A. J. HUGHES & A. J. SLADE, Jr.

SLOW DOWN AND SHEET STRAIGHTENING MECHANISM.

APPLICATION FILED MAR. 31, 1914.

1,128,877.

Patented Feb. 16, 1915.

4 SHEETS—SHEET 1.

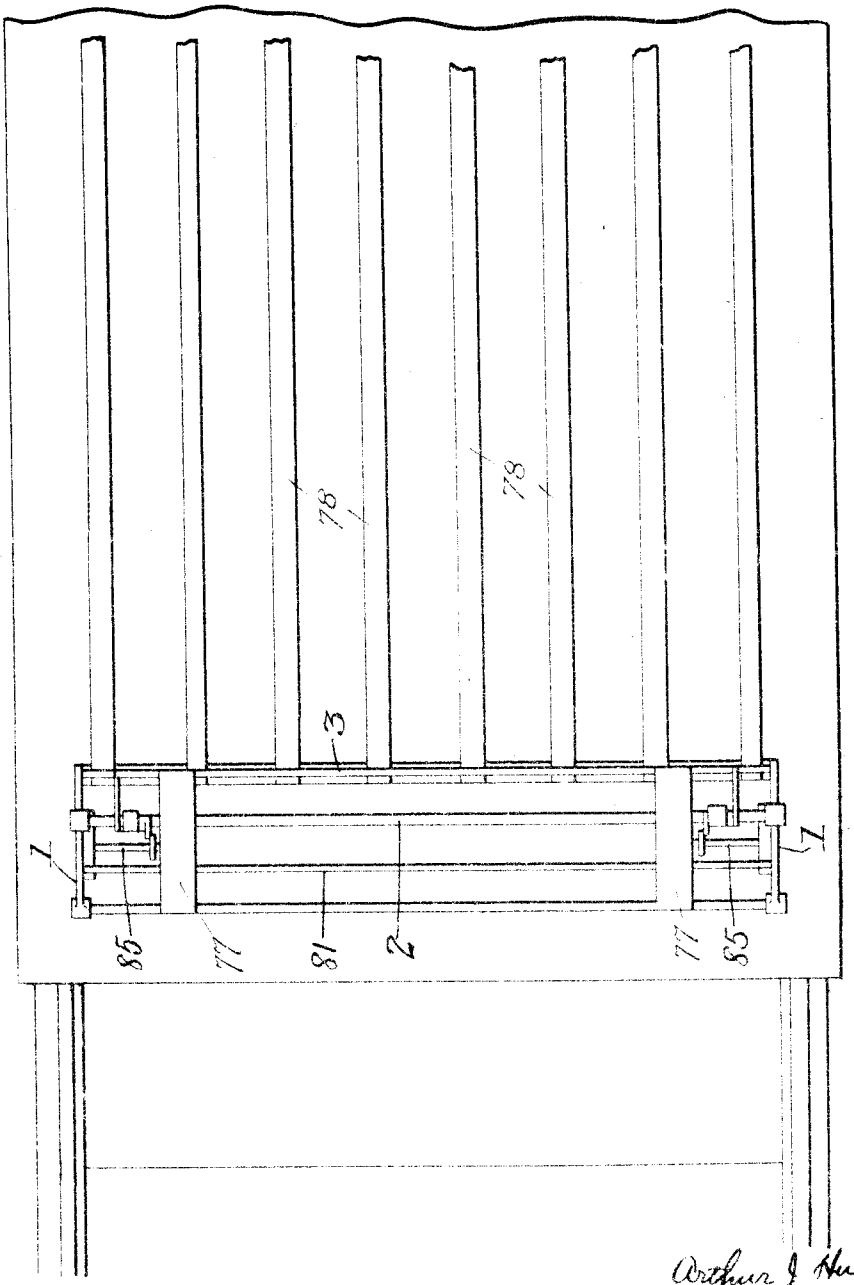


Fig 1

