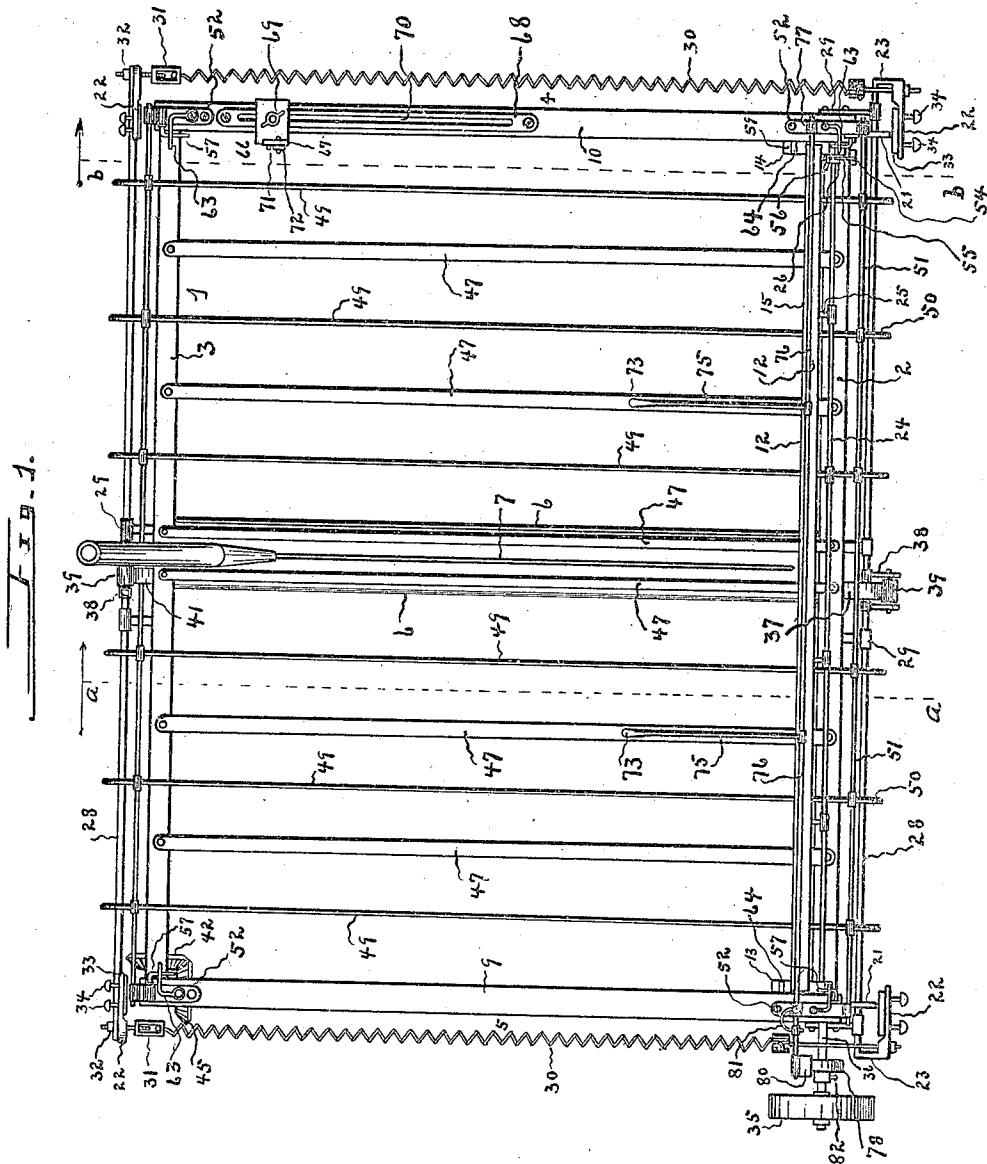


A. R. LITTLE & E. H. SMITH.
FEEDING MECHANISM FOR PAPER FOLDING MACHINES.
APPLICATION FILED OCT. 5, 1909.

952,534.

Patented Mar. 22, 1910.

5 SHEETS—SHEET 1.



Witnesses

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W. C. Compton.

334

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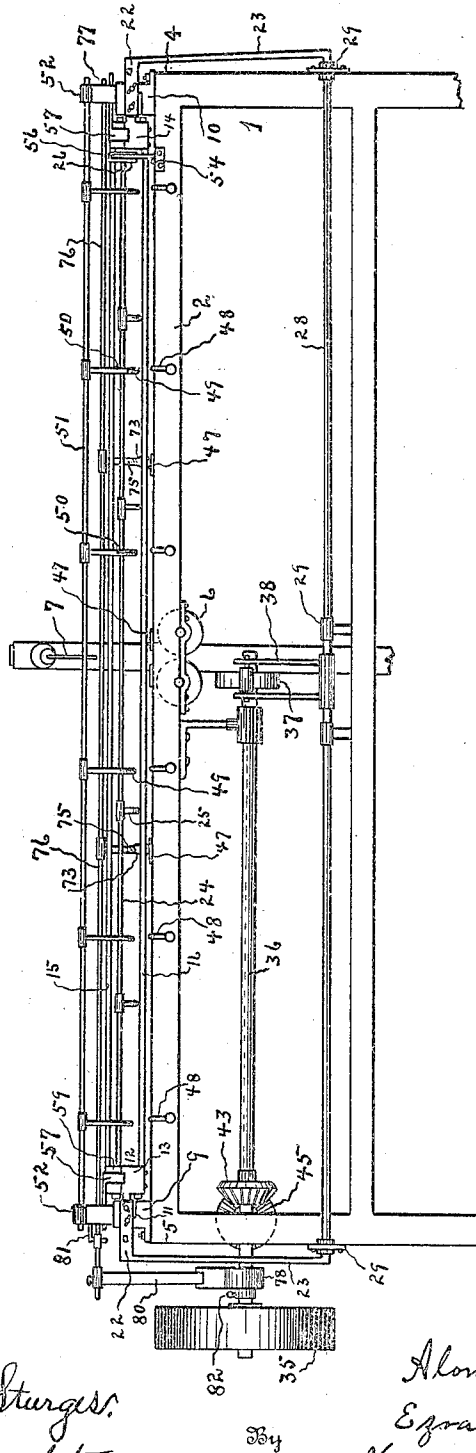
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5 SHEETS—SHEET 2.

Fig. 2.



