To all whom it may concern:

Be it known that I, SEVERIN HALVOREN, a citizen of the United States of America, and resident of Seattle, in the county of King and State of Washington, have invented certain new and useful Improvements in Paper-Feeding Mechanisms, of which the following is a specification.

My invention relates to feeding devices for signatures, papers and like articles, and consists of an improved feeding apparatus by which the feeding of the papers, signatures or the like, one at a time, is insured. The object of my invention is to simplify the mechanisms formerly employed for this purpose as well as to improve upon the character of their operation, whereby the mechanism will, with certainty, feed a single signature or paper at a time without probability of feeding more than one at a time.

The particular parts and combinations of parts of which my invention consists will be hereinafter described and particularly pointed out in the claims. In the accompanying drawings I have shown my invention embodied in the form which is now preferred by me.

Figure 1 is a sectional elevation through the paper holding and feeding means.

Fig. 2 is a plan view of the same parts.

Figs. 3 and 4 are cross sectional elevations showing the parts in different positions.

Fig. 5 shows, in perspective, the cam track by which one set of the paper feeding needles are thrown out of action.

Fig. 6 is a plan view with parts broken away showing one of the feed bars and its associated mechanisms.

Fig. 7 is a sectional elevation showing like parts to those in Fig. 6, and Fig. 8 shows, in end elevation, the same parts as in Figs. 6 and 7.

One of the principal uses for my invention is for the feeding of papers in connection with stuffing apparatus and I will herein describe the same as applied to this use. I clearly realize, however, the adaptability of my invention for other uses, such as the feeding of signatures, pamphlets and other like articles, and do not wish to be understood as abandoning any rights for the device when used for analogous purposes.

The papers are herein shown as placed within a container which has an inclined bottom, the side faces of the papers being in contact with this bottom. The wall, which lies toward the lower end of this inclination, is provided with an inwardly turned ledge, upon which the edges of the papers are supported. The papers should be placed in this compartment or container, in such position that the folded edges of the papers are toward the side 5. The ledge 50 is positioned above the bottom of this compartment a distance which is determined by the thickness of the papers being operated upon. This distance should be sufficient to permit ready discharge of one paper beneath this ledge and not sufficient to permit simultaneous discharge of two papers. This distance is preferably made adjustable, either by vertical movement of the ledge, or by vertical movement of the floor of the compartment at this side.

The floor of this compartment is divided into two sections. The upper section 1, is, or may be, fixed in position. The other section, which is formed by the member 11, is, or may be, vertically adjustable in position to control the gap between this part and the ledge 50, through which the papers are discharged. The section 11 is provided with a series of guides or grooves extending away from the discharge slot, in which the paper feeding members are mounted. These paper feeding members are shown in side elevation in Figs. 3 and 4 and in further detail in Figs. 6 and 7.

Each of the feeding mechanisms comprises a bar 2, which is mounted to reciprocate within a groove formed in the member 11. This reciprocation is shown as being secured by providing each bar with a downwardly extending arm 20, to which a link 21 is connected, this link extending to a crank arm 22, carried by a rock shaft 28, which rock shaft is oscillated between the positions indicated by full and by dotted lines in Fig. 1, through the action of a rod 26, which is in turn reciprocated in any convenient and suitable manner. The crank
arm 25 is provided with a slot 27, for the reception of an adjustable connecting pin 28, whereby the extent of oscillation given to the shaft 29 and the extent of movement given members 2, may be adjusted.

The bars 2 carry two sets of feeding members. The construction of these members in the two sets is essentially the same, but they are so positioned that one set is adapted to feed the paper in one direction, while the other set is adapted to feed it in the opposite direction. The feeding elements of each set consist of a block 3, which is pivoted at 31 to the bar 2, and which carries projecting needles or pins 33, these being inclined in the direction toward which they are expected to move the paper. The blocks 3 are held in position to project the needles 33 slightly above the surface of the table, by means of springs 35. While the above is the construction herein shown and the one preferred by me, other suitable feeding members might be employed without departing from the essence of my invention.

The bar 2 is mounted toward the edge of the paper which is first discharged and reciprocates so as to be drawn entirely under the pile of papers and to be moved in the other direction so as to be projected well beyond the edge of the pile of papers, as is shown in Fig. 1. I have shown two of the blocks 3 provided on each bar 2, positioned to move the paper in the direction which will discharge it through the gap beneath the ledge 50, and one of the feeding elements positioned inwardly from the two just mentioned and adapted to engage and move the paper in the opposite direction. The latter set is provided, each with a cam roller 31, which is adapted for engagement with a cam track 32, so as to positively lower the needle carrying end of the block 3 beneath the surface of the table, to thereby prevent its engaging with the paper.

The cam track 32 is secured integral with an angle shaped member 30, which is provided with slots 37, through which the securing bolts or screws 38 are passed. By this means the position of the cam track may be adjusted to secure the depression of the feeding members of this set at the time desired.

I have shown feed rollers 4 having feed tapes 40 passing about them and placed so as to receive the paper as its edge is projected through the opening under the ledge 50. These tapes may be arranged to conduct the paper to any point desired.

The permanent, or fixed plate 1, which forms part of the table or support for the papers, is provided with an opening in which is placed the plate or frame member 11, in which is mounted the feed bars 2. The opening provided for this purpose is not entirely closed by these parts. These parts are so designed that a space 10 is provided, extending across the table, into which the lowermost paper may be buckled or folded, as is shown at 60 in Fig. 4. This is necessitated for reasons which will now be explained.

