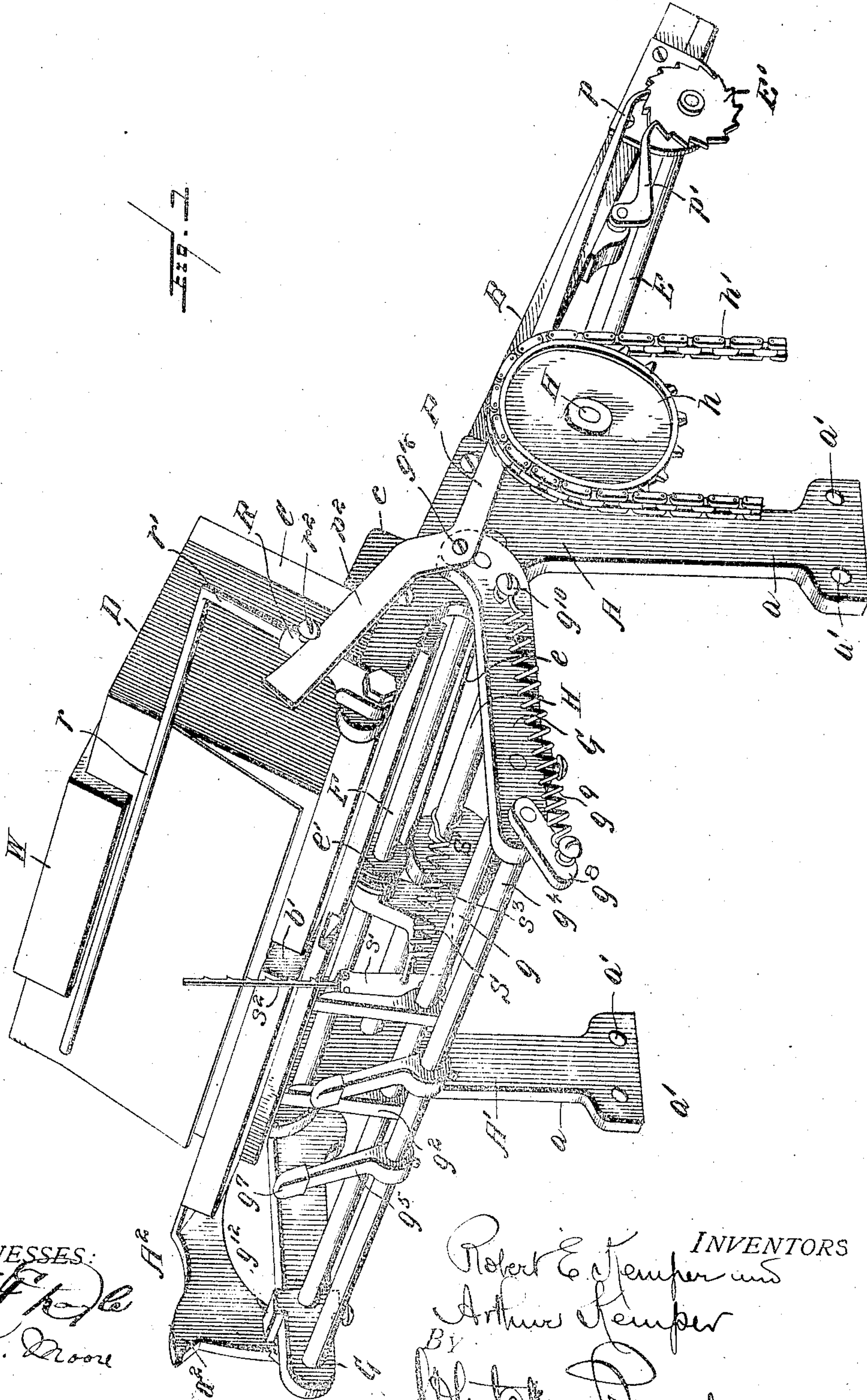


No. 862,172.

PATENTED AUG. 6, 1907.

R. E. & A. KEMPER.  
SEPARATING AND FEEDING DEVICE FOR SHEETS, CARDS, ENVELOPS,  
AND THE LIKE.

APPLICATION FILED JAN. 22, 1906. RENEWED JAN. 2, 1907. 4 SHEETS—SHEET 1.



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4 SHEETS—SHEET 2.

