C. E. CHRISTOPHEL.

COMBINATION SHEET SLOW DOWN AND STRAIGHTENER FOR FEEDERS.

APPLICATION FILED APR. 3, 1912.

1,068,106. Patented July 22, 1913.

5 SHEETS-SHEET 1.

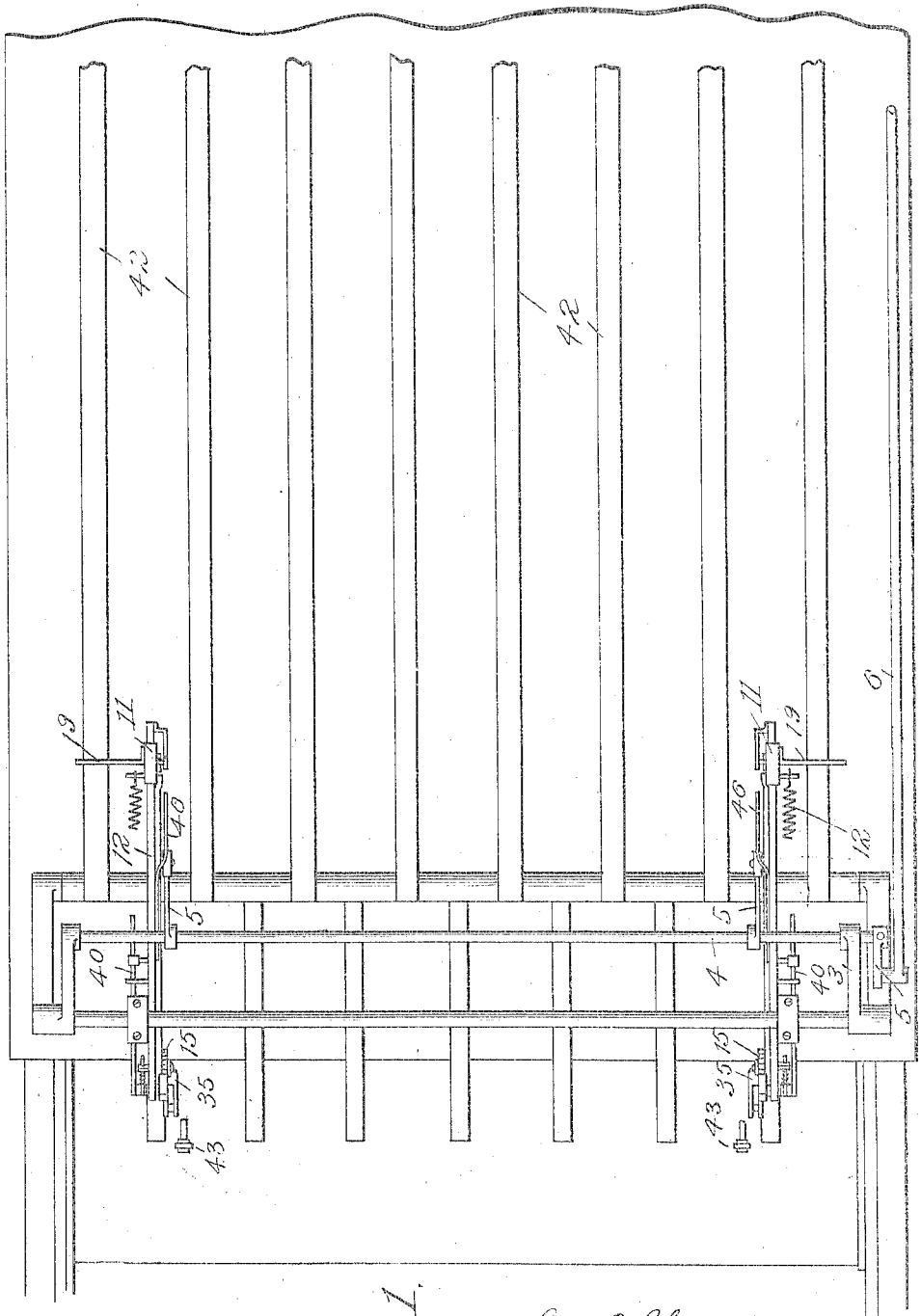


Fig. 1.