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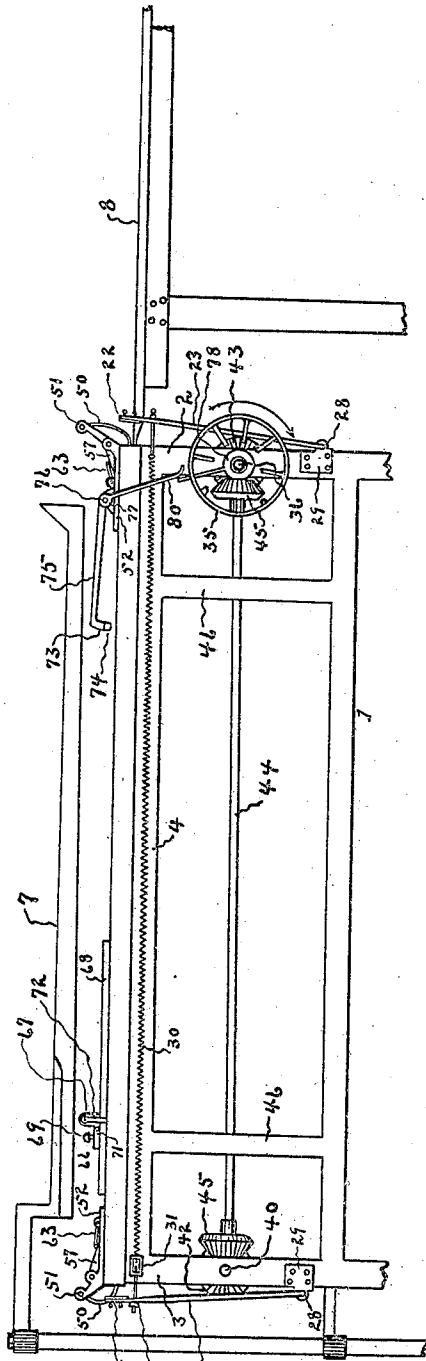
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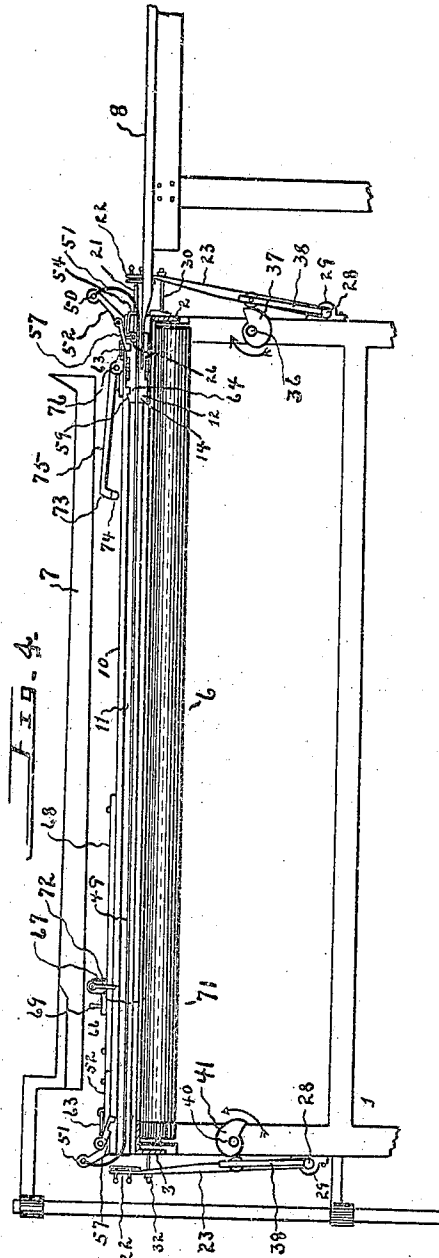
FIG. 3.



Witnesses

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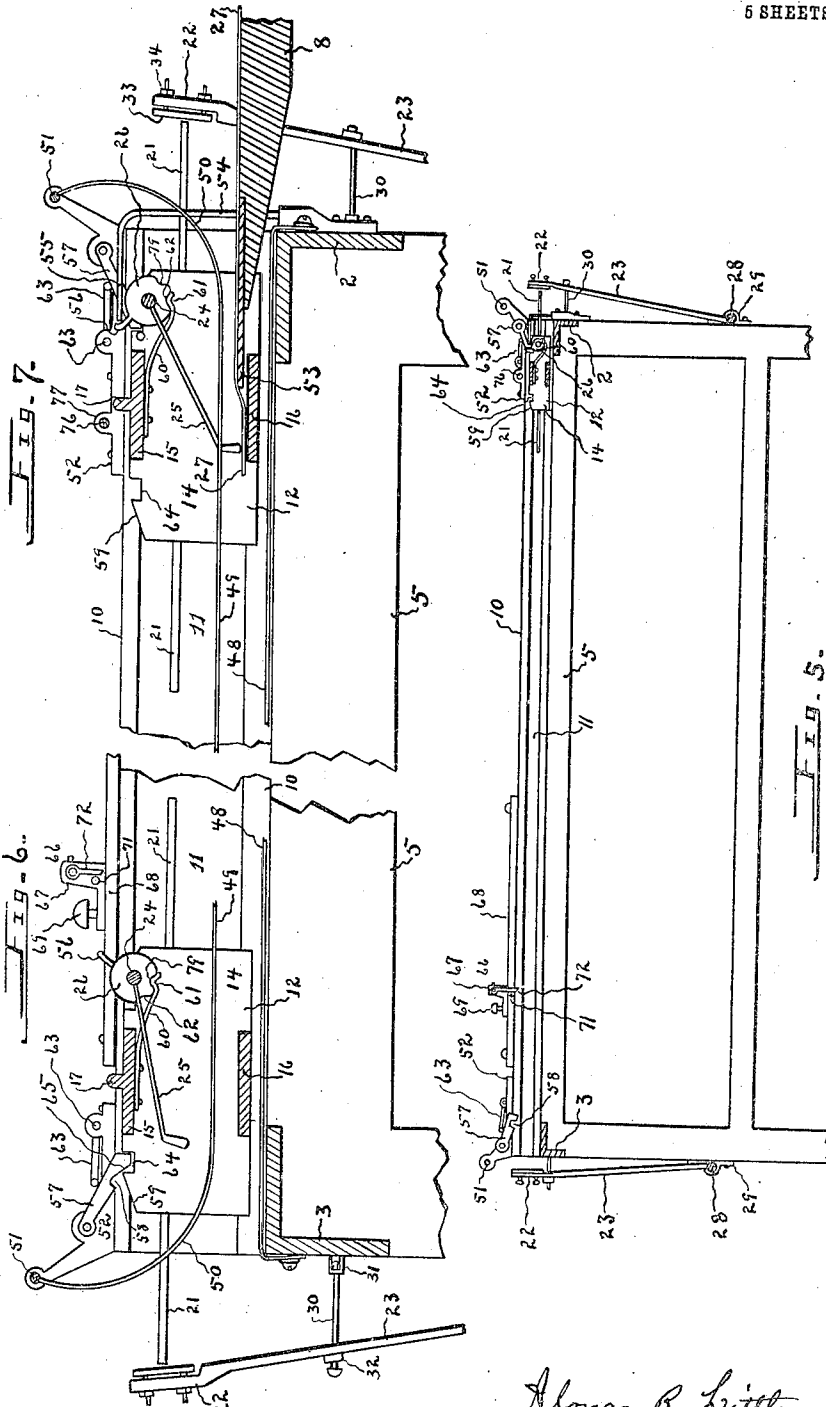
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5 SHEETS—SHEET 4.



