No. 649,821. Patented May 15, 1900.

T. C. DEXTER.

PAPER FEEDING MACHINE.

(No Model.) (Application filed Mar. 6, 1899.)

6 Sheets—Sheet 1.

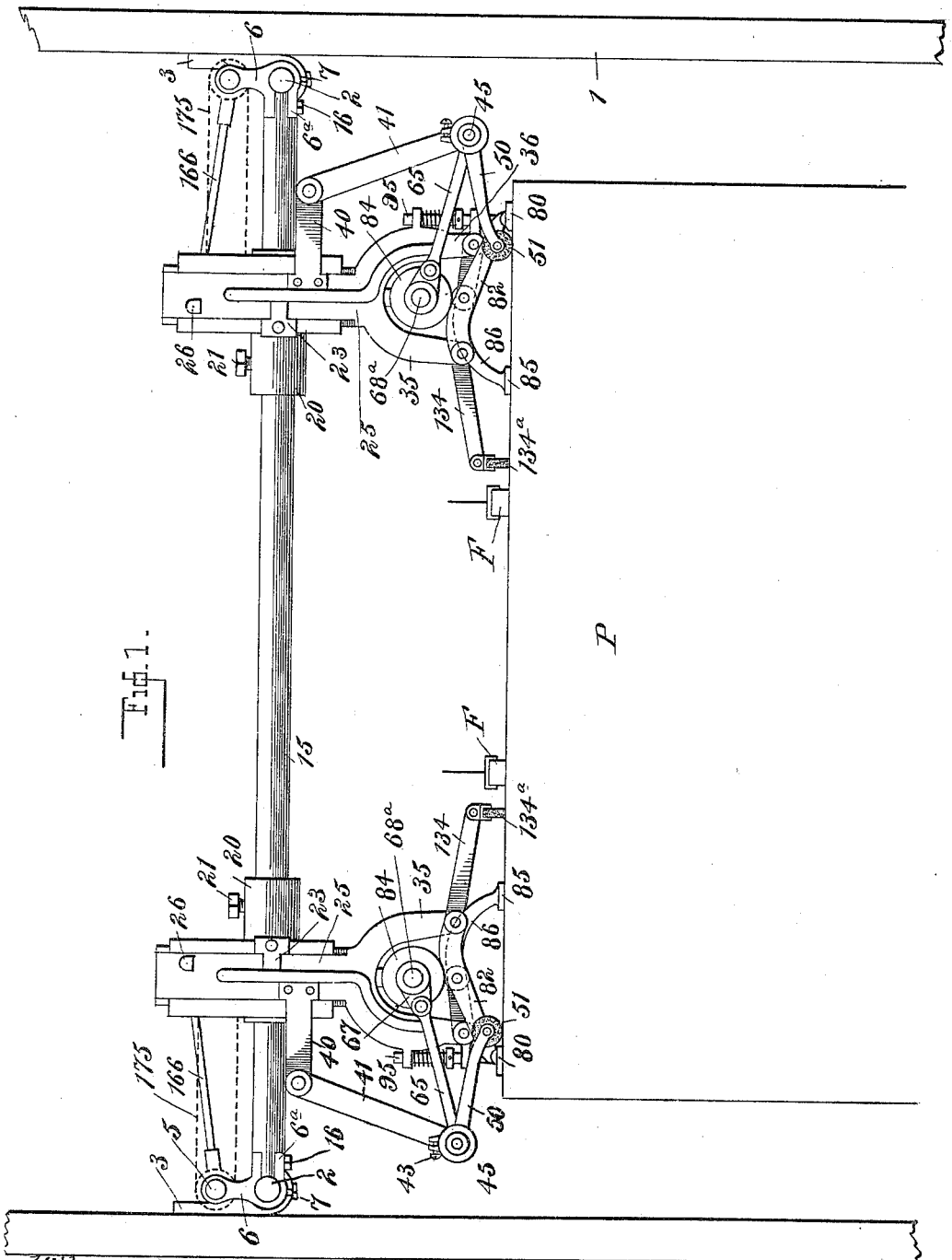

FIG. 1.

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PAPER FEEDING MACHINE.

(Application filed Mar. 6, 1899.)

(No Model.) 6 Sheets—Sheet 2.