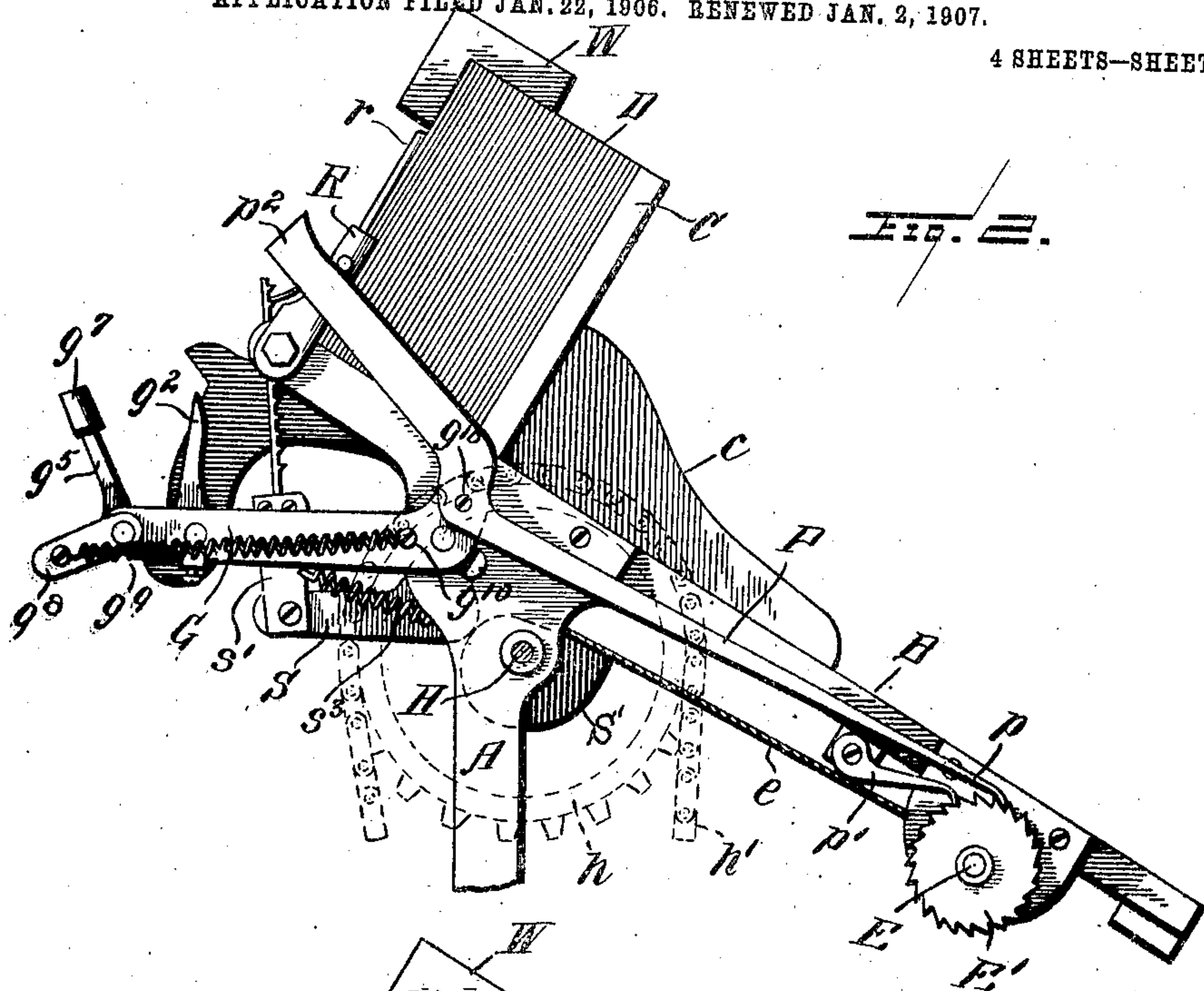


Fig. 2.