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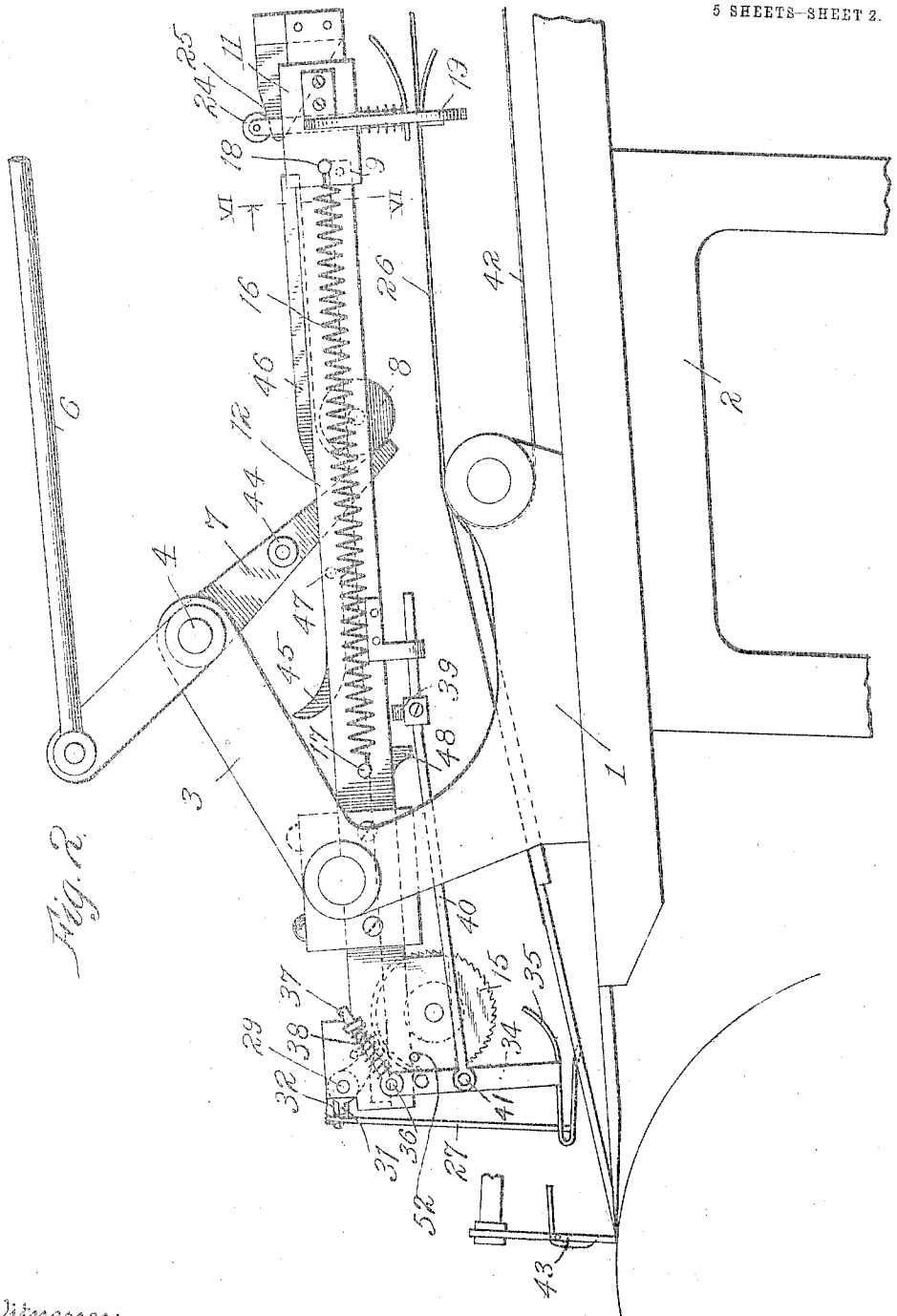


Fig. 2.