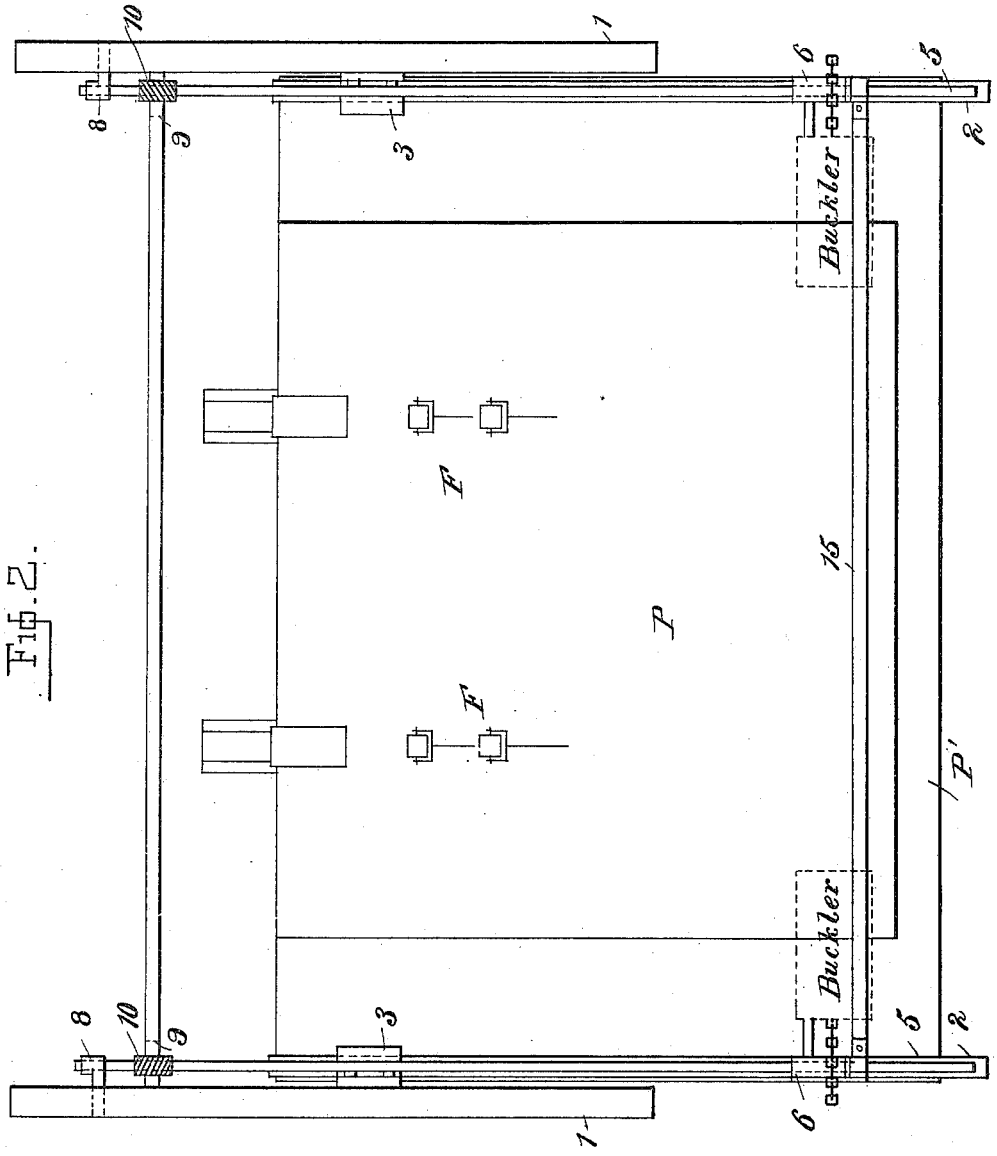

Fig. 2.

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(Application filed Mar. 6, 1899.)

(No Model.) 6 Sheets—Sheet 3.