Witnesses

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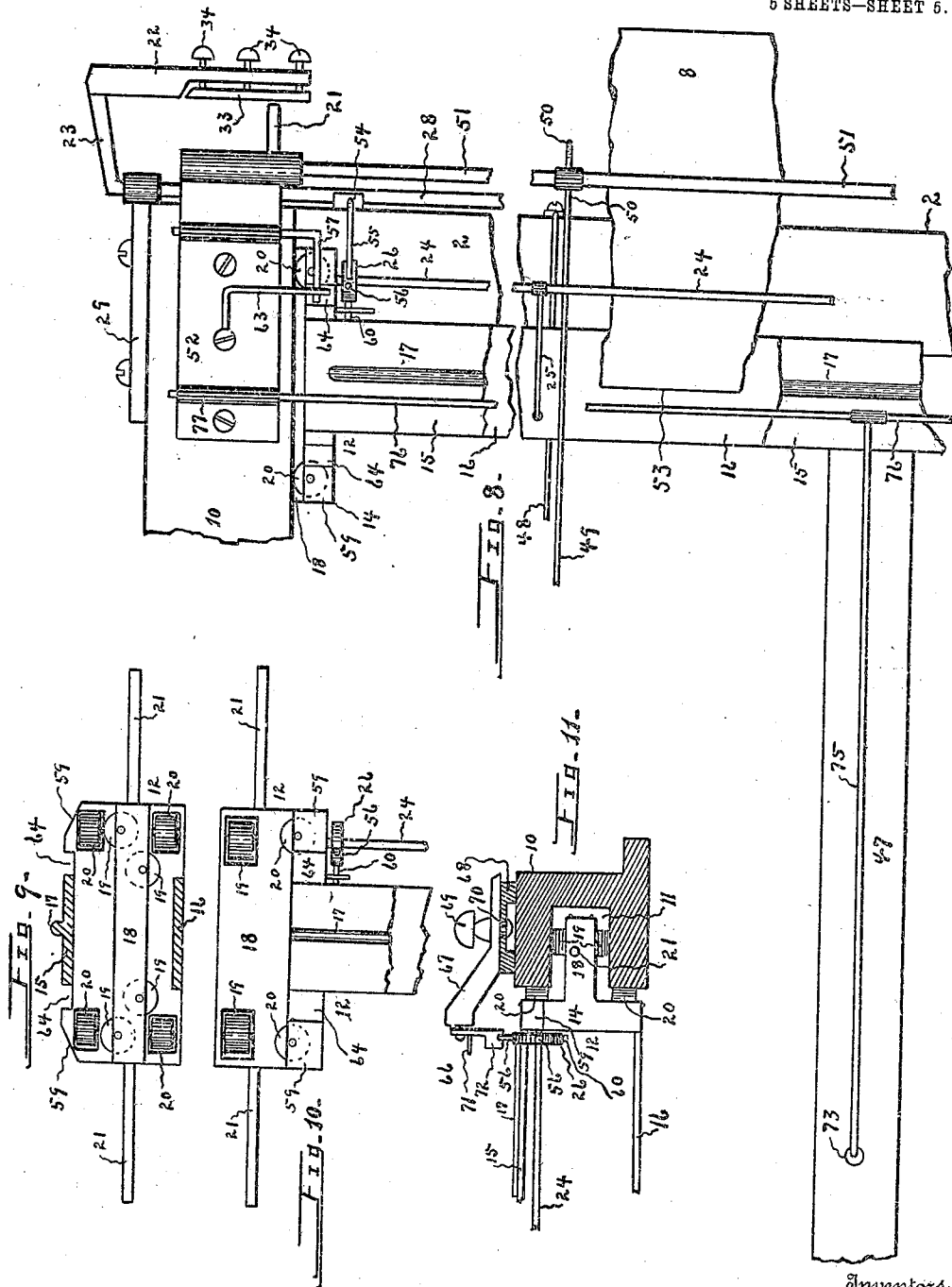
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5 SHEETS—SHEET 5.



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UNITED STATES PATENT OFFICE.

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FEEDING MECHANISM FOR PAPER-FOLDING MACHINES.

952,534.

Specification of Letters Patent. Patented Mar. 22, 1910.

Application filed October 5, 1909. Serial No. 521,162.

To all whom it may concern:

Be it known that we, ALONZO R. LITTLE and EZRA H. SMITH, citizens of the United States, residing at York, in the county of York and State of Nebraska, have invented certain new and useful Improvements in Feeding Mechanism for Paper-Folding Machines, of which the following is a specification.

10 This invention relates to a means for moving paper sheets, useful for a variety of purposes, and of especial utility in connection with the operation of printing presses or paper folding machines.

15 The invention is shown and described in connection with a paper folding machine, this being one embodiment of the invention. These machines have been in use by printers and bookbinders for many years for folding paper sheets, the sheets being moved one-by-one from a feeding board located at the front end of the machine. The sheets are carried forward horizontally upon the upper part of the machine and are folded by 20 a vertically movable folding-knife in connection with a pair of horizontal rollers, the knife when moving downward, creasing or partly folding the paper at its middle and causing the paper to make contact with the rollers, the latter causing the paper to be 30 completely folded. Other folds are then made of the original paper sheet, providing 4, 8, &c., leaves, this being accomplished by similar or other mechanism, located in the 35 lower part of the machine.

The size of paper sheets to be folded will vary, certain adjustments being employed so that large newspaper sheets or small sheets may be folded by the same machine. While 40 only a slight force is required to move the sheet, it will be understood that the movement must be regular and that there must not be undue vibration, otherwise the paper will buckle or become rolled and creased 45 while moving, thereby requiring removal from the machine, and causing delay.