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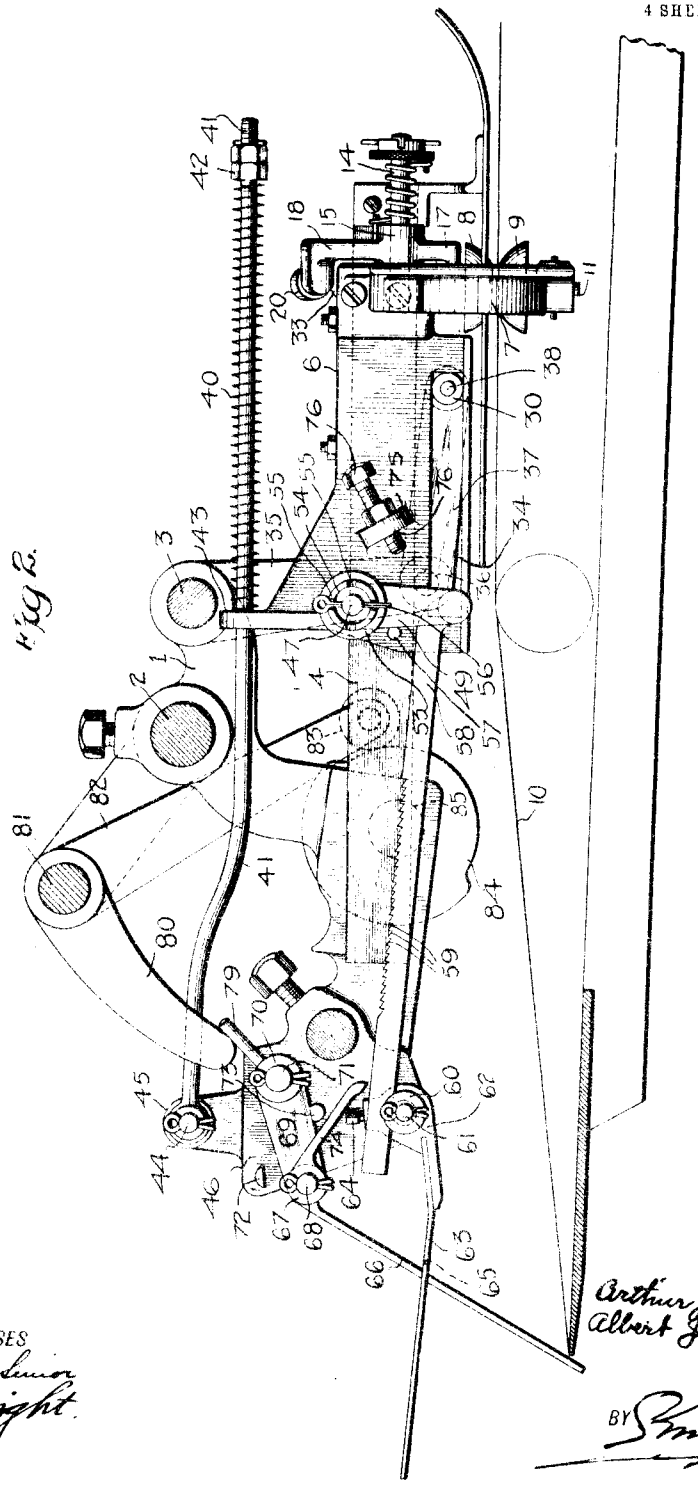


Fig 2.

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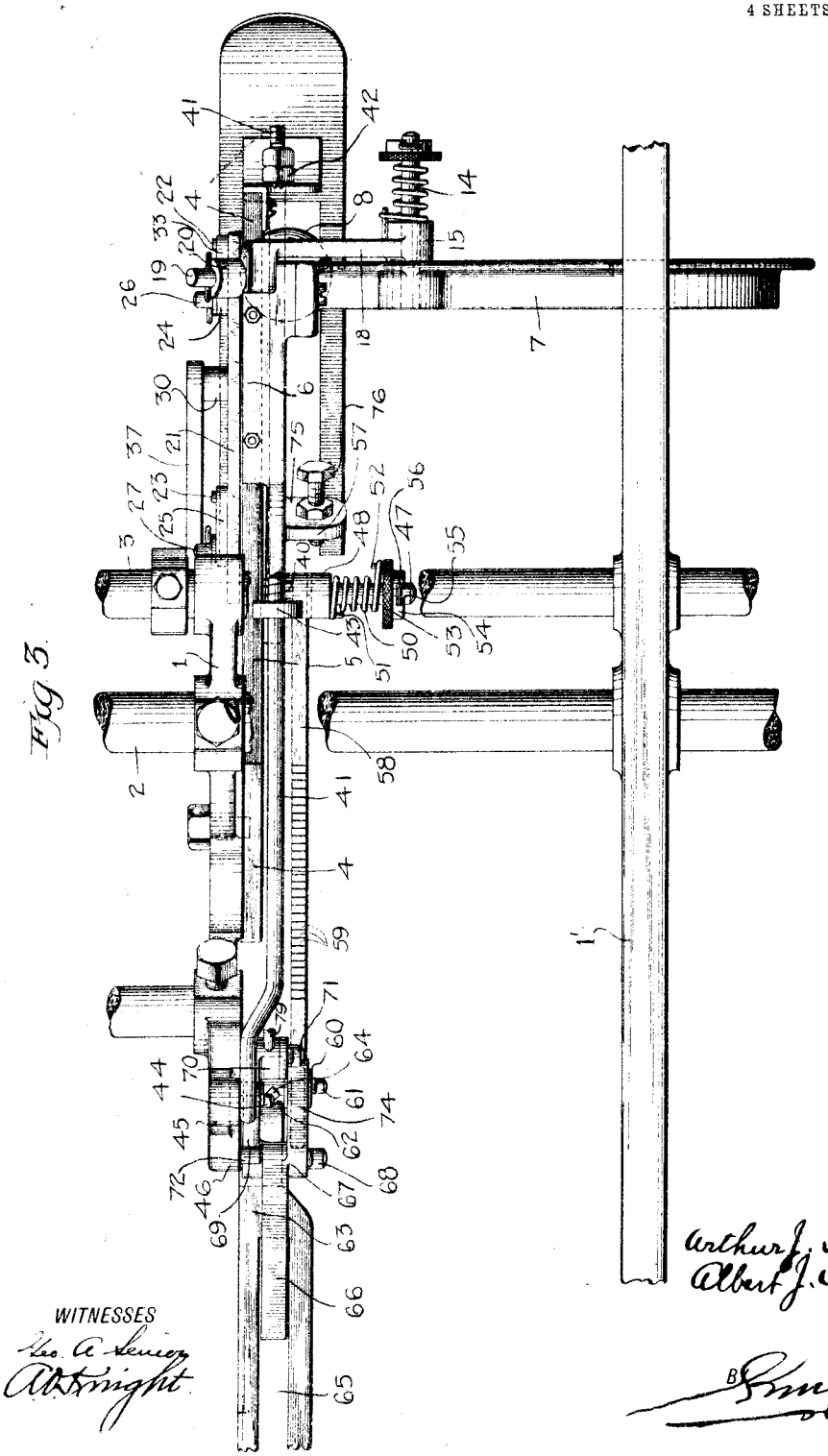
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4 SHEETS—SHEET 3.