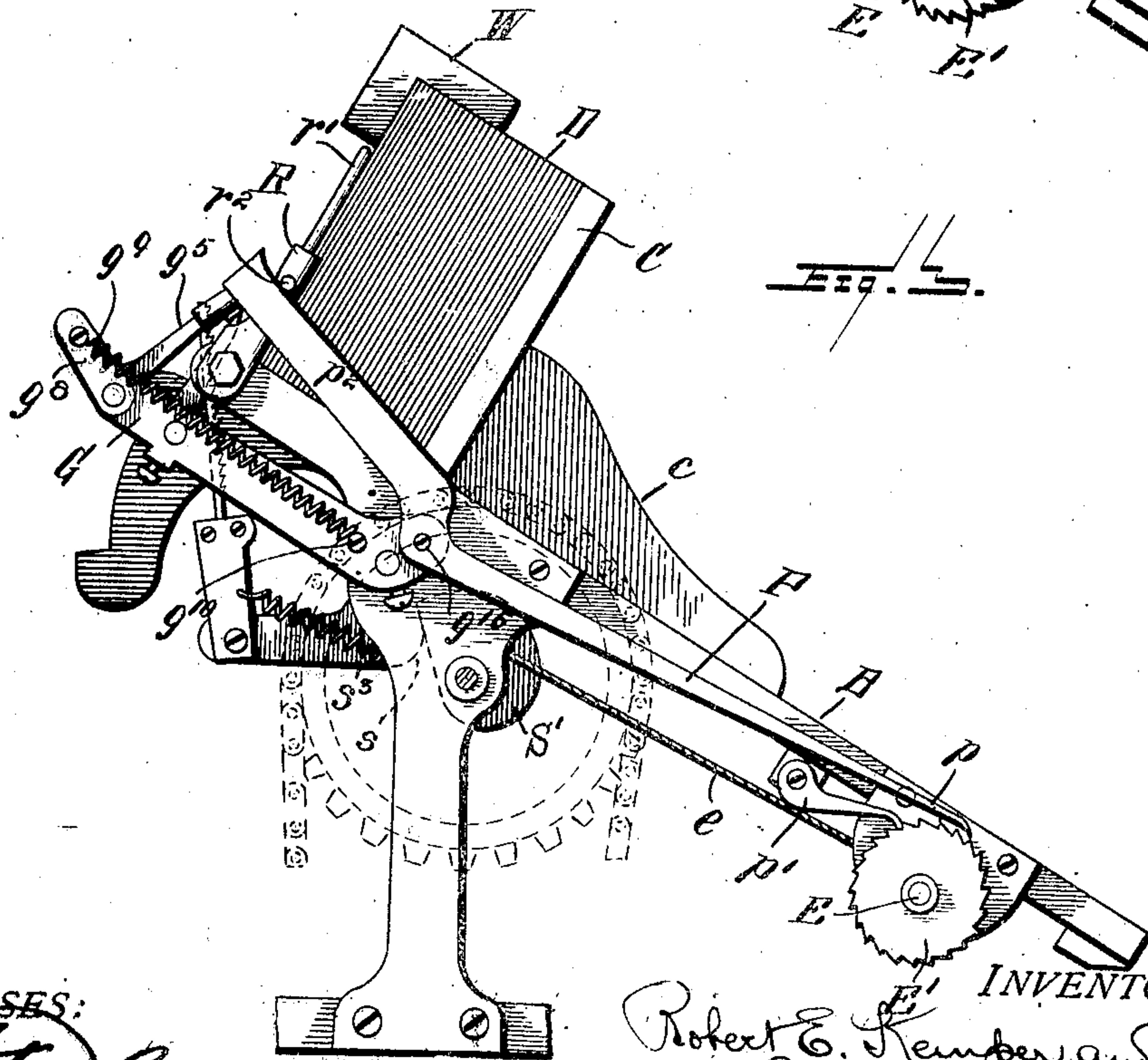


Fig. 3.