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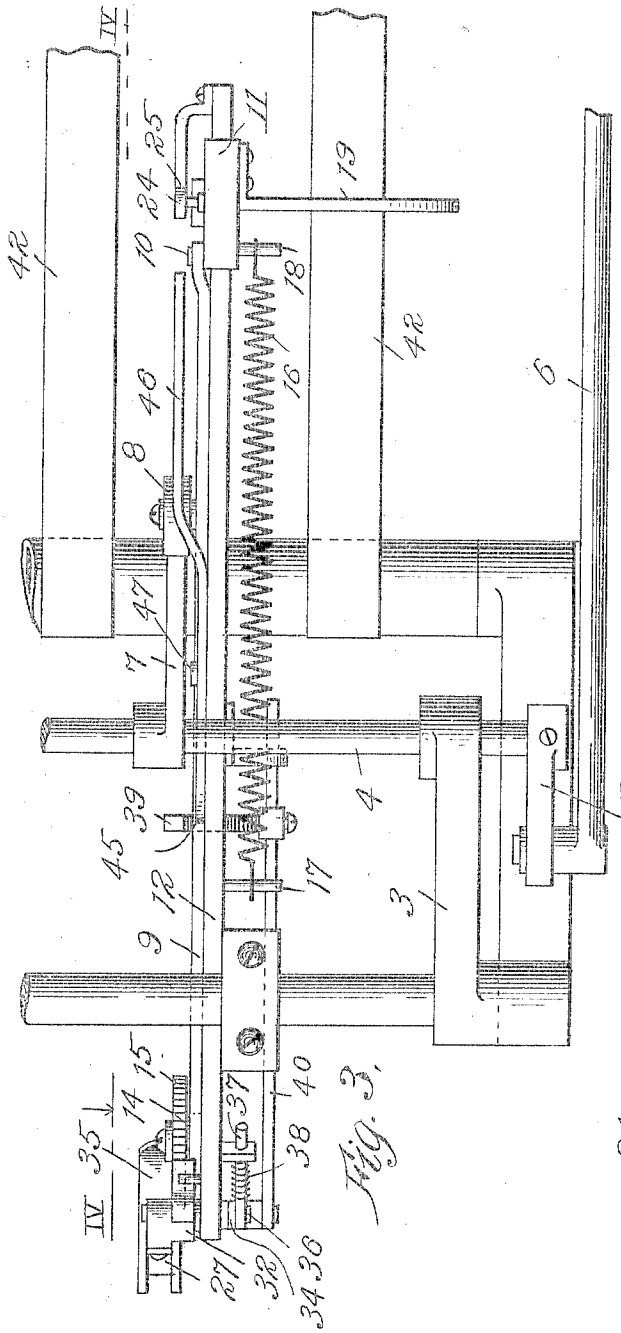


Fig. 3.

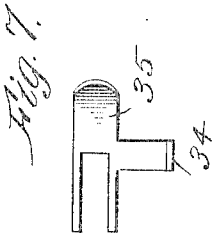


Fig. 7.

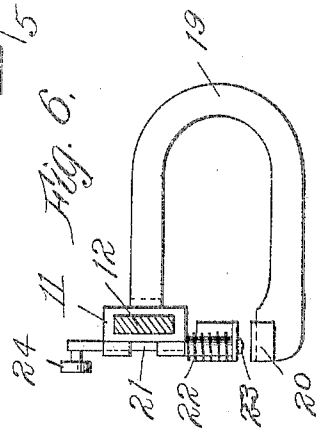


Fig. 6.