Fig 3.



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4 SHEETS—SHEET 4.

Fig 4.

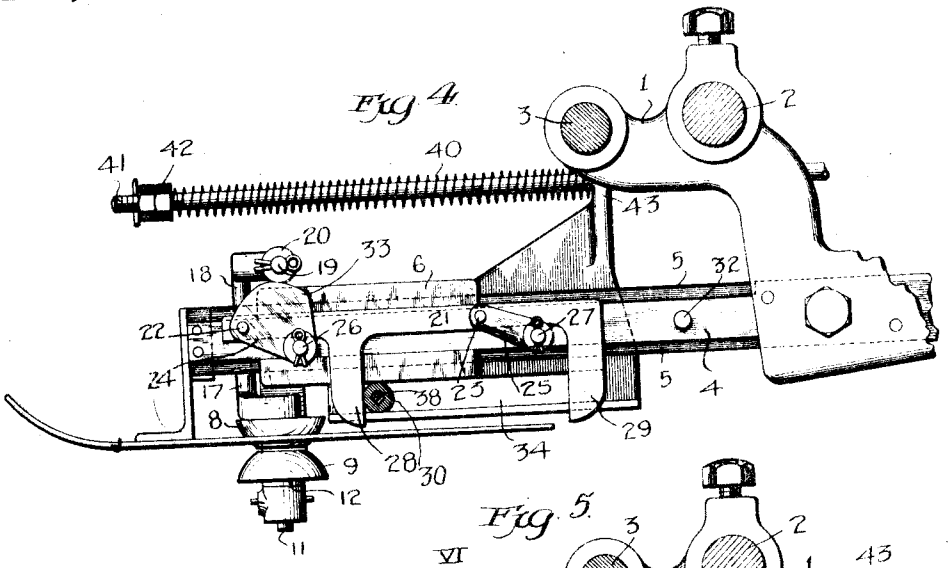


Fig 5.