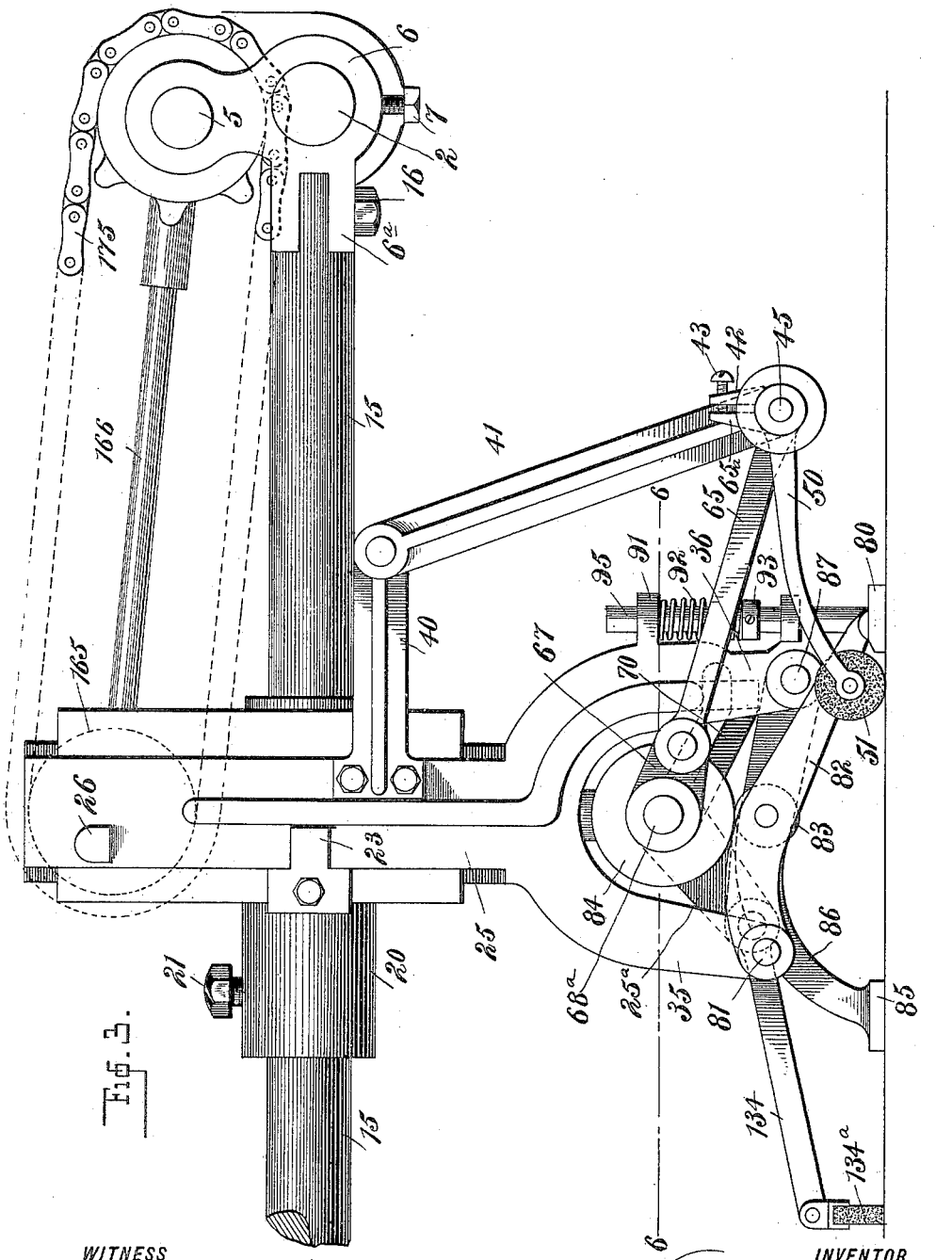

FIG. 3.

WITNESS

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No. 649,821. Patented May 15, 1900.

T. C. DEXTER.

PAPER FEEDING MACHINE.

(Application filed Mar. 6, 1899.)

(No Model.) 6 Sheets—Sheet 4.

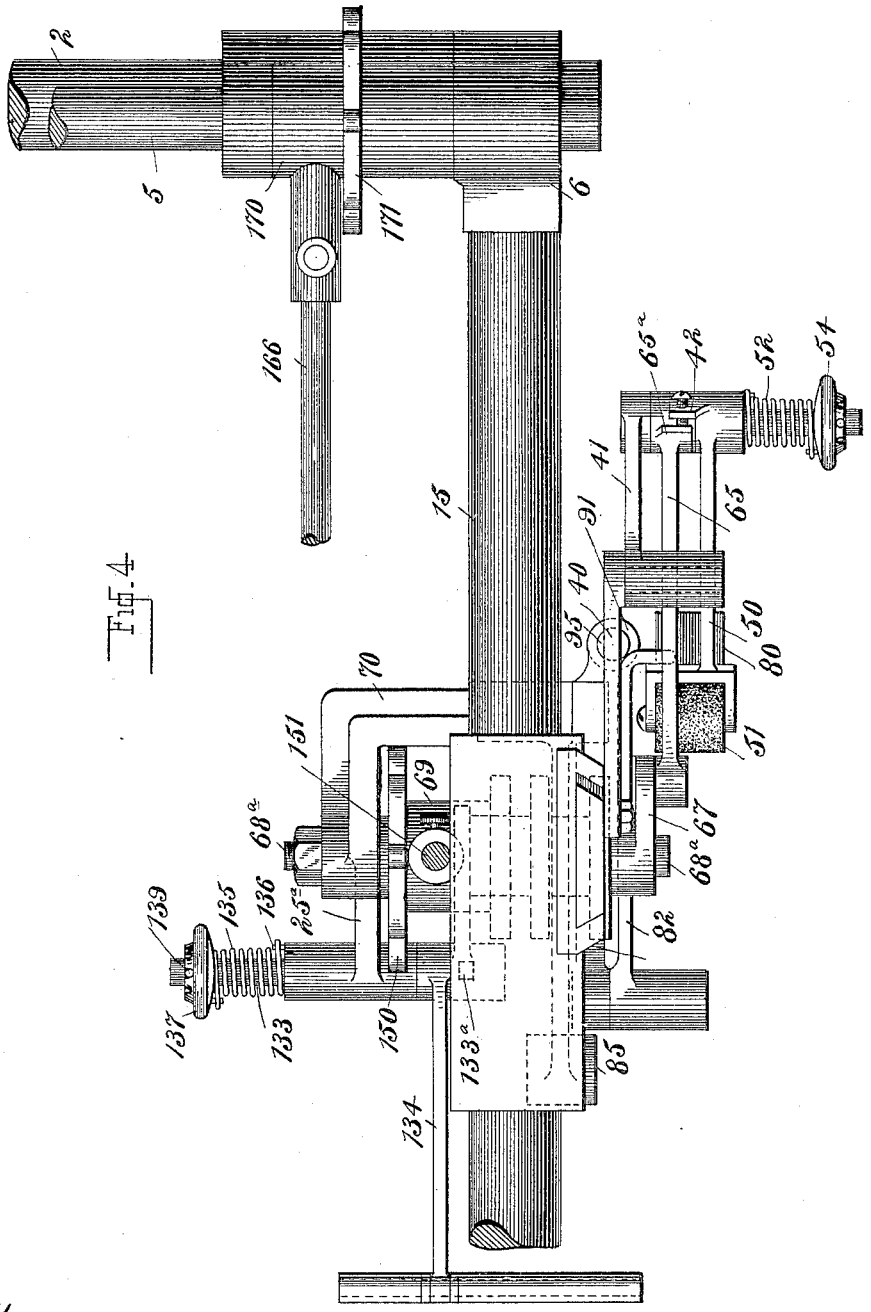

Fig. 4.

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No. 649,821. Patented May 15, 1900.