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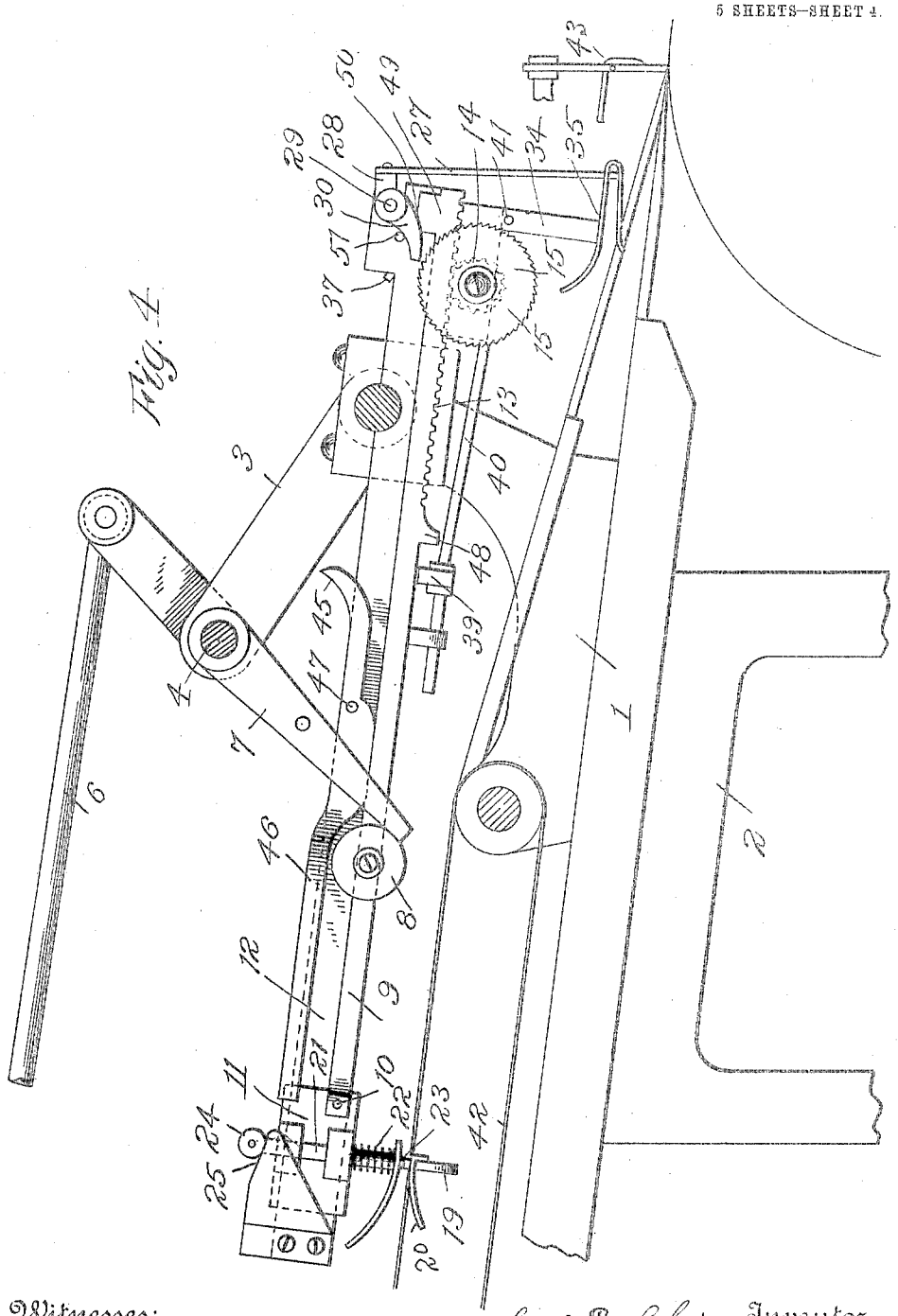
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5 SHEETS—SHEET 4.

Fig. 4



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5 SHEETS—SHEET 5.