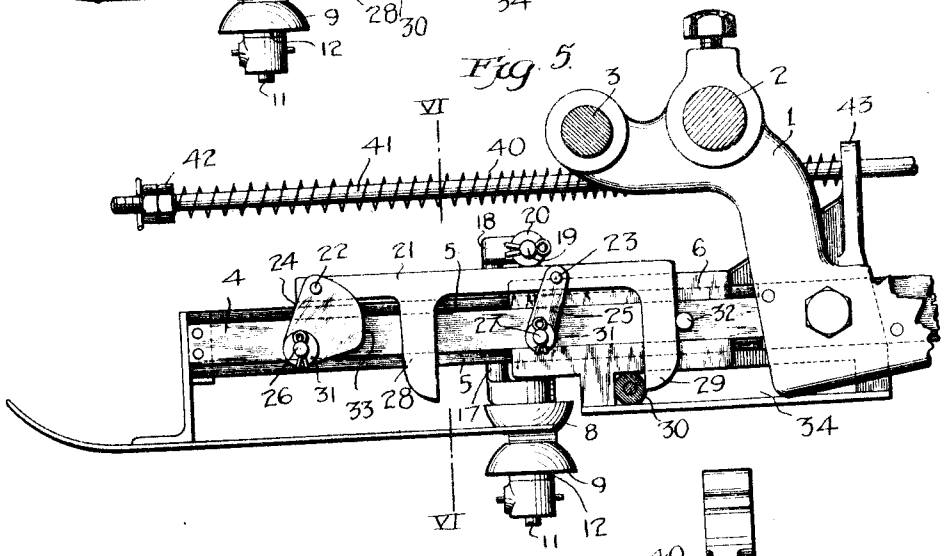
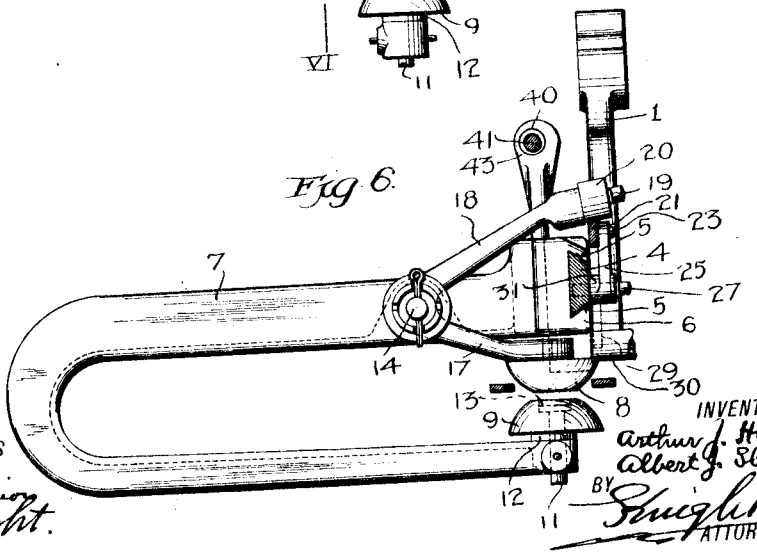


Fig 6.



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UNITED STATES PATENT OFFICE.

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SLOW-DOWN AND SHEET-STRAIGHTENING MECHANISM.

1,128,877. Specification of Letters Patent. Patented Feb. 16, 1915.

Application filed March 31, 1914. Serial No. 828,541.

To all whom it may concern:

Be it known that we, ARTHUR J. HUGHES and ALBERT J. SLADE, Jr., both citizens of the United States, and both residing at Pearl River, in the county of Rockland and State of New York, have invented certain new and useful Improvements in Slow-Down and Sheet-Straightening Mechanism, of which the following is a full and clear specification.

This invention relates to slow down and sheet straightening mechanisms for feeding machines and has for its primary object to simplify the construction and arrangement of parts in mechanisms of this character with a view to rendering such mechanisms more efficient and durable and the parts thereof more readily timed and adjusted.

Certain specific objects in the construction and arrangement of parts will appear in the specification and appended claims, reference being had to the accompanying drawings in which the invention is exemplified in a preferred embodiment.

In the drawings,—Figure 1 is a diagrammatic top plan view of a feeding machine embodying laterally spaced mechanisms for slowing down and straightening sheets; Fig. 2 is a side elevation of one of said mechanisms; Fig. 3 is a top plan view of the same; Fig. 4 is a fragmentary side elevation of the same taken from the opposite side of said mechanism, showing the carriage in its rearmost position, parts being broken away and parts shown in section; Fig. 5 is a view similar to Fig. 4, with the carriage in its forward position; Fig. 6 is a rear elevation of the gripper, parts being broken away and parts shown in section.