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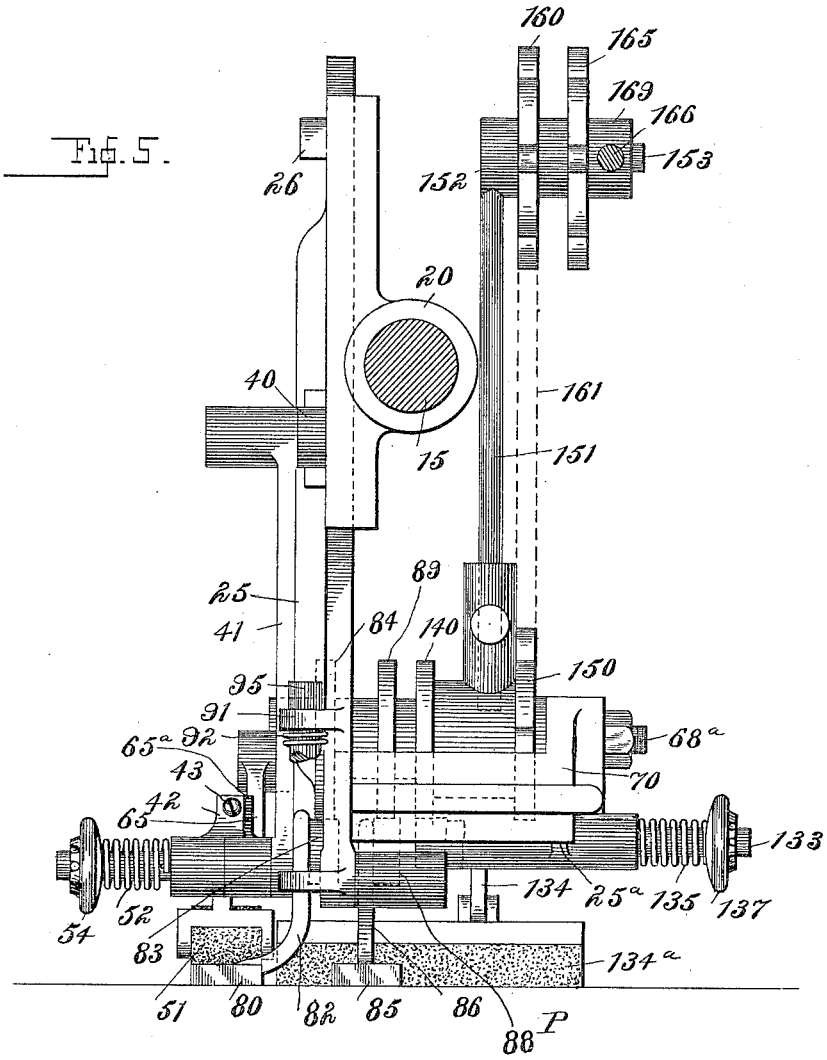
PAPER FEEDING MACHINE.

(Application filed Mar. 6, 1899.)

(No Model.) 6 Sheets—Sheet 5.

Fig. 5.



Witnesses.
Wm. A. Cuttland
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No. 649,821. Patented May 15, 1900.

T. C. DEXTER.

PAPER FEEDING MACHINE.

(Application filed Mar. 6, 1899.)

(No Model.) 6 Sheets—Sheet 6.

Fig. 6.

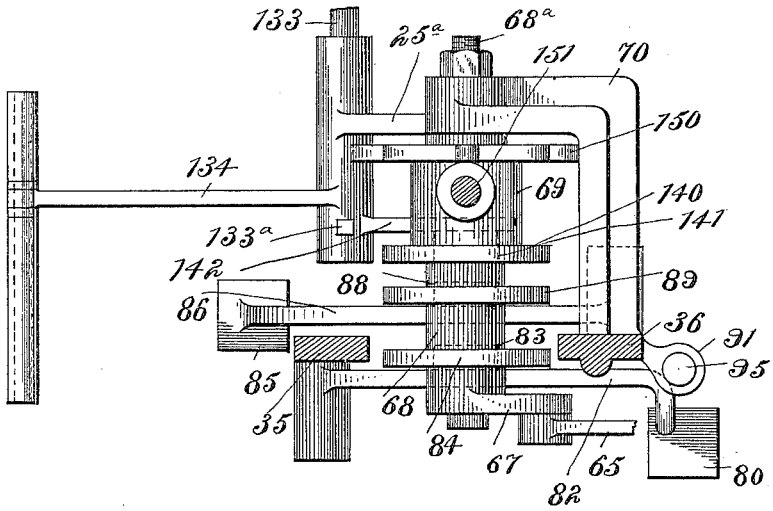
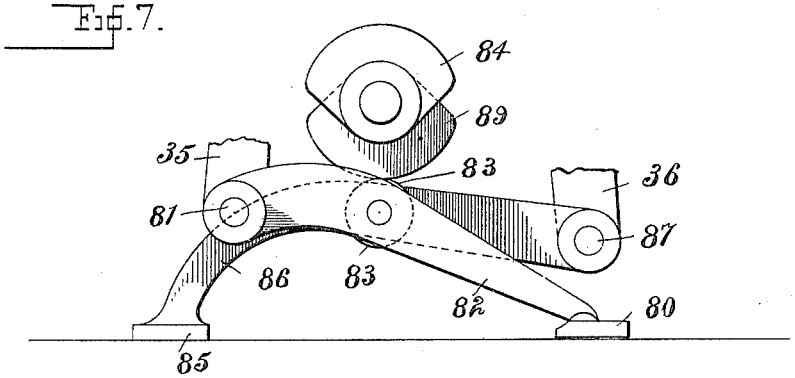


Fig. 7.



Witnesses.
Wm. A. Courtland
M. V. Bridgwood

Inventor.
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UNITED STATES PATENT OFFICE.

TALBOT C. DEXTER, OF PEARL RIVER, NEW YORK.

PAPER-FEEDING MACHINE.

SPECIFICATION forming part of Letters Patent No. 649,821, dated May 15, 1900.

Application filed March 6, 1899. Serial No. 707,875. (No model.)

