in this modified form being the power driven one.

Sheet registering devices now in common use have two steel rollers which have line or dot contact with the sheet under adjustable spring tension, one of said rollers being positively driven. When the sheet reaches the registering gage with this mechanism, it stops while the positively driven roller continues to rotate upon the stationary surface of the sheet. The contact area of the registering rollers is so minute that the driven roller has a very objectionable frictional wearing action upon the sheet surface even when the minimum of spring tension necessary to register the sheet has been used. On account of the very small area of contact of the rollers with the sheet the pressures build up rapidly and necessitate a very delicate adjustment of the spring tension, even aside from the objectionable marking or injuring of the surface of the sheet.

The improved sheet registering mechanism of the present application does not require the fine adjustment of the commonly used form of registering devices. The registering rollers of the new mechanism never slip upon the surface of the sheet; the slip occurring in the friction clutch or driving means which is so designed as to assure a large area of contact and of consequent smooth and uniform slip.

I claim:—

1. In a sheet registering mechanism, the combination with an unyielding sheet arresting gage, of cooperating upper and lower moving sheet gripping surfaces movable relatively toward and away from each other to engage and release a sheet, and frictional driving means actuating one of said gripping surfaces, the movement of the sheet gripping surfaces being arrested and the frictional driving means caused to slip by the registry of the sheet against said gage.

2. In a sheet registering mechanism, the combination with an unyielding sheet arresting gage, of the cooperating upper and lower sheet gripping rollers, one of which is periodically movable toward and away from the other to engage and release sheets, and driving means including a slip clutch acting upon one of said rollers, the movement of said rollers upon the engaged sheet being arrested and said clutch being caused to slip by the resistance of the sheet arrested by said gage.

3. In a sheet registering mechanism, the combination with an unyielding sheet registering gage, of the cooperating upper and lower sheet gripping rollers, one of which is periodically movable toward and away from the other to engage and release sheets, a fixed sheet guiding surface in the plane of feed of sheets, a movable sheet confining guiding surface movable toward and away from said fixed guiding surface, driving means including a frictional slip clutch actuating one of said rollers, and means controlling the movements of said movable roller and said movable sheet guiding surface, said rollers being arrested and said clutch being caused to slip by the arrest of a sheet by said gage.

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