In the preferred embodiment of our invention shown in the drawings, a bracket or support 1 may be mounted in any suitable manner, such as by the rods or shafts 2 and 3 which are ordinarily carried by the side frames 1′ of the feeding machine. Rigidly secured to the bracket 1 is a track bar 4 which projects rearwardly from said bracket. Said track bar is preferably provided with beveled edges 5 to adapt it to slidably mount a dove-tailed slide 6 which constitutes the main body portion of a carriage which is thus reciprocably mounted. Rigidly secured to the slide 6 or carriage is a substantially U-shaped frame 7 upon which sheet-gripping members 8 and 9 are carried. Said frame projects laterally from the slide 6 in suitable position to have the lateral edge of a sheet 10 pass between the branches thereof. The gripping member 9 is provided with a post 11 which projects upwardly from the inner end of the lower branch of the frame 7. Said gripping member is preferably a cup-shaped shell having a hub portion 12 journaled upon the post 11, the gripping surface of said member being preferably flat in the form of an annulus formed by providing a recess in the upper surface of gripping member 9 for receiving the head 13 of post 11. Spaced from the slide 6 and extending rearwardly from the upper branch of the frame 7 is a rod or pin 14 upon which is journaled the hub 15 of a bent lever embodying a lower arm 17 which carries a post upon which the upper gripping member 8 is journaled. The upper arm 18 projects upwardly and inwardly over the track bar 4, forming an acute angle with the lower arm 17. Projecting inwardly from the end of the upper arm 18 is a pin 19 upon which is journaled a cam roller 20, said cam roller being suitably disposed to be engaged at periodic intervals by a cam bar 21. Said cam bar 21 is pivotally connected at 22 and 23 with a pair of guide links 24 and 25 which are journaled respectively upon pins 26 and 27 which project inwardly from the track bar 4. Cam bar 21 is provided with depending tappet arms 28 and 29 suitably disposed to be engaged successively by a reciprocable slide or roller 30 to be presently referred to. Links 24 and 25 are provided with hubs 31 upon which the cam bar 21 rests when in lowered position. A stop pin 32 extends inwardly from the track bar 4 in suitable position to engage the forward tappet arm 29 just after the links 24 and 25 have passed their dead center positions, so that when the cam bar is raised, it will remain in elevated position until again displaced rearwardly to fall into lowered position. Dead center position as applied to the links 24 and 25 is intended to designate that position of either link in which the line connecting the pivotal

centers at opposite ends thereof, extends vertically upward from the pivotal center 26 or 27 on the fixed support or track bar 4.

Suitable and efficient means for maintaining the sheet gripping means 8 and 9 apart at the rear end of their travel, is provided by a cam 33 which preferably forms an integral part of the guide link 24. It will be seen in Fig. 4 that the cam roller 20 will be engaged by the cam 33 when the slide or roller 30 is in rearmost position, said slide or roller being then in abutment with the rear tappet arm 28 which acts as a stop for limiting the rear movement of said slide or roller 30. A slot or guideway 34 is provided in the slide 6 within which the slide or roller 30 travels, said slot providing a lost motion connection between the slide 6 and said slide or roller 30. Any suitable means may be provided for reciprocating the slide or roller 30, such for example as by a crank arm 35 (see Fig. 2) which is pivotally connected at 36 to one end of a link 37, the other end of said link being provided with a laterally projecting pin 38 which, in the present embodiment, constitutes the slide as well as the journal of the roller 30 which travels in the slot 34. The slide 6 is normally pressed forwardly by a spring 40 coiled about a rod 41 intermediately of an abutment 42 mounted on the rear end of the rod 41 and an upwardly projecting lug 43 mounted on the slide 6. The forward end of the spring rod 41 is mounted upon a pin 44 which projects laterally from a lug 45 projecting upwardly from a plate 46 on the forward end of the bracket 1. Projecting laterally from the outer face of the slide 6 is a pin or stud 47 upon which is journaled the hub 48 of an oscillatory arm 49, said arm being yieldably held in forward position by means of a spring 50 coiled upon the stud 47, said spring having one end secured to a pin 51 in the hub 48, and its other end secured to a pin 52 carried by a knurled nut 53, said nut being provided with a flange 54 having radial notches 55 into which a pin or cotter 56 which is carried by the outer end of the pin 47 extends. A stop 57 is mounted in the forward edge of the slide 6 to limit the forward movement of the arm 49. Pivotally mounted on the outer end of the arm 49, is a bar 58 provided with ratchet teeth 59, said bar resting within the grooves of a roller 60 which is journaled upon a pin 61 projecting laterally from the plate 46. The boss 62 of a guide 63 is rigidly secured to the pin 61 by means of a set screw 64. The guide 63 is provided with a slot 65 within which the pendulum 66 is adapted to swing to and fro in the manner to be hereinafter pointed out. Pendulum 66 depends from a hub 67 which is journaled upon a pin 68 projecting laterally from the outer end of an oscillatory arm 69, the hub 70 of which is journaled upon a pin 71 projecting from the plate 46. Stops 72 and 73 which are mounted in a plate 46 serve to limit the movements of the arm 69. Projecting rearwardly from the hub 67 of the pendulum 66 is a pawl or dog 74 which is adapted to be moved into engagement with the ratchet teeth 59 when the pendulum 66 is engaged by the forward edge of a sheet. Threaded within a lug 75 on the slide 6 is an adjustable abutment 76 which limits the rearward movement of the arm 49 after the rack bar 58 has been engaged by the dog 74. Projecting upwardly and rearwardly from the hub 70 of the arm 69 is a pin 79 which is adapted to be engaged by a lever arm 80 which is keyed to a shaft 81. Also keyed to the shaft 81 is a cam arm 82 which carries at its lower end a cam roller 83. Cam roller 83 runs upon a cam 84. This cam operated mechanism embodying parts 79 to 85 may or may not be used according to the character of the machine with which the feeding machine is to be used. This will be understood from the operation as hereinafter described.