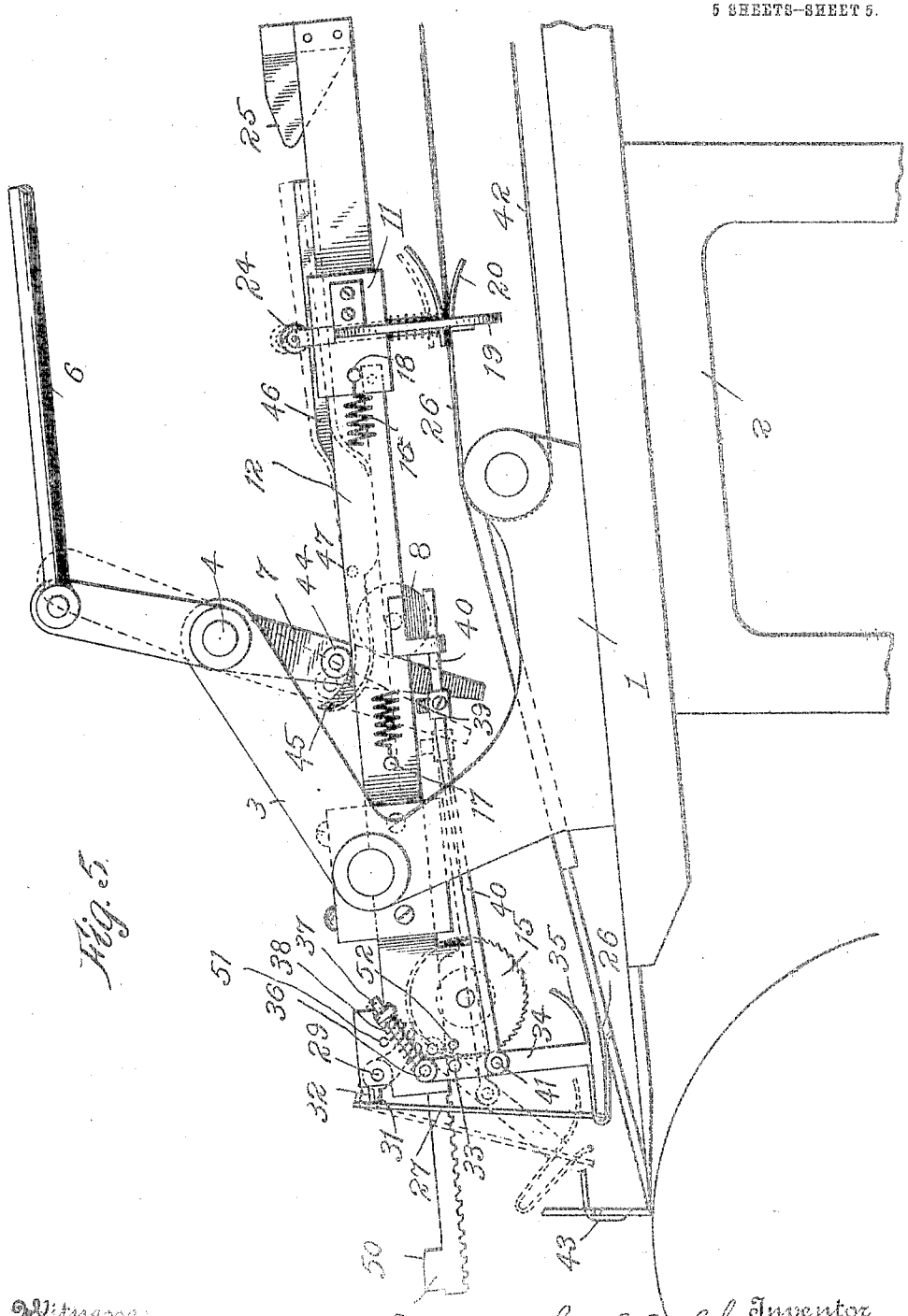


Fig. 5.

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UNITED STATES PATENT OFFICE.

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COMBINATION SHEET SLOW-DOWN AND STRAIGHTENER FOR FEEDERS.

1,068,106. Specification of Letters Patent. Patented July 22, 1913.

Application filed April 8, 1912. Serial No. 686,169.

To all whom it may concern:

Be it known that I, CARL E. CHRISTOPHEL, a subject of the German Emperor, residing at Pearl River, in the county of Rockland and State of New York, have invented certain new and useful Improvements in Combination Sheet Slow-Downs and Straighteners for Feeders, of which the following is a full and clear specification.

This invention relates to a device for slowing down and straightening the sheets passing through a feeding machine, preliminary to their detraction therefrom by another machine, which is to perform some duty on said sheets.

The primary object of this invention is to provide an improved mechanism in which the slowing down and straightening movements will be coöperative so that one will control and modify the action of the other.

Toward the attainment of this object, my invention contemplates the provision of one or more grippers which are governed by a device which modifies the movement of the gripper or grippers. While there are various ways in which these movements can be embodied, I preferably employ a reciprocatory movement of the grippers in the direction in which the sheet is moved and control this reciprocatory movement by means of a pendulum or pendulums disposed in the path of movement of the sheets, the action of these pendulums being modified according to the angular disposition of the sheet to be straightened.

Various auxiliary and collateral objects will appear in the specification and be specifically pointed out in the appended claims, reference being made to the accompanying drawings exemplifying the invention in its preferred embodiment.