In order that the horizontal movement of the sheets referred to would be reliably effected and regular, bands or tapes have 50 heretofore been employed arranged as horizontal, endless belts and mounted upon pulleys; they have been used in pairs, and the paper sheets have been conveyed forwardly between the pairs of tapes at regular inter-

vals from the feed board upon the machine, 55 ready for folding.

The construction referred to has been attended with certain objectionable features. It has required the use of a large number of pulleys and the employment of a considerable power for their movement; also the 60 bands or tapes frequently become disengaged or require adjustment and their use has resulted in much loss of time and expense. 65

In order that the use of pulleys and tapes may be dispensed with in the construction of machines of this class, and to move paper sheets regularly and reliably so that they may be folded, certain devices may be employed and will now be described; the same 70 comprising a shuttle, carrier frame or like vehicle, movable horizontally and at intervals from one end of the machine to the other, its movements being caused by the 75 impact communicated thereto of a movable body, the paper sheet being carried forwardly and horizontally from the feeding board and deposited upon the machine ready to be folded. The invention does not in- 80 clude means for folding the sheet.

The invention consists broadly of a vehicle or carrier frame movable in guideways horizontally and in alternation from one end of the machine to the other, to carry 85 paper sheets, the movements being caused by the impact of a force extraneous to itself. The vehicle or carrier may slide or may be provided with rollers and may be pushed or thrown, the paper sheet being conveyed 90 by the carrier and deposited upon the machine ready for folding. The impetus of the carrier may be caused by a blow delivered by a beating-arm or by a push delivered by a rock-lever; and resilient means 95 may be employed in connection with the beater or rocking arms, if desired.

The invention consists of the novel combination and arrangement of parts as described herein, pointed out by the appended 100 claims and as illustrated in the accompanying drawing, it being understood that changes in form, size, proportion and minor details may be made within the scope of the claims without departing from the spirit 105 of the invention or sacrificing any of its advantages.

In the drawing, which forms a part of the

application, the lower part of the folding machine is broken away.

Figure 1 is a plan view of a paper folding machine with sheet-carrying means mounted thereon embodying our invention. Fig. 2 is a front end view somewhat enlarged, showing the parts illustrated in Fig. 1. Fig. 3 is a side view of the parts shown in Figs. 1 and 2, a feeding board being added. Fig. 4 is a sectional view on line *a a* of Fig. 1, a feeding board being added. Fig. 5 is a sectional view on line *b b*, of Fig. 1. Figs. 6 and 7 are vertical side views partly in section, being enlarged details relating to Fig. 5, to more plainly show construction, barrier strips, gripping devices and part of a feeding board being added. Fig. 8 is a broken-away plan view showing parts of the carrier frame and its mounting, to be considered in connection with Figs. 6 and 7. Fig. 9 is a vertical end view of the carrier frame. Fig. 10 is a plan view, showing one of the ends of the carrier frame, the upper and lower connecting bars of the frame and the grip rod being broken away. Fig. 11 is a vertical, end-view, in section, of one of the grooved supporting rails, and illustrating, in connection therewith, the mounting of the carrier frame.

Referring now to the drawing for a more particular description, numeral 1 indicates the frame of a folding machine; the front and rear ends of the machine or top rails thereof are indicated, respectively, at 2 and 3, the top rails of the sides of the machine frame being shown at 4 and 5. Midway between sides 4 and 5 and supported by the frame are mounted the pair of rollers 6; the folding-knife or blade is indicated at 7, said knife being vertically movable from a position above to dispose its horizontal blade between the rollers.

A feeding table is indicated at 8, and it will be understood that sheets must be conveyed singly and at regular intervals from the table and be deposited upon the upper part of the machine below the blade and above the rollers; also that the blade, actuated by mechanism provided by the machine, descends at regular intervals, the sheet being folded by operation of the blade and rollers; and it will be understood that as soon as the blade is elevated, another sheet is carried beneath the blade to be folded.

The present invention being an improvement relating simply to means for conveying the sheets, means are not shown or described for movements of the folding blade. We provide longitudinal end trackways, guideways or supporting rails 9 and 10. They are disposed substantially horizontal and parallel upon the ends of the machine, and, preferably, are of similar construction; they are provided with a longitudinal

groove or slot 11 (best shown in Figs. 2 and 11.) within which may be seated the ends of the carrier frame or shuttle 12.

The carrier frame may consist of any desired, rigid longitudinal structure to provide a vehicle upon which the paper sheets may be temporarily secured, and which may be moved swiftly from the feeding board to that part of the machine opposite to the feeding board; and we have employed to advantage for this purpose the end plates indicated at 13 and 14; between and secured to these end plates are the parallel upper and lower connecting bars or strips 15 and 16. Upon parts of the carrier frame thus mentioned, are mounted certain devices which facilitate operation, and which will be fully described hereinafter. Connecting strips 15 and 16 may have a greater length than the widest sheet to be folded, and strip 15 is preferably formed as a T-bar or provided with a longitudinal ridge 17 upon its upper side, to the end that, while the carrier frame has a narrow, lengthwise construction, it will be rigid in a required degree.

End plates 13 and 14 are each provided with a side lug or ledge 18 preferably having rollers 19 mounted thereon upon its upper and lower sides to contact with the upper and lower walls of grooves 11, and suitably mounted upon the outer sides of said end plates are rollers 20; and when the carrier frame is operatively mounted ledges 18 being seated in grooves 11, rollers 20 may make contact with the inner walls of supporting rails 9 and 10. The carrier frame thus described may have a movement from one end of the machine to the other by means presently described to convey the paper sheets, and the horizontally and vertically mounted rollers or bearings mentioned are for the purpose of preventing vibration of the frame as far as possible during its movements, and for avoiding friction. The carrier frame is also provided with contact pins 21, said pins extending longitudinally from the ends of ledges 18, and to these pins may be transmitted, during operation, the impact or force of heads 22 of push-members or beating-arms 23. They may be resiliently mounted as hereinafter described, and operate as actuating-arms whereby the carrier-frame is moved in alternation, from one end of the machine to the other.

Pivotaly mounted upon the upper part of end-plates 13 and 14 and extending horizontally between said plates is grip rod 24 having a plurality of grips or transverse fingers 25 rigidly secured thereon, the pivotal mounting of said rod being upon that part of end-plates 13 and 14 nearest to the feeding board or end 2 of the machine. The free ends of fingers 25, as will be seen, are adapted on occasion, to make contact

with the upper side or surface of connecting strip 16 of the slidable carrier frame (Figs. 7, 8).

Upon grip-rod 24 adjacent to end-plate 14 is rigidly mounted disk 26 (Fig. 7), which controls the movements of the grip-rod and causes the grip-fingers to swing downward and to be pressed upon the paper sheet 27 as soon as the carrier frame arrives at end 2 of the machine, said disk also causing the grip-fingers to release the sheet as soon as the frame arrives at the opposite end of the machine. The devices which control the disk will be fully described herein-
after.