To all whom it may concern:

Be it known that I, TALBOT C. DEXTER, a citizen of the United States, residing at Pearl River, in the county of Rockland and State of New York, have invented certain new and useful Improvements in Paper-Feeding Machines, of which the following is a specification.

The object of my present invention is to provide a self-adjusting sheet-buckling mechanism for paper-feeding machines which is particularly applicable to the form of such mechanism covered by my application for Letters Patent filed August 5, 1898, Serial No. 687,880.

In the accompanying drawings I have represented my improvements in connection with the mechanism covered by said application Serial No. 687,880, and in said drawings—

Figure 1 is a rear end elevation of a paper-feeding machine embodying my improvements. Fig. 2 is a plan view of the same. Fig. 3 is an enlarged rear end elevation of the sheet-buckling mechanism shown at the right-hand side of Fig. 1. Fig. 4 is an enlarged plan view of the same. Fig. 5 is an edge elevation of the same looking toward the center of the machine. Fig. 6 is a horizontal sectional view taken on the line 6 6 of Fig. 3. Fig. 7 is a detail view representing the action of the cams upon the pile-retaining and buckler-supporting feet.

1 1 are parts of the main side frames of the paper-feeding machine, upon which the supporting-frame of my improved sheet-buckling mechanism is mounted.

2 2 are the longitudinally-extending buckler-supporting bars, which are rigidly secured adjacent to their rear ends in brackets 3 3, which are in turn securely bolted to the inner face of the side frames 1 1.

5 5 are longitudinally-extending buckler-operating shafts journaled at their forward ends in the longitudinally-adjustable brackets 6 6, which are supported upon the bars 2 2 and secured in adjusted position by tap-bolts 7 7. The shafts 5 5 are journaled at their rear ends in suitable bearings 8 8.

9 10 represent worm-gearing, the gear 9 being keyed to one of the shafts 5, while the gear 10 is keyed to the transverse shaft 11, which is the main operating-shaft of the paper-feeding machine. Each of the shafts 5 is geared to the transverse main shaft 11 at its opposite ends by a pair of gears 9 10. In this manner shafts 5 5 are continuously rotated, for the purpose hereinafter explained.

At the inner edges of the longitudinally-adjustable brackets 6 6 are formed bifurcated lugs or ears 6^a, between which are secured the reduced ends of the transverse buckler-supporting bar 15.

16 16 represent bolts which secure the ends of the bar 15 in the bifurcated lugs 6^a, the ends of bar 15 having elongated slots, through which the bolts 16 16 loosely pass.

It will be observed that the buckler-supporting frame comprises the longitudinally-extending rigid bars 2 2 and the transverse bar 15, the bar 15 being adjustable longitudinally upon the bars 2 2 by reason of the adjustable brackets 6 6, which slide upon the bars 2 2. The loose-joint connection between brackets 6 and ends of bar 15 prevents the brackets binding upon the bars 2 2, as they would do if the brackets were rigid with bar 15. The brackets 6 6 also slide longitudinally upon shafts 5 5, which are held against longitudinal movement.

I will now describe one of the sheet-buckling mechanisms, from which the structure of both will be understood, as they are substantially identical with the exception that they are reversed.

20 is a casting mounted upon the bar 15 and adjustable thereon transversely of the pile of sheets.

21 reprerents tap-bolts threaded into suitable openings formed in the bosses of casting 20 and engaging the bar 15 for clamping the casting or bracket 20 in any desired adjusted position.

25 is a vertically-movable automatically-adjustable bracket or slide which is supported in a vertical guideway formed in the rear face of casting 20. This slide bracket or frame 25 is suitably confined in the guideway, but is free to move vertically to follow the height of the pile of sheets by gravity. The operating parts of the sheet-buckling mechanism are all suitably supported upon the bracket or slide 25, as hereinafter described, and move up or down with the self-adjusting slide and are maintained in working relation to the pile of sheets.

23 is a stop-finger bolted to the bracket 20, and 26 is a stop-lug on the rear face of slide 25, which is arranged to engage the stop 23 for limiting the downward movement of the slide and supporting it when the pile-support or table is lowered for the reception of a new pile of sheets.

Projecting horizontally from the face of the bracket or slide 25 is a rigid bracket-arm 40, to which is journaled the upper end of a laterally-movable link 41, which supports at its lower end the sheet-buckling finger 50, provided with the rigidly-secured block or roll 51, of soft rubber or other suitable frictional material. The buckling-finger 50 is mounted upon a bolt or journal-pin 45, journaled in laterally-movable link 41 and provided with a torsional spring 52, which engages the link 41 at one end and a rotary adjustable washer 54 upon pin 45 at its other end for the purpose of giving the buckling-finger 50 a constant downward spring-pressure.

42 is a lug or finger formed integral with the hub of buckling-finger 50, and 43 is an adjusting-screw mounted in the lug or finger 42 and engaging a similar lug or finger 65^a, formed integral with a pitman 65, which is journaled upon the pin 45 at one end and to a crank 67 at its opposite end. The crank 67 is keyed to or formed integral with a short rotary sleeve 68, which is journaled upon a bolt or pin 68^a, secured in the head 69 (hereinafter referred to) and bracket 70 of the vertically-movable gravity-slide 25. The means for rotating the sleeve 68 will be hereinafter described. The slide 25 is formed at its lower end with bracket-arms 35 and 36, between which the rotary sleeve is located.

80 is the holding-down foot or pile-retaining clamp, formed integral with or attached to one end of an arm 82, which is journaled upon a pin 81, projecting rearwardly from the bracket 35 of the gravity-slide 25. The arm 82 has journaled to it between the foot 80 and pin 81 an antifriction-roller 83, which is supported directly beneath a cam 84, keyed to the rotary sleeve 68.