In Fig. 1, two sheet-feeding instrumentalities 77 are shown diagrammatically, each of said instrumentalities comprising the mehcanism hereinbefore described. One of said instrumentalities is disposed adjacent each lateral edge of a sheet passing through a feeding machine.

The operation of these instrumentalities will now be understood. Briefly described the action is as follows: According to the positions of the parts shown in Fig. 4, the slide 6 is in rearmost position. Also the arm 35 which reciprocates the slide or roller 30 is in rear position. Cam roller 20 is raised by the cam 33 on the guide link 24. In this position of the parts, a sheet passing through the feeding machine passes between the gripping members 8 and 9. As the slide 6 is permitted to move forwardly under the pressure of spring 40, the cam roller 20 drops from the cam 33 thus permitting the gripping members 8 and 9 to clamp the sheet and force the sheet to slow down to correspond to the relatively slower movement of the slide 6. As the forward movement of the slide continues, the slide or roller 30 comes into abutment with the forward tappet arm 29 which causes the cam bar 21 to ride forwardly until said tappet arm rests against the stop pin 32. In this position of the cam bar 21 the cam roller is raised as shown in Fig. 5, the gripping members 8 and 9 being thereby released from the sheet. Ordinarily, however, before this action has taken place, the forward edge of the sheet has struck the pendulum 66 and caused the dog 74 to move into engagement with the ratchet bar 58. The subsequent forward movement of the slide 6, forces the

oscillatory arm 69 upwardly against the stop 72 thereby arresting the forward movement of the slide at approximately the same time that the grippers release the sheet. After this, the action of the sheet feeding tapes 78 serves to bring the sheet against the front gages. The relative times at which the latterally spaced pendulums 66 are engaged by the forward edge of the sheet, serves to arrest the forward movement of one edge of the sheet prior to the other which serves to straighten the sheet while at the same time slowing down its movement. With certain classes of machines which receive sheets from feeders, the sheets must be delivered so rapidly and continuously that it is necessary to begin the return movement of the reciprocating carriages before each sheet has been entirely withdrawn. It therefore becomes necessary to provide some means for holding the pendulums in elevated positions after the return movements of the carriages release them. For this purpose, the cam 84 is suitably timed so that the cam roller will travel over the outer run of the cam 84 during the return movement of the carriage. Lever arm 80 is thereupon forced downwardly against the pin 70 which maintains the pendulum in elevated position until the sheet has been completely withdrawn.

I claim:

1. In a sheet-feeding machine, a support, a carriage reciprocable on said support, said carriage being provided with sheet-engaging means movable into and out of sheet-engaging position, means for moving said sheet-engaging means into and out of sheet-engaging position including a member movable into and out of position to hold said sheet-engaging means out of contact with a sheet when said carriage is in rearmost position, and means for reciprocating said carriage.

2. In a device of the character described, a sheet gripping device, means having a lost motion connection with said gripping device for reciprocating the same, and means for opening and closing said sheet gripping device, said opening and closing means including an element which holds the gripping device open in its rearmost position, said element being movable into and out of position to hold said gripping device open by the operation of the opening and closing means.

3. In a sheet-feeding machine, a sheet-gripper having relatively movable jaws, an element movable to and fro in the direction of feed and having a lost motion connection with said gripper, a cam roller mounted on one of said jaws, a cam bar, links for movably mounting the opposite ends of said cam bar, one of said links being provided with an integral portion adapted to hold said jaws apart adjacent the end of the rear movement of said movable element, and means carried by said element adjacent the opposite ends of its travel.

4. In a sheet feeding machine, a sheet gripper having relatively movable jaws, a slide movable to and fro in the direction of feed and having a lost motion connection with said gripper, a cam roller mounted on one of said jaws, a cam bar, links for movably mounting the opposite ends of said cam bar, and means carried by said cam bar to be engaged by said slide adjacent the opposite ends of its travel, one of said links being provided with a cam surface adapted to engage said cam roller in the rearmost position of said gripper.