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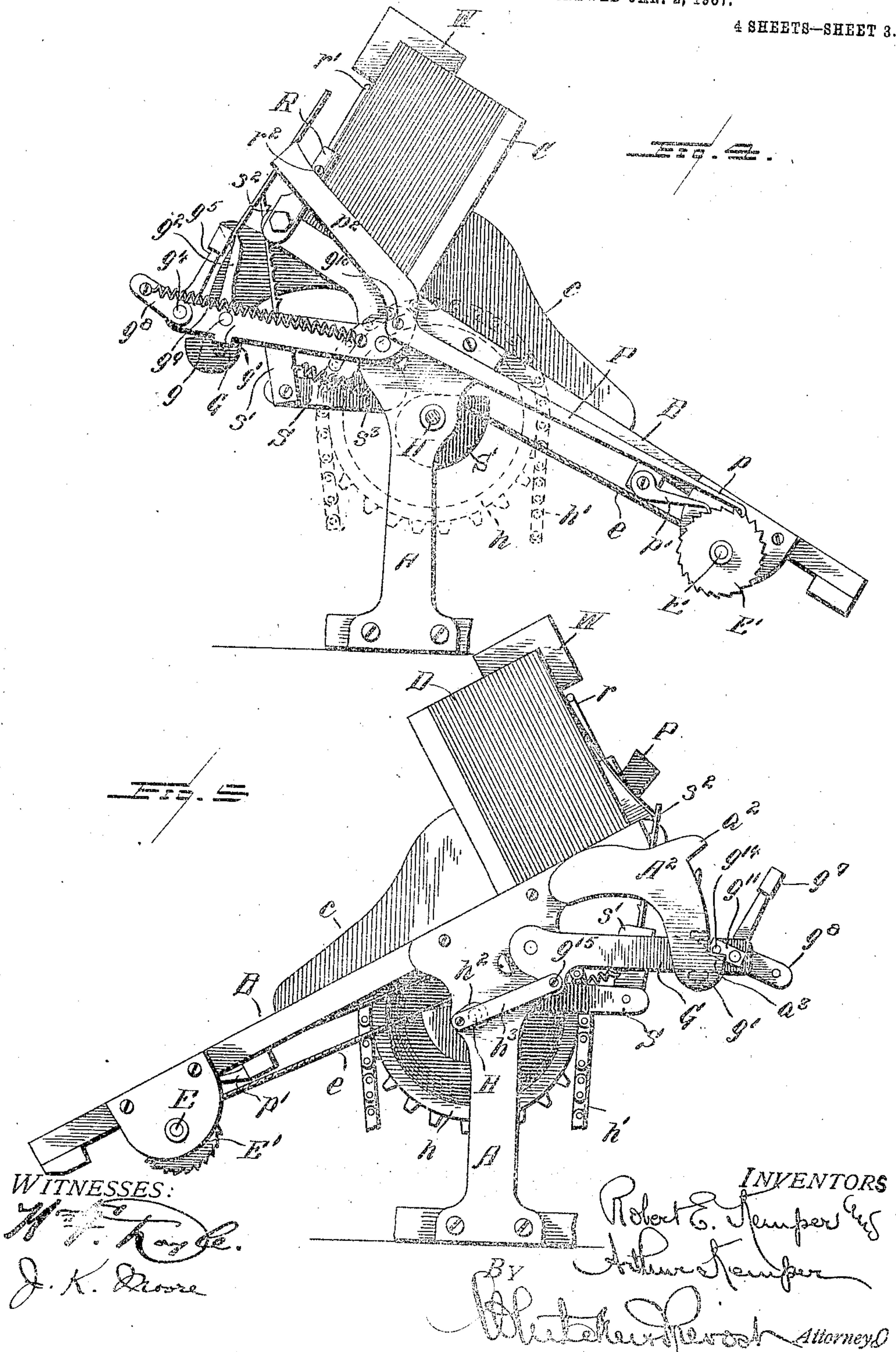
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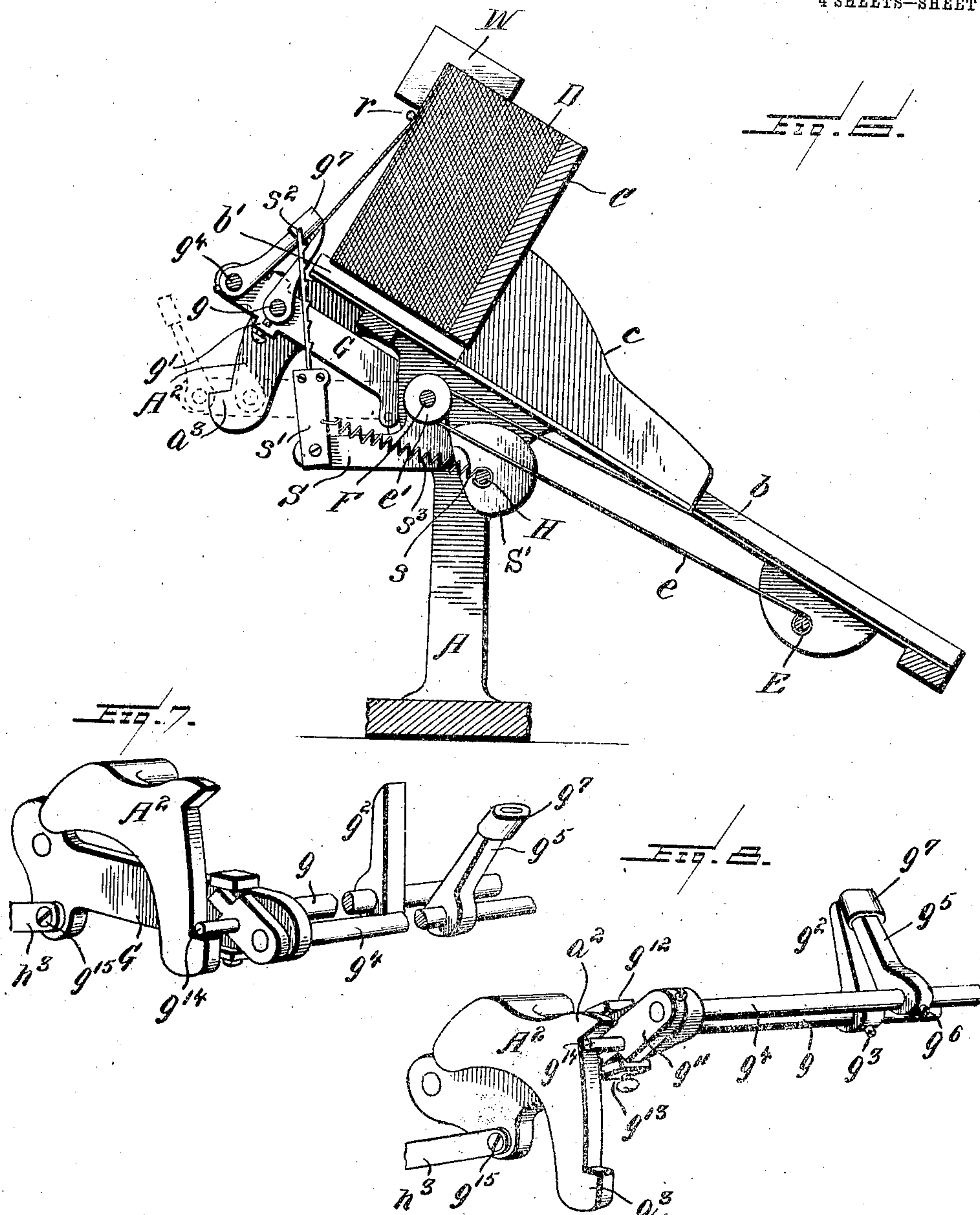
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4 SHEETS—SHEET 4.



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# UNITED STATES PATENT OFFICE.

ROBERT E. KEMPER AND ARTHUR KEMPER, OF RENSSELAER, NEW YORK.