The operation of the device is as follows: When the feed bars 2 are moved backward, or up the incline, this direction being such as to move the bar farther under the pile of papers, the feed members, consisting of the set of blocks 3 and their attached needles which are toward the discharge side of the compartment containing the papers, will have no effect upon the papers to move them, for the reason that the inclination of the needles is in the direction opposite to that of movement. The other set of blocks, 30, and their needles, will not engage the papers to move them during the first part of this movement, for the reason that the cam track 32 holds the roller 31 up, thereby depressing the needle end of these blocks, so that the needles are below the surface of the papers. When, however, the cam roller 31 is permitted to drop, by rolling off of the cam track, the spring 35 will throw the needles up into engagement with the paper. The feed bars 2 have not yet reached the limit of their motion and, in consequence, the lowermost paper will be pushed backward under the pile, as has been shown in Fig. 4. In order to permit this, it is best to provide the gap 10, into which the fold 60 of the paper may be formed.

When the feed bars 2 are moved in the opposite direction, the needles of the blocks 3 immediately engage the paper and advance it in the discharge direction. The preliminary backward movement of the paper has been sufficient to withdraw it from the ledge 50, so that when the discharge movement commences the paper will be forced out beneath the ledge 50 and the movement will be carried to such an extent that the paper will be engaged by the feed roller 4. If the space 50 is properly adjusted, there will be no difficulty in passing a single paper, but two papers will be too thick to pass, the upper paper being therefore retained. By this means the feeding of more than one paper at a time is prevented. The feeding mechanism is also of such positive character that the feeding of one paper is insured, so long as any remain in the container.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent of the United States of America, is:

1. A mechanism for feeding single papers from a pile comprising an under-support engaging the side faces of the papers, a restraining member engaging the edges of the papers and a narrow under-support for the edges of the papers spaced above the main under-support to permit the withdrawal of 180
only one paper between them, means for moving the lowermost paper backward to clear it from said narrow support, and means for them moving it oppositely to withdraw it from beneath said narrow support.

2. A paper feeding mechanism comprising a table or support with which the flat side of a pile of papers contact, means restrainingly engaging the edges of the papers at the side from which the papers are removed, an under-support for this edge of the pile of papers spaced away from the table a distance to permit the passage of a paper between them, and reciprocating paper feeding members carrying means for engaging the lowermost paper to move it in each direction.

3. A paper feeding mechanism comprising a table or support with which the flat side of a pile of papers contact, means restrainingly engaging the edges of the papers at the side from which the papers are removed, an under-support for this edge of the pile of papers spaced away from the table a distance to permit the passage of a paper between them, reciprocating paper feeding members carrying means for engaging the lowermost paper to move it in each direction, and means for disengaging one set of the paper engaging means during the reciprocating movement in one direction.

4. A paper feeding means comprising a support for a pile of papers with which the side faces of the papers contact, a restraining wall for one edge of the pile having a bottom flange projecting under the papers, said flange being spaced away from the paper support to permit removal of a paper between them, means for varying the separation of said paper supports and means for engaging the lowermost paper to first push this edge of the paper back to clear said ledge and to then move the paper outward under said ledge.

5. A paper feeding mechanism comprising a table or support with which the flat side of a pile of papers contact, means restrainingly engaging the edges of the papers at the side from which the papers are removed, an under support for this edge of the pile of papers spaced away from the table a distance to permit the passage of a paper between them, reciprocating paper feeding members carrying means for engaging the lowermost paper to move it in each direction.

6. A paper feeding mechanism comprising a table or support with which the flat side of a pile of papers contact, means restrainingly engaging the edges of the papers at the side from which the papers are removed, an under support for this edge of the pile of papers spaced away from the table a distance to permit the passage of a paper between them, and reciprocating paper feeding members carrying means for engaging the lowermost paper to move it in each direction, the supports for said papers having a gap extending transversely of the direction of movement of the papers to permit buckling of the paper being removed.

7. A paper feeding device comprising a main supporting member for a pile of papers and a supplementary support extending along one edge of the papers, said supports being separated to permit discharge of papers between them, means for adjusting the separation of said supports, and means for moving the under paper backward to clear the supplementary support and then forward to discharge it.

8. A paper feeding device comprising a main supporting member for a pile of papers and a supplementary support extending along one edge of the papers, said supports being separated to permit discharge of papers between them, means for adjusting the separation of said supports, means for moving the under paper backward to clear the supplementary support and then forward to discharge it, and separate feeding means engaging the paper after its edge has been discharged.

9. A paper feeding device comprising a main supporting member for a pile of papers and a supplementary support extending along one edge of the papers, said supports being separated to permit discharge of papers between them, means for adjusting the separation of said supports, means for moving the under paper backward to clear the supplementary support and then forward to discharge it, and paper feeding rolls positioned to receive the papers as discharged.

10. A feed mechanism for papers comprising a bar reciprocating along the face of the papers, a set of needles carried by said bar and inclined in one direction, another set of needles inclined in opposite directions and pivotally mounted upon said bar to swing into disengaging position, and means for automatically swinging said last set of needles into disengaging position during the movement of said bar in discharging direction.

11. A feed mechanism for papers comprising a bar reciprocating along the face of the papers, a set of needles carried by said bar and inclined in one direction, another set of needles inclined in opposite directions and pivotally mounted upon said bar to swing into disengaging position, and a cam track engaging the last set of needles to swing them clear of the paper during the movement of the said bar in discharging the paper.

12. A paper feeding mechanism comprising a bar mounted to reciprocate along the
face of a pile of papers, two sets of needle carrying members pivoted upon said bar, needles mounted upon said carriers and inclined oppositely lengthwise the bar for the respective sets, means for yieldingly holding the points of the needles toward the paper, and a cam acting to swing the carriers of one set to clear its needles from the paper during the movement of said bar to withdraw a paper.

Signed at Seattle, Washington, this 24th day of July 1915.

SEVERIN HALVORSEN.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."