In the drawings, Figure 1 is a top plan view of a portion of a feeding machine embodying my improvements; Fig. 2 is a side elevation of the same; Fig. 3 is an enlarged fragmentary top plan view of the same; Fig. 4 is a section on the line IV—IV of Fig. 3; Fig. 5 is a side elevation similar to Fig. 2 with the parts in changed positions; Fig. 6 is a detail section on the line VI—VI in Fig. 2; Fig. 7 is a detached top plan view of one of the sheet guide yokes.

Referring more particularly to the drawings and to the embodiment shown therein a pair of side brackets 1 are suitably mounted upon the side frames 2, said side brackets being provided with rearwardly projecting arms 3 in the extremities of which are journaled a rock shaft 4. Keyed to one end of the rock shaft 4 is a crank arm 5 which is pivotally connected with the forward end of a connecting rod 6, which transmits power to said rock arm 4 from any suitable source, such as the cam shaft of a feeding machine. Keyed to the rock shaft 4 adjacent each end thereof is a cam lever 7 with a depending extremity engaging a cam roller 8, which is rigidly mounted on a rack bar 9. The rear end of the rack bar 9 is pivotally connected at 10 with a slide 11 reciprocably mounted upon a guide rail 12, which is rigidly mounted in any suitable manner. The forward end of the bar 9 is provided with a rack 13, which meshes with a pinion 14, shown in dotted lines in Fig. 4. Said pinion 14 is rigidly connected with a ratchet 15. A tension spring 16, which is connected at its forward end with a pin 17 carried by the guide rail 12, is secured at its rear end to a pin 18 on the slide 11. There is thus a continuous normal tendency to impart a forward movement to the slide 11. Rigidly mounted upon the slide 11 is a gripper comprising a yoke 19 provided with a pad 20, to which one edge of a sheet may be temporarily clamped by means of a vertical, reciprocable rod 21 which is normally depressed under the action of a compression spring 22. The lower end of this rod is provided with a rounded extremity 23 so that a sheet engaged thereby can be adjusted thereabout as on a pivot. The upper end of the rod 21 is provided with a cam roller 24, which in the rearmost position of the slide 11 rides upon a cam surface 25 which elevates the rod 21. Referring more especially to Fig. 5, in which the cam arm 7 has completed a portion of its forward movement, it will be noted that the rod 21 has descended to clamp the edge of a sheet 26, thus holding this edge of the sheet so that it continues its forward movement at a slower speed corresponding to the movement of the cam arm 7. The forward edge of the sheet at this stage is impinged with a pendulum 27 which depends from a block 28 pivotally mounted on a stud 29, which carries a pawl 30. Said pawl is provided with a forwardly projecting lug 31 (see Figs. 2 and 5) which in the normal inoperative position of the

pendulum 27 is engaged by a lug 32, which projects laterally from the block 28 to hold the pawl 30 out of engagement with the ratchet 15, thus permitting the forward movement of the slide 11. Upon a pivot 33 swings a bar 34 to the lower end of which is secured a guide yoke 35, which guides the forward edge of the sheet 26 to engage the pendulum 27. The upper arm of the bar 34 is pivotally connected at 36, which carries a spring 38, imparting a normal tendency to retain the bar 34 in the position shown in Fig. 5.

By means of this construction it will be apparent that as the pendulum 27 is moved into the position shown in dotted lines in Fig. 5, the pawl 30 is permitted to engage the ratchet 15, and thus interrupt the forward movement of the slide 11 and in consequence that of the sheet 26. As the forward movement of the cam arm 7 continues, however, its lower end engages a laterally projecting tappet 39, which is adjustably mounted upon a slide rod 40 with its forward end pivotally connected at 41 with the bar 34. As a result, the rod 40 imparts a forward movement to the guide yoke 35 by straightening the knuckle joint at 36, thus moving the guide yoke 35 out of the way to permit a resumption of the forward movement of the sheet 26, which takes place under the action of the feed tapes 42 and continues until the front gage 43 is encountered. To make this action possible, the gripper rod 21 must be raised. For this purpose a cam roller 44 on the cam arm 7 when in the position shown in Fig. 5, begins to ride upon the curved extremity 45 of a cam bar 46, which swings about a pivot 47 on the guide rail 12. Said cam bar is provided with a rearwardly projecting arm above which the cam roller 24 travels. As soon, however, as this end of the cam bar is raised in the position shown in dotted lines in Fig. 5, the rod 21 is raised to release the sheet 26. Upon the return movement of the cam arm 7, the rack bar 9 is forced rearwardly and during this movement returns bar 34 and guide yoke 35 to the position shown in Fig. 5, the sheet having passed from under it prior to this. For this purpose, a depending lug 48 intercepts the tappet 39 at a suitable point of its movement. In order to lift the pawl 30 into its normal raised position preparatory to the operations upon the next sheet, the rack bar 9 is provided at its forward end with a cam block 49 which is provided with a cam surface 50, which is adapted to engage the under curved surface of the pawl 30 as shown best in Fig. 4. A stop pin 51 prevents an excessive displacement of said pawl 30. A stop pin 52 serves to prevent the excessive displacement of the upper end of the bar 34.