SEPARATING AND FEEDING DEVICE FOR SHEETS, CARDS, ENVELOPS, AND THE LIKE.

No. 862,172.

Specification of Letters Patent.

Patented Aug. 6, 1907.

Application filed January 22, 1906, Serial No. 297,309. Renewed January 2, 1907. Serial No. 350,445.

*To all whom it may concern:*

Be it known that we, ROBERT E. KEMPER and ARTHUR KEMPER, citizens of the United States, residing at Rensselaer, in the county of Rensselaer and State of New York, have invented certain new and useful Improvements in Automatic Separating and Feeding Devices for Sheets, Cards, Envelops, and the Like; and we do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

Our invention consists in the novel features hereinafter described, reference being had to the accompanying drawings which illustrate one form or embodiment of the invention and said invention is fully disclosed in the following description and claims.

Referring to the drawings, Figure 1 represents a perspective view of a feeding apparatus embodying our invention. Fig. 2 represents a side elevation of the same showing the movable gripper or feeding device proper in its lower and open position, as in Fig. 1. Fig. 3 is a similar view showing the gripper in elevated position and closed to grip one of the articles to be fed. Fig. 4 is a similar view showing the gripper in an intermediate position carrying with it the article to be fed. Fig. 5 is a side elevation of the apparatus, showing the opposite side to that represented in Figs. 2 to 4 inclusive, with the gripper in its lower and open position. Fig. 6 represents a central longitudinal sectional view of the apparatus, the parts being in the position shown in Fig. 4. Fig. 7 is a detail perspective view of a portion of the gripper showing it in its lower and open position. Fig. 8 is a similar view showing the gripper in its upper and closed position.

The object of our present invention is to provide an automatic device or apparatus to separate and feed consecutively flexible articles of substantially uniform size such as cards, envelops, sheets of paper and the like, and the apparatus is adapted and applicable to and use with a printing press, although we do not desire to be limited to its use in such connection.

Referring to the drawings A, A' represent the side frames of the apparatus, which are provided with standards *a* provided with apertures *a'* by which they may be secured to a suitable base or support, which may be a part of the frame of a printing press, or other apparatus to which it is desired to feed articles consecutively.

The side frames are in this instance connected by an inclined supporting table B, of wood, (or other material) to which they are attached, and which serves as a support for the articles to be fed. C represents a movable push plate, disposed transversely of and perpendicular to the support or table B, and forming there-

with a hopper to hold a series of articles to be fed, which is indicated at D. The plate C is provided on its rear side with an extension *c* engaging a longitudinal slot *b* in the table B, for guiding the plate C in its movements, and we provide means for moving said push plate on the table B to push the main body of articles D toward the point of delivery, which may be constructed in many ways. In the present instance we have provided a winding shaft E adjacent to the rear end of the table B, mounted in suitable bearings and carrying a cord, or other flexible connection *e* which extends around a pulley, loosely mounted on a rock shaft F journaled in the side frames, and thence to the extension *c* of the push plate, so that the winding of the cord *e* around the shaft E will cause the push plate to move upward on the table B so as to advance the articles D toward the upper or delivery end of the hopper. We also provide mechanism for automatically operating the said push plate C, which will be presently described.

To the rock shaft F before referred to, is secured what we term a swinging gripper or feeding frame, which comprises two arms G G' secured to the rock shaft at opposite sides of the apparatus and connected by a cross bar *g* near their outer ends, which cross bar is rigidly secured to the said arms by screws *g'*. Upon the cross bar *g* are mounted adjustably two or more rigid gripper fingers *g<sup>2</sup>* each provided with an aperture through which the bar *g* passes and rigidly secured to said bar by a set screw *g<sup>3</sup>*. This construction permits the fingers *g<sup>2</sup>* to be adjusted longitudinally of and also around the bar *g*.

In the outer ends of the arms G G' is mounted a rock shaft *g<sup>4</sup>* upon which are rigidly secured similar gripping fingers *g<sup>5</sup>* adjustably secured thereto by screws *g<sup>6</sup>* in position to engage the fingers *g<sup>2</sup>*. One set of said fingers (or both as preferred) is provided with elastic material as rings *g<sup>7</sup>* of rubber here shown on the fingers *g<sup>5</sup>*, in order to give the fingers a better grip on the articles.

The rock shaft *g<sup>4</sup>* is provided at one end with an arm *g<sup>8</sup>* (see Figs. 1 to 4 inclusive) rigidly secured thereto and to the outer end of said arm is secured a spring *g<sup>9</sup>* the opposite end of which is secured to the arm G at *g<sup>10</sup>*. The construction is such that when the gripper fingers are in open position as shown in Fig. 1 for example, the arm *g<sup>8</sup>* will be below an imaginary line passing through the point of attachment *g<sup>10</sup>* of the spring and the axis of the rock shaft *g<sup>4</sup>* and when the gripper fingers are in closed position as indicated in Fig. 3 for example, the arm *g<sup>8</sup>* will be above such a line. The tension of spring *g<sup>9</sup>* will therefore serve to hold the gripper fingers in either open or closed position, and when the gripper fingers are moved from one position



to the other in either direction, as soon as the outer end of the arm  $g^8$  has passed said imaginary line, the tension of the spring will cause it to complete its movement with an instantaneous movement as will be readily understood.