It has been stated that the carrier-frame is moved horizontally, sidewise, and in alternation, from one end of the machine to the other by operation of resiliently mounted actuating-arms 23. Means used in connection with arms 23 for effecting these movements will now be described.

At each end of the machine, upon the lower part of its frame, is mounted a horizontal rock-arm 28 (Figs. 2, 4), these rock-arms being suitably supported upon brackets 29. Arms 23, above referred to, are mounted upon the ends of rock-arms 28 and are connected by spiral springs 30. Springs 30 extend substantially parallel with the grooved supporting rails and are disposed outwardly of the sides of the machine; and each spring 30 connects a pair of heads 22 at opposite ends of the machine.

Any suitable means may be provided to cause an equal tension of springs 30, as swivels 31 used in connection with screw-bolts 32; and in order that heads 22 may make suitable contact with pins 21 at the ends of the carrier frame, adjustable means (Fig. 8) are provided, as contact-plate 33 and set screws 34, the object being to provide an equal distribution of force applied to the ends of the carrier frame for causing the latter to move parallel with supporting rails 9 and 10.

It will be understood that springs 30 are actuated indirectly by rock-arms 28 above referred to. Certain devices of simple and economical construction are now to be described which operate to provide a rocking movement or partial rotation of arms 28.

A drive wheel is indicated at 35; it is mounted upon the main shaft 36, and may be actuated by any exterior force to cause rotation in the direction indicated by the arrow shown in Fig. 3. Upon the free end of shaft 36, below end-rail 2 and midway between the sides of the machine is mounted cam 37, and a similar cam 41 is employed beneath the opposite end of the machine. Midway between the ends of rocking-arms 28 at each end of the machine are mounted yokes 38, and upon these yokes are mounted

rollers 39 adapted to have seatings upon the cams, and it will be understood by reference to Fig. 4 that at each rotation of a cam, one of the yokes 38 will be thrown inwardly or in directions toward the machine, this movement being caused by the tension of springs 30 when actuated, this force being sufficient to move the carrier frame from end 2 to the opposite end of the machine.

We provide the shaft 40 disposed below and parallel with end 3 of the machine (Figs. 3, 4.) and upon its free end at a distance substantially midway between the ends of end-rail 3 is mounted cam 41 above mentioned, and while the surface of cams 37 and 41 are the same, it will be seen that they rotate in reverse directions. Shaft 40 upon its terminal, opposite cam 41, is provided with pinion 42, and upon shaft 36 is mounted pinion 43; a connection shaft 44 is provided, it being disposed below and parallel with end rail 4; it is provided with pinions 45 mounted upon its ends which mesh with pinions 42 and 43.

By the construction as described, shafts 36, 40 and 44 are not obtrusive, being immediately below the top rails of the frame, and they may be conveniently supported by the legs and intermediate plates 46 of the machine frame.

At 47 are indicated sheet-supporting bars which extend longitudinally and are suitably secured upon the top rails adjacent to and below the carrier frame, and we employ other sheet-supports, as strands or wires 48 (Figs. 2, 8.) stretched across the space between ends 2 and 3 below the carrier frame. These bars and wires are disposed substantially parallel, and they provide a support for the paper sheet while it is being conveyed by operation of the carrier frame, and while being folded.

As a means to prevent the paper sheets from buckling during their horizontal movement from the feeding board toward the opposite end of the machine we provide a plurality of barrier-strips or strands 49. They are disposed between the upper and lower members 15 and 16 of the carrier frame (Figs. 6-7) in the vertical plane, preferably, of strands 48; and during the horizontal movement of the paper sheets after leaving the feeding board said sheets are, in a measure, confined between strands 48 and 49.

Barrier-strands 49 are preferably constructed of wire and are provided with curved end portions 50, their terminals being mounted upon supporting-rods 51 which extend substantially parallel with and somewhat above ends 2 and 3 of the machine, their terminals being supported upon the outer ends of brackets 52, these brackets being suitably secured upon the terminals of the grooved rails 9 and 10. By reason

of the curvature of end portions 50 above the feeding board, the paper sheet will be unobstructed by strands 49 in its movement to a seating upon the upper surface of strip 16 from the feeding board.

The feeding board is so disposed that its front edge 53 extends inwardly of end 2 of the machine, as plainly shown in Figs. 7 and 8, and during operation, a paper sheet to be folded is placed upon the feeding board so that its front edge will project somewhat beyond the edge 53 of the feeding board; and when the carrier frame, actuated by cam 41 and its connecting parts, has moved from end 3 to end 2 of the machine and is at rest, the parts will be in positions shown in Fig. 7, and strip 16 of the carrier frame will be below end 53 of the feeding board. Standard 54 is mounted upon end 2 of the machine frame and has a finger 55 disposed in alinement with lug 56 of disk 26. Pawl 57, having a recess 58, is mounted upon bracket 52. The terminals of end-plates 13 and 14 at their upper edges are provided with inclined facets 59, and when the carrier frame arrives at end 2 of the machine, the end of finger 55 contacts with lug 56 of the disk and this operation causes the grip fingers 25 to have firm seatings upon the paper sheet, since the disk and grip-rod 24 are partly rotated. At the time of arrival mentioned, of the carrier frame at end 2 of the machine frame, two of the contact-pins 21 are disposed adjacent to heads 22, arms 23 being swung outward by operation of cam 37.

In order that the paper sheet may be reliably held between grip fingers 25 and strip 16, the holding-bar or spring 60 is provided (Figs. 6-7.). It may be secured to strip 15 of the carrier frame and it is provided near its terminals with a curved portion 61 adapted to have a seating in either of recesses 62 or 79 of the disk; and spring 60 has an adequate resiliency, so that when its curved terminal engages within recess 62 of the disk, it will cause grip-fingers 25 to be held thereafter firmly upon the paper sheet.

We employ to advantage four pawls 57 above mentioned, one being mounted upon each of blocks or brackets 52. They have a normal downward pressure by reason of springs 63. The function of the pawls, in part, is to stop the movement of the carrier frame when it arrives at either end of the machine. At this time the free ends of the pawls contact with and slide upward upon facets 59 of end-plates 13 and 14, and they enter recesses 64 of said end plates, formed therein adjacent to the facets, being forced into the recesses by springs 63; and at this moment the grips are moved downward and operate to hold the paper upon strip 16.

The mountings of cams 37 and 41 upon their respective shafts (best shown in Fig.