85 is a clamp or foot against which the sheets are buckled. The foot 85 is formed integral with or attached to an arm 86, journaled upon a pin 87, projecting forwardly from the bracket-arm 36 of the slide 25. The arm 86 has journaled to it between the foot 85 and pin 87 an antifriction-roller 88, which is engaged by a cam 89, keyed to the rotary sleeve 68 adjacent to the cam 84. The cams 84 and 89 are similarly shaped, being approximately one-third circular, and are oppositely placed upon the rotary sleeve 68, so that they will operate alternately, and one of them is constantly operating one of the clamps 80 or 85. Each of the pile-engaging feet or clamps 80 or 85 when released from its operating-cam 84 or 89 rests by its own gravity upon the pile and does not materially affect or interfere with the operation of the other parts of the mechanism. The clamp-arms 82 and 86 extend in opposite directions from their supporting bracket-arms 35 and 36 to support the clamps 80 and 85 in proper position upon the pile and bring the antifriction-rollers 83 and 88 directly beneath the rotary sleeve 68 for the operation of the cams upon them.

95 is a rod or bar journaled in brackets 91, so as to slide freely vertically therein. The rod or bar 90 carries at its lower end a small rubber block or pad, which is constantly held in engagement with the top sheet of the pile by means of an expansion-spring 92, surrounding the rod 90 and confined between the upper bracket 91 and an adjustable collar 93, secured to the rod or bar 95. The rod or bar 95, with its block or pad of rubber, constitutes an auxiliary frictional device which engages the pile adjacent to the pile-retaining clamp or foot 80 to assist in preventing the withdrawal of more than one sheet from under the clamp or foot 80 by the action of the sheet-buckling finger. Such an auxiliary frictional device is broadly covered in an application for patent filed by me August 4, 1897, Serial No. 647,014.

Journaled in a bracket 25^a of the slide 25 is a rock-shaft 133, having adjustably clamped upon it an arm 134, carrying in its forward bifurcated end a rubber block 134^a. The arm 134 is adjustably clamped to the rock-shaft 133 by means of a bolt 133^a. Mounted upon one end of the rock-shaft 133 is a spiral spring 135, which engages a pin 136 of the bracket-arm 25^a at one end and an adjustable collar 137 at its opposite end. The collar 137 is formed with the slotted circular flange 138, in the slots of which engage a pin 139, extending transversely through shaft 133. It will be observed that the spring 135 will constantly tend to move the rubber block 134^a upon arm 134 into engagement with the top of the pile of sheets. This movement is allowed to occur intermittently by the operation of a rotary cam 140, keyed to or formed integral with the rotary sleeve 68, (adjacent to cam 89,) which constantly engages an antifriction-roll 141, journaled in the end of the rock-arm 142, which is rigid with arm 134 upon the rock-shaft 133. The cam 140 is approximately semicircular in shape and is placed upon the sleeve 68 in opposite relation to the cam 89, the same as cam 84, so that when the pressure upon holding-down finger or clamp 80 is released by the operation of cam 84 and the pressure upon clamp 85 is applied by cam 89 the rubber holding-block 134^a will be held in engagement with the pile by the operation of spring 135. It will further be observed that the forward motion of the buckling-finger 50 is accomplished while the clamp 85 and the rubber holding-block 134^a are in operative engagement with the pile and that the rearward motion of the buckling-finger is accomplished while the holding-down finger or clamp 80 is firmly held in engagement with the pile and clamp 85 and holding-block 134^a are inoperative. The arm

134, with block of rubber 134ª, constitutes a tail-gripper which engages the under sheet or sheets just in rear of the rear edge of the top sheet as it moves forward under the action of the feeding-off devices.

I will now proceed to describe the extensible driving mechanism which transmits motion from the operating-shafts 5 to the operating parts of the sheet-buckling mechanisms, said extensible driving mechanism comprising a pair of angularly-disposed driving members so arranged that the independent transverse and automatic vertical adjustments of the buckling mechanisms can be accomplished without disarranging the operating mechanism or interfering with the continuous operation of the machine, while the longitudinal adjustment of the driving mechanisms is accomplished simultaneously with the same adjustment of the buckling mechanisms upon the buckler-supporting bars.

Keyed to or formed integral with the rotary sleeve 68 is a sprocket-wheel 150, by which said rotary sleeve is driven.

151 is an adjustable or extensible strut or brace adjustably secured at its lower end to the bearing part 69, through which bolt or pin 68ª extends, and rigidly secured at its upper end to a head 152ª, supporting a short shaft or pin 153. The pin 68ª journals the head 69 to the bracket 70 of the buckler-frame 25. It will be observed that the brace or strut 151 can be shortened or lengthened.

Journaled upon the short shaft or pin 153 is a sprocket-wheel 160, which is supported by said shaft 153 in the same vertical transverse plane as the sprocket 150.

161 is an endless sprocket-chain passing around the sprocket-wheels 150 and 160 for driving the former from the latter.

165 is a second sprocket-wheel upon the short shaft 153, alongside of and secured to the sprocket-wheel 160.

166 is an adjustable transversely-extending strut or brace rigidly secured at one end to a bearing-head 169, through which the shaft 153 extends, and adjustably secured at its other end to a bearing 170, journaled upon the shaft 5 and secured to the bracket 6 of the supporting-bar 2.

171 is a sprocket-wheel having spline connection with the shaft 5, so as to be adjustable longitudinally thereof.

175 is a sprocket-chain passing around the sprocket-wheels 171 and 165.