We provide stops for limiting the movement of the rock shaft in both directions, under the influence of spring  $g^9$ , which are clearly shown in Figs. 7 and 8. The rock shaft  $g^4$  is provided at the end opposite that to which arm  $g^8$  is secured, with a rearwardly extending arm  $g^{11}$ , which has an end portion constructed to lie between two stops  $g^{12}$  and  $g^{13}$  secured to or cast integrally with the adjacent arm  $G'$  of the gripper frame, as the engagement of the movable fingers with the rigid fingers will of necessity limit the movement of the rock shaft  $g^4$  in that direction the stop  $g^{13}$  might be dispensed with if desired. The arm  $g^{11}$  is also provided with an outwardly extending stud or pin which we term the trip pin.

In order to trip the pin  $g^{14}$  and actuate the rock shaft  $g^4$  and the movable gripper fingers  $g^5$ , we provide the side frame  $A'$  with a bracket  $A^2$  having a projection or shoulder at its upper and lower ends, lettered  $a^2$ ,  $a^3$  and arranged so as to engage the trip pin  $g^{14}$  when the gripper frame is swung up or down.

H represents the driving shaft of the apparatus which may be driven in any suitable manner, as by a sprocket wheel  $h$  and chain  $h'$  from a rotary part, for example, a shaft on the printing press with which it is to be employed. At one end said shaft is provided with a crank  $h^2$  connected by a link  $h^3$  with a crank pin or stud  $g^{15}$  on the arm  $G'$ . The radius of crank pin  $g^{15}$  is greater than that of the crank  $h^2$  and it will thus be seen that when the driving shaft is rotated the crank  $h^2$  will cause the rock shaft  $F$  to oscillate and the gripper frame to move up toward the delivery end of the hopper or table B, and downward away from said hopper.

At the opposite end of the rock shaft  $F$  the arm  $G$  is provided with a crank pin  $g^{16}$  to which is attached a long pawl  $P$  the end  $p$  of which engages a ratchet wheel  $E'$  on the winding shaft  $E$ , and a locking pawl  $p'$  is also provided to prevent the ratchet wheel from moving backward. The operating pawl  $P$  is also provided with an inclined release arm  $p^2$  extending upwardly and forwardly in an inclined direction from the crank pin  $g^{16}$ .

R represents a feed release arm pivoted to the side frame  $A$  extending upwardly therefrom and provided with a transverse bar  $r$  which extends across the front face of the first article held in the hopper, as shown in Fig. 1. We prefer to make the arm  $R$  with a longitudinal aperture in which a bent portion  $r'$  of the transverse bar  $r$  is adjustably inserted and held in adjusted position by a set screw  $r^2$ .

We also provide a separating device for separating the first of the articles held in the hopper, from the remaining articles, to enable it to be removed by the feeding devices or gripping fingers, and for this purpose we employ the form of separating device shown, described and claimed in our former application for Letters Patent filed Mar. 10, 1905, Serial No. 249,494.

Upon the rock shaft  $F$  is loosely mounted an arm  $S$  provided with a cam engaging portion  $s$ , and having its outer end provided with a yieldingly supported arm  $s'$ , pivoted thereto and provided at its upper end

with a clamping device, carrying a slender blade  $s^2$ , provided with one or more teeth each having an abrupt feeding face and an inclined shoulder, as shown, the device being similar to a very fine saw blade. This blade is shown in a somewhat exaggerated manner in the drawings for greater clearness.

$s^3$  represents a light spring connected to the arm  $s'$  and extending rearwardly, its rear end being shown connected to the drive shaft  $H$ .

$S'$  represents an operating cam on the shaft  $H$  adapted to engage the cam engaging portion or heel of the arm  $S$  to raise and lower the separating blade  $s^2$ . This blade is so adjusted that it will have a movement under the influence of the cam  $S'$  transversely across the extreme edge (in this case the lower edge) of the first article in a direction away from the remaining articles, so as to separate the first article and place its lower edge in position to be grasped and removed by the gripper fingers. The table  $B$  forming the bottom of the hopper is recessed at the front as shown at  $b'$  to allow the blade  $s^2$  to freely engage the first article while affording a proper support for the rest.

It is desirable to provide means for preventing the upward movement of the articles held by the hopper when the separating blade engages and separates the first article and in this instance, we provide a weight  $W$  of wood, metal or other suitable material, preferably made in rectangular form, one flange or portion lying on top of the articles  $D$  in the hopper and the other flange or portion extending downward over the first article, and said weight will be sustained in this position owing to the inclination of the hopper so long as there are any articles to be delivered, and will eventually be deposited on the top edge of the push plate  $C$  when all the articles have been removed.