4), are so adjusted that arms 23 are swung inwardly in alternation, and the adjustment is such, that as soon as the paper sheet has been secured by the grip fingers, as above mentioned, arms 23 actuated by cam 37 will have the movement described.

The impact communicated to pins 21 from heads 22 at end 2 of the machine is sufficient to cause the carrier frame to move to end 3 of the machine, the sheet of paper also being conveyed. Since walls 65 (Fig. 6.) of recesses 58 of the pawls are inclined, said pawls do not operate to detain the carrier frame at this time. While the pawls operate to stop the movement of the carrier frame upon its arrival at the ends of the machine, and while springs 63 have a resiliency adequate to hold the pawls reliably in recesses 64 and prevent recoiling or rebounding of the carrier frame, the pawls become readily dislodged from recesses 64, this being on account of the inclination of wall 65 referred to, and also on account of the considerable force imparted to pins 21 of the carrier frame from arms 23.

We provide the releasing-member 66 comprising the standard 67, secured to the holding plate 68 by the bolt or thumb-screw 69, the plate being provided with the longitudinal slot 70 traversed by the thumb-screw. Standard 67 is provided with a stop-lug 71 and with the pivotally mounted contact-block or finger 72, the latter being mounted in the plane of lug 56 of disk 26, and it will be understood that when the carrier frame reaches a point adjacent to the releasing device referred to, lug 56 will be engaged by finger 72 and this engagement will cause a rotatable movement of the disk, said disk being moved to the position shown in Fig. 6 and thereby causing an upward swinging movement of grip fingers 25, whereby the paper sheet is released. It will be seen that the curved portion 61 of spring 60 will occupy recess 79 of the disk at the time the latter is rotated by operation of releasing member 66; and the spring will cause the grip fingers to remain elevated until the carrier frame is returned to end 2 of the machine.

Means are provided to prevent buckling of the paper sheet which might otherwise occur by the sudden stop of the carrier frame and these means will presently be described. The means for causing the carrier frame to stop at end 3 of the machine consist simply of pawls 57, under operation of their springs 63 already described. It will be noted that the pawls are provided with angular terminals and they operate reliably to cause an abrupt cessation of movement of the carrier frame at the moment of arrival at either end of the machine. After the carrier frame arrives at end 3 of

the machine, it remains there a limited amount of time, this interval being governed by the shape and mountings of cams 37 and 41.

5 The carrier frame remains at end 3 of the machine until the vertically movable folding knife has descended and ascended, and after the folding knife has ascended the carrier frame is forced from end 3 to end 2
10 of the machine by means similar to those already described, this movement being effected by cam 41 in conjunction with springs 30, arms 23, heads 22 and their connections. It will be understood that the releasing device 66 may be secured in any part of slot 70 of bar 68, and this is a desirable feature since an adjustment may thereby be made for the carriage of sheets having different lengths.

20 At 73 are indicated heads or enlargements, preferably having rubber pads 74 secured thereon, these heads being the terminals of contact-arms 75, the opposite end of said arms being mounted upon the supporting-bar 76. The ends of bar 76 are pivotally mounted at 77 upon brackets 52 near
25 end 2 of the machine frame, the bar being disposed at a sufficient altitude so that the movements of the carrier frame will not be obstructed,—and bar 76 is adapted to be partly rotated so that arms 75 will swing downward and cause heads 73 to rest lightly upon the rear part of the paper sheet just before the carrier frame reaches the releasing device 66. The weight imposed by the contact referred to of the head upon the sheet, however, is not sufficient to detach the sheet from the hold of the grip-fingers, but is sufficient to prevent the rolling or buckling
40 of the paper above referred to.

The partial rotation of bar 76 is provided for by means of cam 78, best shown in Figs. 2 and 3, coöperating with tripping-arm 80, said arm being rigidly secured upon the end
45 of bar 76. Arms 75 remain normally at an altitude somewhat above the movable carrier frame, and are held by means of spring 81, mounted upon the machine frame. Cam 78 is adjustably mounted upon shaft 36 by any suitable means, as set-screw 82, and is so adjusted that arms 75 will swing downward just before the carrier frame reaches the releasing device 66, while said frame is moving with the paper sheet in the direction
50 of end 3 of the machine.

Having fully described our invention, what we claim, and desire to secure by Letters Patent is,—

1. In devices for the purposes described,
60 the combination with a frame having a stationary guideway with oppositely disposed terminals and provided with releasing devices, of a carrier frame having paper gripping devices, resiliently actuated arms dis-

posed adjacent to the terminals of said 65 guideway, said carrier frame being movable intermediate the oppositely disposed terminals of the guideway from a movement of said resiliently actuated arms, the paper gripping devices during said movement en- 70 gaging said releasing devices.

2. In feeding mechanism for paper folding machines, the combination of spaced, horizontal, parallel guideways mounted thereon, one of said guideways being pro- 75 vided intermediate its ends with sheet releasing devices, a carrier frame disposed transversely between and seated upon said guideways, said carrier frame being provided with sheet gripping devices; verti- 80 cally movable contact-arms; means for reciprocating the carrier frame slidably in directions from one end of the guideways to the other, said sheets passing upon said machine between said guideways; said 85 gripping devices engaging said releasing devices and said vertically movable contact arms making engagement with said sheet during one of the sliding movements of the carrier frame. 90

3. In devices for the purposes described, the combination with a support having a guideway with oppositely-disposed, terminals and provided with releasing devices, of movable actuating arms disposed outwardly 95 of the terminals of said guideway, a carrier frame provided with paper gripping devices and having contact-portions adapted to be disposed intermediate the terminals of the guideway and said actuating arms, said 100 carrier frame being movable in directions parallel with said guideway from movements of said actuating arms, the releasing devices engaging said paper gripping devices; means upon the support and upon 105 said carrier frame to terminate the movements of the carrier frame at points adjacent to the terminals of said guideway.

4. In feeding mechanism for paper folding machines, the combination with a frame 110 having a pair of horizontal, adjacently disposed, longitudinally grooved guideways, of a carrier frame provided with paper holding devices and having end portions with outwardly projecting rollers and with lugs 115 disposed intermediate and extending outwardly of said rollers, said carrier frame being disposed transversely between said guideways, its lugs engaging within the grooves and the rollers engaging the guide- 120 ways adjacent to said grooves; means to cause a forward sliding movement of the carrier frame upon said guideways, said paper holding devices being closed; means to release said holding devices during the 125 forward movement of the carrier, and means to cause a rearward sliding movement of said carrier frame upon said guideways.