The operation of my improved device will now be obvious and briefly stated is as follows: When the sheet 26 reaches the position shown in Fig. 2, the rock arm 7 begins its forward movement, permitting the slide 11 to travel in the same direction. As the cam roller 24 leaves the cam 25, the gripper pivot clamps the sheet to the pad 20, and causes the movement of this edge of the sheet to slow down and correspond with the movement of the slide 11. As soon as the forward edge of the sheet hits the pendulum 27 on that side, the pawl 30 is permitted to drop and interrupt the movement of the ratchet 15, thus locking the rack bar 9 against further forward movement and temporarily holding the sheet 26 in the position shown in Fig. 5. The forward movement of the rock arm 7 continuing however, the bar 34 with the guide yoke 35 suspended therefrom is thrown into raised position shown in dotted lines in Fig. 5, permitting the forward edge of the sheet 26 to drop. At approximately the same time, the roller 44 rides upon the upwardly deflected end 45 of the rocker bar 46, thus releasing this edge of the sheet and permitting said sheet to be propelled forward against the front gages 43. It will be seen from this description that each lateral edge of the sheet is positively held in the position shown in Fig. 5 until the opposite lateral edge of said sheet reaches the same position, the relative action of the several parts being suitably timed for this purpose. In consequence when the guide yokes 35 are raised, the sheet has been straightened and the short forward movement which follows places its forward edge in suitable position against the front gages to be gripped by the gripper fingers of a printing press or other machine to which the sheets are being fed. By means of the construction shown and described, the guide yokes 35 remain in elevated position until the sheet 26 has been withdrawn. During the return movement of the rock arm 7, the lug 48 engages the tappet 39, returning the guide yoke 35 to normal position and eventually raising the gripper rod 21 into first position. The pivots 23 on the lower end of the gripper rods 21 permit the relative angular adjustment of the sheets subsequently to the gripping action of either gripper.

What I claim is:

1. In a device of the character described, means traveling in the direction of feed for feeding a sheet, a slow down gripper adapted to travel in the same direction at a slower speed than said feeding means, a pendulum normally disposed to intercept said sheet in the forward travel of said sheet, and means under the control of said pendulum and operatively connected to said gripper for determining the distance traveled by said gripper.

2. In a device of the character described, the combination with a gripper reciprocable

in the direction of feed, said gripper being disposed to engage a lateral edge of a sheet, a pendulum suitably disposed to be engaged by the forward edge of said sheet, means for reciprocating said gripper, and means operated by said pendulum for controlling the reciprocating means.

3. In a device of the character described, the combination with sheet feeding mechanism, of laterally spaced slow down grippers reciprocable in the direction of feed imparted by said mechanism, means for imparting forward movement to said grippers independently of each other and at a slower speed than said feeding mechanism, and means disposed in front of each gripper in position to be engaged by the forward edge of said sheet, said means being operatively connected to said gripper and adapted to determine the extent of the forward movement thereof.

4. In a device of the character described, sheet feeding means, a slow down device adapted to retard a sheet moved by said feeding means, yielding means for imparting a forward movement to said device, positive means for interrupting said forward movement, and controlling means operatively connected to said positive interrupting means, said controlling means being adapted to be actuated by said sheet when it has reached a predetermined point in its forward travel.