5. In a sheet feeding machine, a track bar, a carriage reciprocable thereon, a gripper comprising relatively movable jaws mounted on said carriage, a cam roller connected to one of said jaws, a cam bar adapted to coöperate with said roller in effecting the relative movement of said jaws, links having their opposite ends pivoted to said cam bar and track bar respectively, and a reciprocable slide having lost motion connections with said carriage and cam bar respectively, one of said links being adapted to engage said cam roller in a predetermined position of said carriage.

6. In a device of the character described, a sheet-gripping device, means for reciprocating the same, and means for opening and closing said sheet-gripping device, said opening and closing means including an element movable into and out of position to hold the gripping device open in its rearmost position.

7. In a sheet feeding machine, a sheet gripper having relatively movable jaws, means for reciprocating said gripper, a cam for imparting the relative movement to said jaws, a link partaking of the movement of said cam, and means operated by the movement of said link for holding said jaws apart adjacent one end of the path of movement of said gripper.

8. In a feeding machine, a reciprocable gripper frame, a gripper member partaking of the reciprocatory movement of said frame, a lever pivotally mounted on said frame, a gripper member mounted on one arm of said lever, and means for operating the other arm of said lever, said means including a fixed support, links pivotally mounted on said support and a cam bar pivotally connected to each of said links.

9. In a feeding machine, a reciprocable gripper comprising gripping members, one of which is movable relatively to the other, a fixed support, links pivotally mounted on said fixed support, a bar pivotally connected to each of said links and adapted thereby to move into and out of position for operating said movable gripper member,

and means for moving said bar, one of said links being provided with a cam-like protuberance adapting it to hold said movable gripper member in open position when the cam bar is in inoperative position.

10. In a feeding machine, a reciprocable gripper comprising gripping members, one of which is movable relatively to the other, a fixed support, links pivotally mounted on and extending above said fixed support, a bar pivotally connected to each of said links for operating said movable gripper member, and means for moving said bar, including tappet arms depending from said bar and a reciprocable slide adapted to engage said arms successively, and means adapting said links to sustain said bar in raised position on one side of the dead center position of said links.

11. In a feeding machine, a reciprocable gripper comprising gripping members, one of which is movable relatively to the other, a fixed support, links pivotally mounted on said fixed support, a bar pivotally connected to each of said links for operating said movable gripper member, and means for moving said bar, one of said links being provided with a cam surface for holding said movable gripper member away from the other gripper member adjacent one extremity of the reciprocatory movement of said slide.

12. In a sheet-feeding machine, a sheet-gripping device, means for reciprocating the same, a cam movable into and out of position to open said sheet-gripping device adjacent one end of its reciprocatory movement, and another cam movable into and out of position to hold the device open adjacent the other end of its reciprocatory movement.

13. In a sheet-feeding machine, a sheet-gripping device, means for reciprocating the same, a cam movable into and out of position to open said sheet-gripping device adjacent one end of its reciprocatory movement, and another cam movable into and out of position to hold the device open adjacent the other end of its reciprocatory movement, said cams being operated by the reciprocatory movement of said device.

14. In a feeding machine, a support, a pair of links pivotally connected to and extending above said support, a cam bar pivotally connected to each of said links and adapted thereby to be raised and lowered when moved endwise, a reciprocable gripper, sheet gripping members carried thereby, one of said members being movable relatively to the other, a cam arm for said movable gripping member adapted to be engaged by said cam bar in raised position, sheet actuated means for controlling the reciprocatory movement of said gripper, and a reciprocatory slide having lost motion connection with said gripper, yieldable means for driving said slide forwardly, said cam bar being provided with tappet arms depending on opposite sides of said slide to be engaged thereby in its reciprocatory movements, and means for limiting the forward movement of said cam bar, said cam bar being thereby adapted to limit the forward travel of said slide.

15. In a sheet feeding machine, a gripper frame having spaced horizontal arms projecting laterally inwardly and disposed respectively above and below the path of a lateral edge of a sheet passing through said feeding machine, a sheet gripping jaw carried by the lower arm of said gripper frame, a lever pivotally mounted on the upper arm of said gripper frame, a sheet gripping jaw connected to one arm of said lever, means for raising and lowering the other arm of said lever, and means for reciprocating said frame.

16. In a sheet feeding machine, a gripper frame having spaced horizontal arms projecting laterally inwardly and disposed respectively above and below the path of a lateral edge of a sheet passing through said feeding machine, a sheet gripping jaw carried by the lower arm of said gripper frame, a lever pivotally mounted on the upper arm of said gripper frame, a sheet gripping jaw connected to one arm of said lever, means for raising and lowering the other arm of said lever, and means for reciprocating said frame, said sheet gripping jaws being rotatable about axes transverse to said sheet.