The sprocket-wheels 160 and 165 are arranged to rotate together upon shaft 153, the former being driven by the latter.

From this structure it will be observed that the rotation of shaft 5 will be directly transmitted to the rotary sleeve 68, the extensible driving mechanism allowing for any adjustment of the buckling mechanism transversely or vertically with relation to the pile of sheets.

As above stated, the two sheet-buckling mechanisms and their operating mechanisms are substantial duplicates.

The pile of paper P is supported upon an adjustable table or support P'.

The machine described constituting my invention is of course designed to be employed in connection with the essential parts of a paper-feeding machine.

The feeding-off devices of any suitable construction are indicated by reference F F.

The operation of my improved sheet-buckling mechanism may be briefly described as follows: The brackets 25 being supported freely in the castings 20, so as to move by gravity down toward the pile of sheets, it will be observed that the brackets and all of the operating parts of the buckling mechanism attached thereto are supported only by the engagement of the buckler-supporting and pile-holding feet 80 and 85. As shown in Fig. 3, the mechanisms are in the position assumed at the commencement of the buckling operation. By the rotation of the sleeves 68 the buckling-fingers 50 are moved inwardly, the lugs 65ª moving out of the way of limiting-screws 43 sufficiently to allow the buckling-finger springs to press the rubber blocks 51 down into frictional engagement with the top sheet of the pile. As this movement commences the cams 89 are in engagement with antifriction-rollers 88, holding the pile-engaging feet 85 firmly in engagement with the pile and supporting the whole weight of the two sets of buckling mechanism upon said feet. The pile-retaining feet 80 rest very lightly upon the pile, being influenced only by gravity, and the tail-grippers 134 are elevated from the pile by engagement of cams 140. The forward movement of the buckling-fingers buckle the rear corners of the top sheet of the pile from under the feet 80 and against the feet 85. At the completion of the inward stroke of the buckling-fingers the position of cams 84 and 89 and 140 is reversed, so that the pressure upon feet 85 will be released, the weight of the buckling mechanisms be thrown upon the pile-retaining feet 80, and the tail-grippers will be moved into engagement with the pile by their springs. At this point in the operation the feeding-off devices F F come into play and feed the buckled sheet forwardly upon the pile, the rear edge of the partially-separated sheet passing under and being just missed by the spring-pressed tail-grippers 134 to further insure against the forward movement of any under sheets with the top sheet. The reverse movement of the buckling-fingers is accomplished by the continued rotation of the sleeves 68, the fingers 65ª engaging screws 43 to elevate the buckling-fingers from the pile just before and maintain them in elevated position during the reverse movement.

The important feature of novelty in my present application is the automatically-adjustable or self-adjusting sheet-buckling mechanism. The importance of this structure is apparent. The height of the pile of sheets to be fed in this style of feeding-ma-

chine will vary greatly for different reasons. The principal cause of the unevenness in the pile of sheets is the fact that in printing the sheets the impression of the type upon the paper is very unequal, so that the thickness of the sheet at various points differs to such an extent that the pile presents an uneven top surface. These uneven surfaces do not of course correspond in different piles, and one pile may be high at a point where the succeeding pile will have a depression. For this reason the self-adjusting feature of my improved buckler is of great importance as it moves vertically to suit the uneven surface of the pile without the necessity of the attention and adjustment of the parts by the operator.

The advantage of the improved structure covered by my present application over the structure covered by my application, Serial No. 687,880, is that in the latter structure dependence has to be placed upon the operator to maintain the buckling mechanisms in proper adjusted position with relation to the pile, whereas in the present case the buckling mechanisms are self-adjusting and faithfully follow the changing inequalities in the pile.

Having thus described my invention, what I claim as new therein, and desire to secure by Letters Patent, is—

1. The combination, in a paper-feeding machine, of a support for a pile of sheets, with two independent automatically-adjustable sheet-buckling mechanisms self-adjustable up and down with relation to the pile of sheets, and means for operating said independent self-adjustable sheet-buckling mechanisms.

2. The combination, in a paper-feeding machine, of a support for a pile of sheets, of a self-adjusting sheet-buckling mechanism movable up and down with relation to the pile, two pile-engaging feet or clamps adapted to alternately support the sheet-buckling mechanism, and means for operating said sheet-buckling mechanism, substantially as set forth.

3. The combination, in a paper-feeding machine, of a support for a pile of sheets, a sheet-buckling mechanism comprising a self-adjusting vertically-movable frame, a sheet-buckling finger, two pile-engaging feet or clamps, and means for operating the sheet-buckling finger and for supporting the weight of the buckler-frame upon said feet or clamps alternately, substantially as set forth.

4. The combination, in a paper-feeding machine, of a support for a pile of sheets, with a sheet-buckling mechanism comprising a vertically-movable self-adjusting frame, a buckling-finger carried by said frame, two pile-engaging feet or clamps pivotally mounted upon said frame, means for throwing the weight of the buckler-frame and operating parts upon the pile-engaging feet alternately, and means for operating the buckling-finger, substantially as set forth.

5. The combination, in a paper-feeding machine, of a support for a pile of sheets, a suitable guideway or bracket, a vertically-movable self-adjusting buckler-frame supported in said guideway or bracket, a buckling-finger and operating mechanism mounted upon said frame, the two pile-engaging feet journaled upon said frame, and means for throwing the weight of the buckler-frame and connected parts upon said feet alternately, substantially as set forth.