5. In a device of the character described, sheet feeding means, laterally spaced slow down devices adapted to travel along with said sheet feeding means and at a slower speed than said sheet feeding means, said slow down devices having relatively movable jaws capable of releasably engaging said sheet, controlling means adapted to determine the movement of said slow down devices, and means for releasing said jaws.

6. In a device of the character described, sheet feeding means, laterally spaced slow down devices movable independently of each other and adapted to separately engage a sheet, elements operatively connected to said slow down devices respectively, and laterally spaced contacts adapted to interrupt the movements of said elements, said contacts being suitably disposed to be engaged by the forward edge of said sheet.

7. In a feeding machine provided with sheet feeding means, laterally spaced grippers reciprocable in the direction of the sheet movement, means constraining the movement of said grippers to retard a sheet, a stop mechanism for separately interrupting the reciprocatory movement of each gripper, and laterally spaced contacts depending in the path of said sheet and operatably connected to said stop mechanisms respectively.

8. In a device of the character described, sheet feeding means, laterally spaced slow down grippers adapted to engage the opposite lateral edges of a sheet conveyed by said feeding means, reciprocating bars connected to said grippers, a ratchet geared to the forward end of each of said bars, a locking pawl for said ratchet, and a pendulum contact provided with means for normally holding said pawl in raised position, said grippers being adapted to arrest the movement of said sheet with its front edge normal to the direction of feed.

9. In a device of the character described, sheet feeding means, laterally spaced slow down grippers adapted to engage the opposite lateral edges of a sheet conveyed by said feeding means, reciprocating bars connected to said grippers, a ratchet geared to the forward end of each of said bars, a locking pawl for said ratchet, a pendulum contact provided with means for normally holding said pawl in raised position, said grippers being adapted to arrest the movement of said sheet with its front edge normal to the direction of feed and means for raising said pendulums out of the path of said sheet.

10. In a device of the character described, sheet feeding means, laterally spaced slow down grippers adapted to engage the opposite lateral edges of a sheet conveyed by said feeding means, reciprocating bars connected to said grippers, a ratchet geared to the forward end of each of said bars, a locking pawl for said ratchet, a pendulum contact provided with means for normally holding said pawl in raised position, said grippers being adapted to arrest the movement of said sheet with its front edge normal to the direction of feed, means for raising said pendulums out of the path of said sheet and means for releasing said grippers.

11. In a device of the character described, sheet feeding means and sheet straightening devices arranged along opposite sides of said feeding means, each of said devices comprising a guide rail, a slide thereon, a gripper carried by said slide, a ratchet journaled in advance of said gripper, a reciprocating bar pivoted at its rear end to said slide and having its front end geared to said ratchet and means operated by the forward edge of a sheet for locking said ratchet, the movement of said gripper being slower than said feeding means.

12. In a device of the character described, sheet feeding means and sheet straightening devices arranged along opposite sides of said feeding means, each of said devices comprising a guide rail, a slide thereon, a gripper carried by said slide, a ratchet journaled in advance of said gripper, a reciprocating bar pivoted at its rear end to said slide and having its front end geared to said ratchet, means operated by the forward edge of a sheet for locking said ratchet, the movement of said gripper being slower than said

feeding means, a cam bar for releasing said gripper approximately at the end of its forward movement, and common means for operating said reciprocating bar and said cam bar.

13. In a device of the character described, the combination with sheet feeding means, of laterally spaced sheet straightening mechanisms, each of said mechanisms comprising a slow down sheet engaging device capable of being reciprocated parallel to the direction of feed, means for terminating the forward movement of said sheet engaging device when a point on the forward edge of said sheet in front of said device reaches a predetermined point, means for disengaging said slow down device from the paper, and common means for reciprocating said slow down device and operating said disengaging means.

14. In a device of the character described, the combination with sheet feeding means, of laterally spaced sheet straightening mechanisms, each of said mechanisms comprising a slow down sheet engaging device capable of being reciprocated parallel to the direction of feed, means for terminating the forward movement of said sheet engaging device when a point on the forward edge of said sheet in front of said device reaches a predetermined point, means for disengaging said slow down device from the paper, common means for reciprocating said slow down device and operating said disengaging means and means adjacent the rearmost position of said slow down device for holding it in disengaged position.

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