The hopper being provided with a stack of envelopes, cards, sheets or other articles to be fed, the winding shaft  $E$  is operated by turning the ratchet wheel  $E'$  by hand until the first article is but a short distance from the delivery end of the table  $B$ , and over the slot or recess  $b'$  therein. The device can then be started and the operation will be as follows, assuming that the parts are in the position shown in Fig. 2.

The high point of the blade operating cam is so arranged as to engage the separating arm  $S$  while the crank  $h^2$  is on its dead center, so as to give the separating device a slight lead over the gripping frame. As the drive shaft  $H$  rotates the cam will elevate the separating blade, one of the teeth of which will engage the lower edge of the first article and move it outwardly as shown in Fig. 1, into position to be engaged by the gripper fingers. The crank pin  $h^2$  now causes the gripper frame to rise carrying the gripper fingers, the stationary fingers  $g^2$  passing below the article and the movable fingers  $g^5$  above. The trip pin  $g^{14}$  now strikes the upper tripping projection  $a^2$ , and arrests it while the further upward movement of the frame swings the trip arm  $g^{11}$  and rocks the rock shaft  $g^4$  carrying the fingers  $g^5$  until the arm  $g^8$  carrying the spring  $g^9$  passes its median position when the spring pulls the arm  $g^8$  sharply upward and snaps the fingers  $g^5$  down upon the first article and clamps it between the fingers  $g^2$  and  $g^5$ , see Figs. 3 and 6. The swinging of the gripper frame upward also throws the pawl  $P$  rearward and operates the ratchet wheel  $E'$  so as to move the push plate forward and feed



up the remaining articles. The gripper frame is then lowered, carrying with it the article held by the fingers, as shown in Fig. 4, while the separating device is also lowered to original position. As the frame descends the trip pin  $g^{14}$  will strike the lower projection  $a^3$  arresting it and the further movement of the frame causes the gripper fingers  $g^5$  to snap into open position as before described, releasing the article, which drops through the fingers  $g^2, g^5$  into the proper position determined for it by the location of the apparatus. The operation is then repeated and the articles are consecutively separated and fed.

The articles will vary in thickness and in order to prevent the push plate from pushing the articles in the hopper too fast, it will be noted that if the first article in the hopper has its position advanced from what it should normally be, as indicated in Fig. 2 for example, the transverse rod  $r$  and release arm  $R$  will be moved forward. The release arm  $R$  carries a stud (in this instance the set screw  $r^2$ ) which engages the inclined release arm  $p^2$  of the pawl  $P$ , thus depressing the arm  $p^2$  and elevating the end  $p$  so as to disengage it from the ratchet wheel. This will prevent any further forward feeding of the articles in the hopper until sufficient articles have been removed to permit the release bar  $R$  to resume its normal position, and this mechanism in a simple manner regulates the position of the articles in the hopper and compensates for variations in the thickness of the articles fed.

In the foregoing specification and in the following claims, we have used the term "edge" in referring to the portion of the first article in the hopper which is engaged by the separating device, as meaning the edge proper as distinguished from the marginal portions of the sheet within the limits of the edge proper.

What we claim and desire to secure by Letters Patent is:—

1. In an automatic feeding device for sheets, cards and envelopes, the combination with means for supporting a plurality of articles to be fed, of a reciprocating gripper, arranged adjacent thereto, and constructed to permit the passage of the articles therethrough, and a separating device having a longitudinal portion provided with teeth each having an abrupt feeding face and an inclined shoulder, and means for drawing said separating device longitudinally in both directions across the edge of the first of said articles the movement of said separating device in one direction moving the said first article into position to be seized by said gripper, substantially as described.
2. In an automatic feeding device for sheets, cards and envelopes, the combination with means for supporting a plurality of articles to be fed, of a reciprocating gripper, arranged adjacent thereto, and constructed to permit the passage of the articles therethrough, and a separating device comprising a metal blade having one of its longitudinal edges provided with teeth, each having an abrupt feeding face and an inclined shoulder and means for drawing said separating device longitudinally in both directions across the edge of the first of said articles, substantially as described.
3. In an automatic feeding device for sheets, cards and envelopes, the combination with a hopper for supporting the articles to be fed on edge, a gripper movable vertically, disposed adjacent to the delivery end of the hopper and constructed to permit the passage of the articles through the gripper, and a separating device comprising a blade provided with teeth, each having an abrupt feeding face and an inclined shoulder arranged adjacent to the delivery end of the hopper, and means for reciprocating said separating device longitudinally across the lower edge of the first of said articles in the hopper, the movement of said

separating device in one direction moving said first article into position to be engaged by said gripper, substantially as described.

4. In an automatic feeding device for sheets, cards and envelopes, the combination with a hopper for supporting a plurality of articles on edge, of a movable gripper constructed to permit the articles to pass through the same, and arranged adjacent to said hopper, a separating device consisting of a blade provided with teeth, on one of its longitudinal edges, having a transverse movement across the lower edge of the first of said articles, and a retaining device for engaging the upper edges of the first article and adjacent articles in the hopper, for preventing their accidental displacement, substantially as described.