5. In devices for the purposes described, the combination with a frame having a stationary guideway with oppositely disposed terminals and provided with a releasing device mounted longitudinally-adjustable thereon, of a carrier frame having paper gripping devices, resiliently actuated arms disposed adjacent to the terminals of said guideway, said carrier frame being movable intermediate the oppositely disposed terminals of the guideway from a movement of said resiliently actuated arms, the paper gripping devices during said movement engaging said releasing devices.

6. In feeding mechanism for paper folding machines, the combination of spaced, horizontal, parallel guideways, one of said guideways being provided intermediate its ends with sheet releasing devices mounted longitudinally adjustable thereon, a carrier frame disposed transversely between and seated upon said guideways, said carrier frame being provided with sheet gripping devices; resilient means for reciprocating the carrier frame slidably in directions from one end of the guideways to the other, said sheets passing upon said machine between said guideways; said gripping devices engaging said releasing devices during one of the sliding movements of the carrier frame.

7. In devices for the purposes described, the combination with a support having a guideway with oppositely-disposed terminals and provided with releasing devices, of resiliently mounted actuating arms disposed outwardly of the terminals of said guideway, a carrier frame provided with paper gripping devices and having contact-ports adapted to be disposed intermediate the terminals of the guideway and said actuating arms, said carrier frame being movable in directions parallel with said guideway from movements of said actuating arms, the releasing devices engaging said paper gripping devices; means upon the support and upon said carrier frame to terminate the movements of the carrier frame at points adjacent to the terminals of said guideway.

8. In feeding mechanism for paper folding machines, the combination with a frame having a pair of horizontal, adjacently disposed, longitudinally grooved guideways, of a carrier frame provided with paper holding devices and having end-portions with outwardly projecting rollers and with horizontal lugs disposed intermediate and extending outwardly of said rollers, said lugs having rollers mounted upon their upper and lower sides; said carrier frame being disposed transversely and horizontally between said guideways, the rollers of its lugs engaging the walls of the grooves and the projecting rollers of its end-portions engaging the guideways adjacent to said grooves;

means to cause a forward sliding movement of the carrier frame upon said guideways said paper holding devices being closed; means to release said holding devices during the forward movement of the carrier frame, and means to cause a rearward sliding movement of said carrier frame upon said guideways.

9. In devices for the purposes described, the combination with a support having a guideway with oppositely-disposed terminals and provided with releasing devices mounted longitudinally adjustable thereon, of resiliently mounted actuating arms disposed outwardly of the terminals of said guideway, a carrier frame provided with paper gripping devices and having contact-ports adapted to be disposed intermediate the terminals of the guideway and said actuating arms, said carrier frame being movable in directions parallel with said guideway from movements of said actuating arms, the releasing devices engaging said paper gripping devices; means upon the support and upon said carrier frame to terminate the movements of the carrier frame at points adjacent to the terminals of said guideway.

10. In feeding mechanism for paper folding machines, the combination with the frame, a guideway disposed horizontally upon said frame and having its terminals disposed at opposite ends thereof, actuating arms disposed outwardly of each of the terminals of said guideway and adapted to have swinging movements in the direction of said terminals, a sheet holding carrier frame seated upon said guideway and adapted to have sliding movements from one terminal to the opposite terminal of the guideway from the swinging movements of said actuating arms.

11. In folding machines, a means for moving paper sheets as described, comprising a pair of spaced guide-bars secured parallel upon the frame and having resilient pawls upon their terminals; a carrier-frame, comprising a longitudinal body-portion having end-plates with inclined facets and recesses, and having a grip-bar with transverse fingers, said grip-bar extending between and pivotally mounted upon said end-plates; said carrier-frame disposed transversely between with its end-plates in engagement with the guide-bars; means for moving said carrier-frame longitudinally of the guide-bars, said pawls engaging the inclined facets and entering the recesses of said end-plates; means for causing a partial rotation of said grip-bar, its transverse fingers moving into and out of engagement with the longitudinal body portion of the carrier-frame; and means for releasing said pawls from the recesses of said end-plates.

12. In folding machines, a means for mov-

ing paper sheets as described, comprising a pair of spaced guide-bars secured parallel upon the frame and having resilient pawls upon their terminals; a carrier-frame, comprising parallel, vertical end-plates with recesses and a transverse, longitudinal body-portion intermediate said end-plates, and provided with a grip-bar with transverse fingers, said grip-bar extending between and pivotally mounted upon the end-plates; said carrier-frame disposed transversely between with its end-plates in engagement with the guide-bars; means for moving said carrier-frame longitudinally of the guide-bars, said pawls engaging the recesses of said end-plates; means for causing a partial rotation of said grip-bar in one direction, its transverse fingers moving into engagement with the longitudinal body-portion of the carrier-frame; means for releasing said pawls from the recesses of said end-plates; and means for causing a partial rotation of said grip-bar in a reverse direction, its transverse fingers moving out of engagement with said longitudinal body-portion of the carrier-frame.

13. In folding machines, a means for moving paper sheets as described, comprising a pair of spaced track bars secured parallel upon the machine frame and having pawls upon their terminals; a longitudinal carrier-frame, comprising end members with recesses and intermediate upper and lower connecting-strips, and provided with a grip-bar with transverse fingers, said grip-bar extending between and pivotally mounted upon the end members; said carrier-frame disposed transversely between with its end members seated upon the track bars, said pawls engaging within the recesses of said end members; means for causing a partial rotation of said grip-bar, its transverse fingers engaging the lower connecting-strip of the carrier-frame; and means for releasing said pawls from the recesses of said end members.

14. In folding machines, a means for moving paper sheets as described, comprising a pair of spaced track bars secured parallel upon the machine frame and having pawls upon their terminals; a longitudinal carrier-frame, comprising end members with recesses and intermediate upper and lower connecting-strips, and provided with a grip-bar with transverse fingers, said grip-bar extending between and pivotally mounted upon the end-members; said carrier-frame disposed transversely between with its end members seated upon the track bars, said pawls engaging within the recesses of said end members; means for causing a partial rotation of said grip-bar, its transverse fingers moving to a bearing upon said lower connecting-strip; means to maintain the

bearing of said transverse fingers upon said lower connecting-strip; means for releasing said transverse fingers from their bearings and means for releasing said pawls from the recesses of said end members.