17. In a sheet feeding machine, a gripper frame having spaced horizontal arms projecting laterally inwardly and disposed respectively above and below the path of a lateral edge of a sheet passing through said feeding machine, a sheet gripping jaw carried by the lower arm of said gripper frame, a lever pivotally mounted on the upper arm of said gripper frame, a sheet gripping jaw connected to one arm of said lever, said arm overhanging the first said sheet gripping jaw, the other arm of said lever extending at an angle to the first mentioned arm and above the same, a cam disposed in the angle between said lever arms and adapted to engage the upper arm, and means for reciprocating said gripper frame under the control of a sheet passing through said machine.

18. In a feeding machine, a gripper comprising relatively movable sheet gripping jaws, means for reciprocating said gripper and sheet actuated means for controlling the reciprocating movements of said gripper, said sheet gripping jaws being rotatable about axes transverse to the plane of travel of said sheet.

19. In a feeding machine, a gripper comprising relatively movable sheet gripping jaws, means for reciprocating said gripper,

and sheet actuated means for controlling the reciprocating movements of said gripper, said sheet gripping jaws being rotatable about axes transverse to the plane of travel of said sheet, each of said gripping jaws having rounded surfaces disposed toward each other and flat gripping surfaces adapted to engage the opposite surfaces of said sheet.

20. In a feeding machine, the combination of a track bar, a carriage reciprocable upon said track bar, a ratchet bar pivoted at one end to said carriage, a sheet actuated pawl for engaging said ratchet bar to limit the forward movement of said carriage, sheet gripping jaws mounted on said carriage, one of said jaws being movable relatively to the other, a pair of spaced parallel links pivoted at one end to said track bar, a cam bar pivotally connected to the other ends of said links, said cam bar being adapted to impart the movements to said movable sheet gripping jaw, and means for reciprocating said cam bar to raise and lower it.

21. In a feeding machine, the combination of a track bar, a carriage reciprocable upon said track bar, a ratchet bar pivoted at one end to said carriage, a sheet actuated pawl for engaging said ratchet bar to limit the forward movement of said carriage, sheet gripping jaws mounted on said carriage, one of said jaws being movable relatively to the other, a pair of spaced parallel links pivoted at one end to said track bar, a cam bar pivotally connected to the other ends of said links, said cam bar being adapted to impart the movements to said movable sheet gripping jaw, and means for reciprocating said cam bar to raise and lower it, one of said links being provided with a cam surface which is elevated above said cam bar in lowered position, the cam surface on said link being thus adapted to hold the movable sheet gripping jaw in raised position adjacent one end of the reciprocatory movement of said carriage.

22. In a sheet feeding machine, a reciprocable carriage provided with releasable sheet engaging means, including a member normally disposed in the path of a sheet for terminating the forward movement of said carriage, means for elevating said member out of the path of said sheet, and means for holding said member in elevated position during the return movement of said carriage, said holding means including a rock shaft about which said member is movable, a pin carried by said rock shaft, and a cam operated arm for displacing said pin.

23. In a sheet feeding machine, a sheet gripper comprising sheet gripping jaws, means for moving said gripper, means for moving one of said jaws relatively to the other jaw to open and close said sheet gripper, and means operated by said jaw-moving means for holding the movable jaw away from the other jaw when the gripper is in its rearmost position.

24. In a sheet-feeding machine, a sheet-gripping device, means for reciprocating the same, a cam movable into and out of position to open said sheet-gripping device adjacent one end of its reciprocatory movement, and another cam movable into and out of position to hold the device open adjacent the other end of its reciprocatory movement, said cams being operated by the reciprocatory movement of said device, one of said cams constituting a guide link for the other cam.

25. In a feeding machine, a reciprocating gripper provided with a cam arm for imparting the opening and closing movements thereto, a cam bar for actuating said cam arm, a fixed support, spaced links for movably supporting said cam bar from said fixed support, each of said links having a lower pivotal connection with said fixed support and an upper pivotal connection with said cam bar, means for reciprocating said cam bar, said links being adapted to raise and lower said cam bar during its reciprocatory movement, and means for limiting the reciprocatory movement into gripper operating position to a position adjacent to but beyond the dead center vertical position of said links to sustain the cam bar in operative position.

26. In a sheet-feeding machine, a track bar, a carriage reciprocable on said track bar, sheet-engaging means mounted on said carriage and provided with a cam operated element, a cam for operating said element, spaced links pivotally mounted on said track bar and pivotally connected to said cam, one of said links being provided with a portion which projects upwardly into a position to hold said cam operated element in elevated position in the rearmost position of said sheet-engaging means.

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