5. In an automatic feeding device for sheets, cards and envelopes, the combination with supporting means for the articles to be fed, of a separating device having a movement transversely of an edge of the first of said articles and provided with teeth to engage said edge, a movable gripper frame carrying fingers adapted to receive the separated article, certain of which fingers are movable, a spring holding said movable fingers in open and also in closed position, and tripping mechanism for said movable fingers, operated by the movements of the gripper frame, substantially as described.

6. In an automatic feeding device for sheets, cards, and envelopes, the combination with supporting means for the articles to be fed, of a separating device having a movement transversely of an edge of the first of said articles and provided with teeth to engage said edge, a movable gripper frame carrying fingers adapted to receive the separated article, certain of which fingers are movable, a spring holding said movable fingers in open and also in closed position, a trip arm connected with said movable fingers, and stationary tripping devices adapted to be brought into engagement with a part connected with said trip arm, by the movements of said gripper frame, substantially as described.

7. In an automatic feeding device for sheets, cards, and envelopes, the combination with supporting means for the articles to be fed, of a separating device having a movement transversely of an edge of the first of said articles and provided with teeth to engage said edge, a movable gripper frame carrying fingers adapted to receive the separated article, certain of which fingers are movable, a spring holding said movable fingers in open and also in closed position, a trip arm connected with said movable fingers, a stop for said trip arm for limiting the movement of said movable fingers in a direction to open the gripping mechanism and stationary tripping devices adapted to be brought into engagement with a part connected with said trip arm by the movements of said gripper frame, substantially as described.

8. In an apparatus for automatically feeding sheets, cards, and envelopes, the combination with means for supporting a plurality of articles to be fed, of a separating device movable transversely across an edge of the first of said articles, a movable gripper frame, provided with rigid gripping fingers, a rock shaft mounted in said frame and provided with movable fingers, an arm connected with said shaft, a spring connected with said arm and to an attaching device for holding said movable fingers in both open and closed positions, said arm being movable into positions above and below a horizontal plane passing through the rock shaft and the spring attaching device, a trip arm connected with said rock shaft, a stop for limiting the movement of said movable fingers in a direction to open the same, and stationary tripping devices brought into engagement with a part connected with said trip arm by the movements of said gripper frame, substantially as described.

9. In an automatic feeding device for sheets, cards and envelopes, the combination with a hopper for supporting the articles to be fed, on edge, a vertically movable gripper arranged below the delivery end of said hopper, and provided with gripping jaws constructed to provide a free passage between them for the articles, when the jaws are open, a separating device consisting of a toothed blade and means for reciprocating it across the lower edge of the first article in the hopper, to move the article into



position to be engaged by said gripper, means for moving the gripper vertically and means for opening and closing the gripper jaws, whereby the articles will be withdrawn from the hopper and pass downward through the gripper, substantially as described.

10. In an automatic feeding device for sheets, cards, and envelopes, the combination with a support for the articles to be fed comprising a supporting table and a movable push plate, a separating device having a movement transversely across the edge of the first of the articles held by said support, a movable gripper frame, provided with gripping devices for receiving and removing the separated articles, means for advancing said push plate comprising an operating shaft provided with a ratchet wheel, an operating pawl operatively connected with the gripper frame and engaging said ratchet wheel, a feed releasing device in the path of the advancing articles in said support, and operatively connected with said pawl for disengaging it from said ratchet wheel, substantially as described.
11. In an automatic feeding device for sheets, cards, and envelopes, the combination with a support for the articles to be fed comprising a supporting table and a movable push plate, a separating device having a movement transversely across the edge of the first of the articles held by said support, a movable gripper frame, provided with gripping devices for receiving and removing the separated articles, means for advancing said push plate comprising an operating shaft provided with a ratchet wheel, an operating pawl operatively connected with the gripper frame and engaging said ratchet wheel, a feed releasing lever having a part in the path of the advancing articles on said

support, a release arm on said pawl and a projection on said releasing lever for engaging said pawl release arm to disengage said pawl from the ratchet wheel, substantially as described.

12. In an automatic feeding device for sheets, cards, and envelopes, the combination with the hopper, comprising a support and a movable push plate disposed perpendicularly thereto, of a vertically swinging gripper frame carrying rigid fingers, and a rock shaft mounted in said frame and provided with movable fingers, a spring for holding said fingers in both closed and open positions, a trip connected with said shaft and stationary tripping projections arranged to engage said trip and operate said movable fingers, by the movement of the gripper frame, a separating device comprising a yieldingly mounted blade provided with teeth, said blade having a movement transversely of an edge of the first article in said hopper, means for reciprocating said gripper frame, means for reciprocating said separating device, automatic mechanism for advancing the articles in said hopper, and a releasing device having a part in the path of the articles in the hopper for throwing said automatic advancing mechanism out of operation, substantially as described.

In testimony whereof we affix our signatures, in the presence of two witnesses.

ROBERT E. KEMPER.  
ARTHUR KEMPER.

Witnesses:

PETER KEMPER,  
C. G. KEMPER.