6. The combination, in a paper-feeding machine, of a support for a pile of sheets, a guideway or bracket supported above the pile of sheets, a vertically-movable self-adjusting buckler-frame mounted in said guideway or bracket, means for limiting the downward movement of said frame in its guideway, a buckling-finger and operating mechanism connected with said buckler-frame, pile-engaging feet or clamps journaled upon said buckler-frame, means for forcing said feet or clamps into engagement with the pile alternately for supporting the weight of the buckler-frame and connected parts upon one or the other of said feet or clamps, substantially as set forth.

7. The combination, in a paper-feeding machine, with a support for a pile of sheets, of a buckler-frame, a link pivotally mounted upon said frame, a spring-pressed buckling-finger journaled upon said link, a rotating crank, a pitman connecting said crank with the buckler-finger-supporting link, coacting lugs or fingers upon the buckling-finger and pitman and an adjusting-screw carried by one of said lugs or fingers, substantially as set forth.

8. The combination, in a paper-feeding machine, of a support for a pile of sheets, with a vertically-movable self-adjusting buckler-frame, the two pile-engaging feet or clamps mounted upon oppositely-extending arms journaled upon said buckler-frame, means for throwing said clamps or feet alternately into engagement with the pile, a buckling-finger engaging the pile between said clamps or feet, and means for operating said buckling-finger, substantially as set forth.

9. The combination, in a paper-feeding machine, with a support for a pile of sheets, a buckler-frame suitably mounted above the sheet-support, a laterally-movable buckling-finger support mounted on said frame, a spring-pressed buckling-finger journaled to said laterally-movable support, a rotating crank, a pitman connecting the crank with said laterally-movable support, and coacting lugs or fingers upon the buckling-finger and pitman, substantially as and for the purpose set forth.

10. The combination, in a paper-feeding machine, with a support for a pile of sheets, a buckler-frame suitably mounted above the sheet-support, a laterally-movable buckling-finger support mounted on said frame, a spring-pressed buckling-finger journaled to said laterally-movable support, a rotating crank, a pitman connecting the crank with

said laterally-movable support, coacting lugs or fingers upon the buckling-finger and pitman, and means for adjusting the engagement between said lugs or fingers, substantially as and for the purpose set forth.

11. The combination, in a paper-feeding machine, of a support for a pile of sheets, a self-adjusting vertically-movable frame supported above the pile of sheets, a sheet-buckling finger mounted upon said frame, two pile-engaging feet or clamps connected with said frame, a rotary crank connected with and operating the buckling-finger, and a pair of oppositely-arranged cams adapted to alternately engage said feet or clamps for throwing the weight of the buckler-frame and connected parts upon one or the other of said feet or clamps; substantially as set forth.

12. The combination, in a paper-feeding machine, of a support for a pile of sheets, a guideway or bracket supported above the pile of sheets, a vertically-movable self-adjusting buckler-frame mounted in said guideway or bracket, a reciprocating buckling-finger suitably mounted upon the buckler-frame, a rotary shaft journaled in the buckler-frame, a crank upon said shaft operatively connected with the buckling-finger, a pair of pile-engaging feet or clamps pivotally mounted upon the buckler-frame, two oppositely-arranged cams upon the rotary shaft adapted to alternately engage said feet or clamps for throwing the weight of the buckler-frame upon one or the other of said feet or clamps, and means for operating the rotary shaft, substantially as set forth.

13. The combination, in a paper-feeding machine, of a support for a pile of sheets, a vertically-movable self-adjusting buckler-frame supported above the pile of sheets, a reciprocating buckling-finger suitably mounted upon said frame, means for operating the buckling-finger, a pair of pile-engaging feet or clamps journaled upon said buckler-frame, means for forcing said feet or clamps alternately into engagement with the pile to support the weight of the buckler-frame and connected parts upon one or the other of said feet or clamps, a tail-gripper, and means for throwing the tail-gripper into and out of engagement with the pile, substantially as set forth.

14. The combination, in a paper-feeding machine, of a support for a pile of sheets, sheet-buckling mechanism self-adjustable up and down with relation to the pile, an operating-shaft, and extensible driving mechanism operatively connecting the buckling mechanism with the operating-shaft; substantially as set forth.

15. The combination, in a paper-feeding machine, of a support for a pile of sheets, sheet-buckling mechanism self-adjustable up and down with relation to the pile, means for adjusting said buckling mechanism transversely with relation to the pile, and means for operating the buckling mechanism; substantially as set forth.

16. The combination, in a paper-feeding machine, of a support for a pile of sheets, sheet-buckling mechanism self-adjustable up and down with relation to the pile, means for adjusting said buckling mechanism transversely and longitudinally with relation to the pile, an operating-shaft, and suitable extensible driving mechanism operatively connecting the buckling mechanism with the operating-shaft, substantially as set forth.

17. The combination, in a paper-feeding machine, of a support for a pile of sheets, a sheet-buckling mechanism comprising a self-adjusting vertically-movable frame, a sheet-buckling finger, two pile-engaging feet or clamps, means for throwing the weight of the buckler-frame upon said feet or clamps alternately, and extensible driving mechanism for said sheet-buckling mechanism, substantially as set forth.

18. The combination, in a paper-feeding machine, of a support for a pile of sheets, with a sheet-buckling mechanism comprising a vertically-movable self-adjusting frame, a buckling-finger carried by said frame, two pile-engaging feet or clamps pivotally mounted upon said frame, means for throwing the weight of the buckler-frame and connected parts upon the pile-engaging feet alternately, an operating-shaft, and extensible operating mechanism comprising a pair of angularly-disposed sprocket-chains operatively connected with the operating-shaft and sheet-buckling mechanism and with each other, substantially as set forth.

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