15. In folding machines, a means for moving paper sheets as described, comprising a pair of spaced guide bars secured parallel upon the machine frame and having pawls upon their terminals; a longitudinal carrier-frame, comprising end members with recesses and intermediate upper and lower connecting-strips, and provided with a grip-bar with transverse fingers, said grip-bar extending between and pivotally mounted upon the end members; said carrier-frame disposed transversely between with its end members seated upon the track bars, said pawls adapted to engage within the recesses of said end members; means for causing a partial rotation of said grip-bar, its transverse fingers moving to a bearing upon said lower connecting-strip; means to maintain the bearing of said transverse fingers upon said lower connecting-strip; means for releasing said transverse fingers from their bearings, means for releasing said pawls from the recesses of said end members; and a plurality of barrier strands supported by said guide-bars and disposed substantially parallel with said guide-bars intermediate said upper and lower connecting-strips of the carrier-frame.

16. In feeding mechanism for paper folding machines, the combination with the frame, a guideway disposed horizontally upon said frame and having its terminals disposed at opposite ends thereof, resiliently actuated beating arms disposed outwardly of each of the terminals of said guideway and adapted to have swinging movements in the direction of said terminals, a sheet holding carrier frame seated upon said guideway and adapted to have sliding movements from one terminal to the opposite terminal of the guideway from the swinging movements of said beating arms.

17. A means for moving paper sheets, comprising a support, spaced guide bars disposed horizontally upon the support, a longitudinal paper-holding carrier-frame disposed transversely upon the guide bars; rock shafts mounted upon the support and having transverse arms with terminal heads disposed adjacent to the carrier-frame; means to actuate said rock shafts, the terminal heads of said transverse arms moving into contact with the carrier-frame, said terminal heads having means of adjustment whereby their distance from the carrier may be increased or decreased.

18. A means for moving paper sheets, comprising a support, spaced guide bars disposed horizontally upon the support, a lon-

itudinal paper-holding carrier-frame disposed transversely upon the guide bars; rock shafts mounted upon the support and having resiliently-connected, transverse arms with terminals disposed in the plane of the carrier-frame; means to actuate said rock shafts, the terminals of said transverse arms moving into engagement with the carrier-frame.

19. A means for moving paper sheets, comprising a support, spaced guide bars disposed horizontally upon the support, a longitudinal paper-holding carrier-frame disposed transversely upon the guide bars; rock shafts mounted upon the support and having transverse arms with resiliently connected terminal heads disposed adjacent to the carrier-frame; means to actuate said rock shafts, the terminal heads of said transverse arms moving into engagement with the carrier-frame; means for adjustment whereby the distance between said carrier-frame and said terminal heads may be increased or decreased and means for increasing or decreasing the degree of the resiliency of the connection between the terminal heads of said transverse arms.

20. In a means for moving paper sheets, the combination with a support, spaced guide bars disposed horizontally upon the support; a longitudinal, paper-holding carrier-frame disposed transversely upon the guide bars; a pair of rock shafts mounted upon the support, each having transverse arms with terminals disposed in the plane of the carrier-frame; an actuated main shaft, a secondary shaft in communication with the main shaft, each of said shafts being provided with a cam communicating with one of said rock shafts, the actuation of said main shaft causing the terminals of said transverse arms to move into engagement with the carrier-frame.

21. In a means for moving paper sheets, the combination with a support, spaced guide bars disposed horizontally upon the support, a longitudinal paper-holding carrier-frame disposed transversely upon the guide bars; a pair of rock shafts mounted upon the support, each having resiliently connected, transverse arms with adjustable, terminal heads disposed in the plane of the carrier frame; an actuated main shaft upon said support, a secondary shaft upon the support and actuated by the main shaft, each of said shafts being provided with a cam communicating with one of said rock shafts, the actuation of said main shaft causing the adjustable, terminal heads of said resiliently-connected, transverse arms to move into contact with said carrier-frame.

22. In a means for moving paper sheets, the combination with a support, spaced, parallel guide-bars disposed horizontally

upon the support, a longitudinal, paper-holding carrier-frame disposed transversely upon the guide bars; a pair of rock shafts mounted upon the support, each having resiliently-connected, transverse arms with terminals disposed in the plane of the carrier frame; an actuated main shaft upon said support, a secondary shaft upon the support and actuated by the main shaft, each of said shafts being provided with a cam communicating with one of said rock shafts; the actuation of said main shaft operating to cause the terminals of said resiliently-connected, transverse arms to move into contact with the carrier frame, said carrier frame moving longitudinally of said guide bars; holding devices upon said carrier frame and guide bars for terminating said movement of the carrier frame, and means upon the carrier frame and guide bars for releasing said carrier frame from said holding devices.

23. In paper-folding devices, the combination with a support having spaced, stationary, horizontal guide-bars, of a carrier-frame seated upon and adapted to have movements, alternately, between the terminals of said guide-bars, said carrier frame being provided with paper-holding devices; means for controlling said paper-holding devices; means for locking said carrier-frame at the terminals of the guide-bars, and means for releasing said locking means.

24. In paper-folding devices, the combination with a support having spaced, stationary, horizontal guide-bars, of a carrier seated upon and adapted to have movements in alternation between the terminals of the guide-bars; means for detaining said carrier at the terminals of the guide-bars; means for releasing said detaining means; means upon the carrier and upon said support for securing a paper sheet upon said carrier, and means upon the carrier and upon one of said guide-bars for releasing said sheet.

25. In paper-folding devices, the combination with a support having spaced, stationary, horizontal guide-bars, of a carrier seated upon and adapted to have movements in alternation between the terminals of the guide-bars; means for detaining said carrier at the terminals of the guide-bars; means for releasing said detaining means; gripping members conveyed by said carrier, a resiliently mounted holding-bar connected with said gripping members; means upon said support and cooperating with said holding-bar for securing upon said carrier a paper sheet; a releasing device mounted upon and adapted to have adjustments longitudinally of one of said guide-bars, said releasing device cooperating with said resiliently mounted holding-bar during one

of the movements of the carrier and operating to release the gripping members from said sheet.

26. In feeding mechanism for paper folding machines, the combination with a frame having a pair of horizontal, adjacently disposed, longitudinally grooved guideways, one of said guideways having a releasing device mounted longitudinally adjustable thereon, of a carrier frame provided with a paper gripping device and having end-portions with outwardly projecting rollers and with horizontal lugs disposed intermediate and extending outwardly of said rollers, said lugs having rollers mounted upon their upper and lower sides; said carrier frame being disposed transversely and horizontally

between said guideways the rollers of its lugs engaging the walls of the grooves and the projecting rollers of its end-portions engaging the guideways adjacent to said grooves; means to cause a forward sliding movement of the carrier frame upon said guideways, said gripping devices engaging said releasing device, and means to cause a rearward sliding movement of said carrier frame upon said guideways.

In testimony whereof we have affixed our signatures in presence of two witnesses.

ALONZO R. LITTLE.

EZRA H. SMITH.

Witnesses:

E. A. McCloud,

A. B. CHRISTIAN.