No. 821,601. PATENTED MAY 22, 1906.

R. E. & A. KEMPER.

AUTOMATIC FEEDING DEVICE FOR SHEETS, CARDS, AND ENVELOPS.

APPLICATION FILED MAR. 10, 1905.

4 SHEETS—SHEET 1.

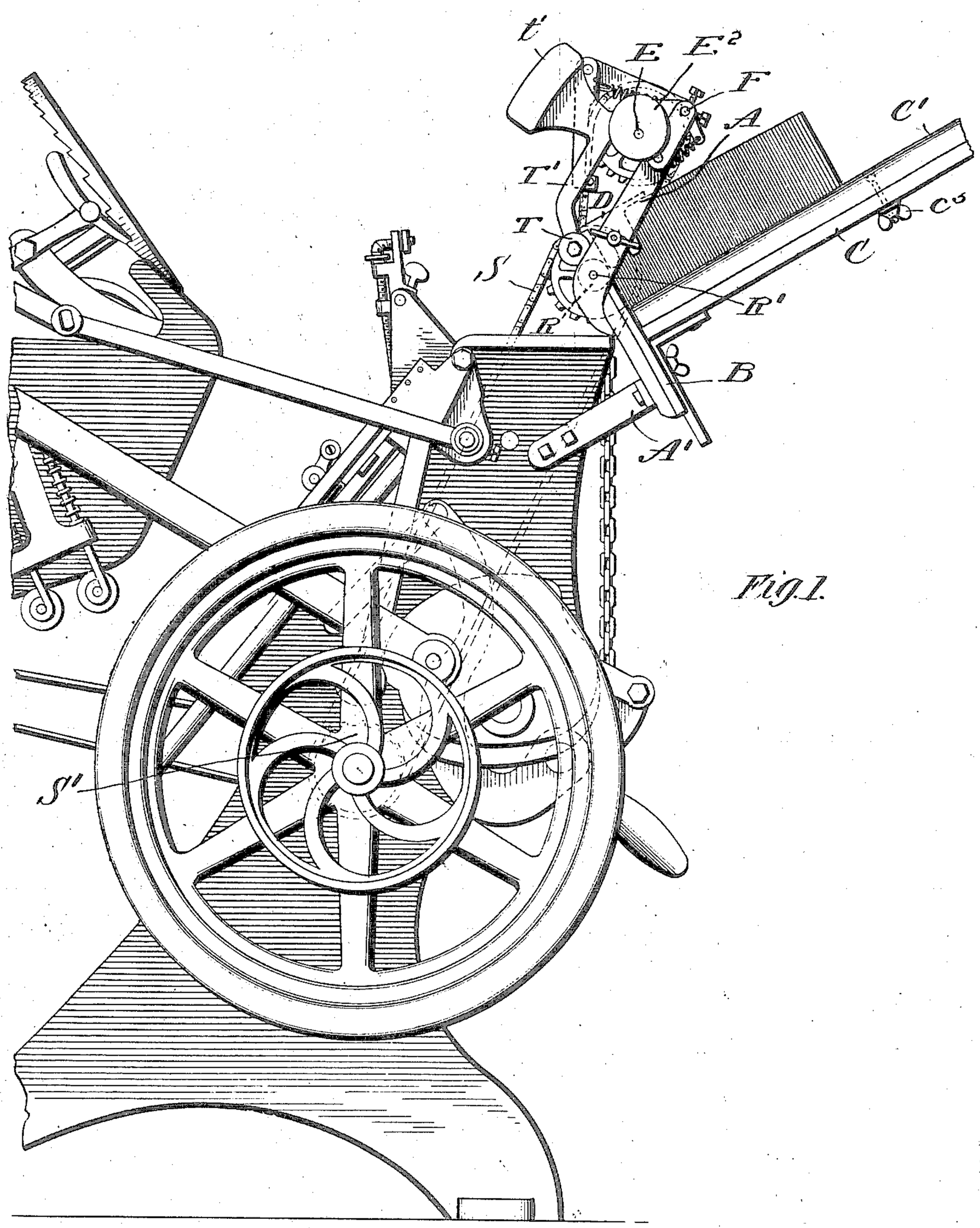

Fig. 1.

WITNESSES:

H. T. Fowle.

W. H. Hubbard

INVENTORS.

Robert E. Kemper and
Arthur Kemper
BY

Whittaker & Wright Attorneys.

No. 821,601. PATENTED MAY 22, 1906.

R. E. & A. KEMPER.

AUTOMATIC FEEDING DEVICE FOR SHEETS, CARDS, AND ENVELOPS.

APPLICATION FILED MAR. 10, 1905.

4 SHEETS—SHEET 2.

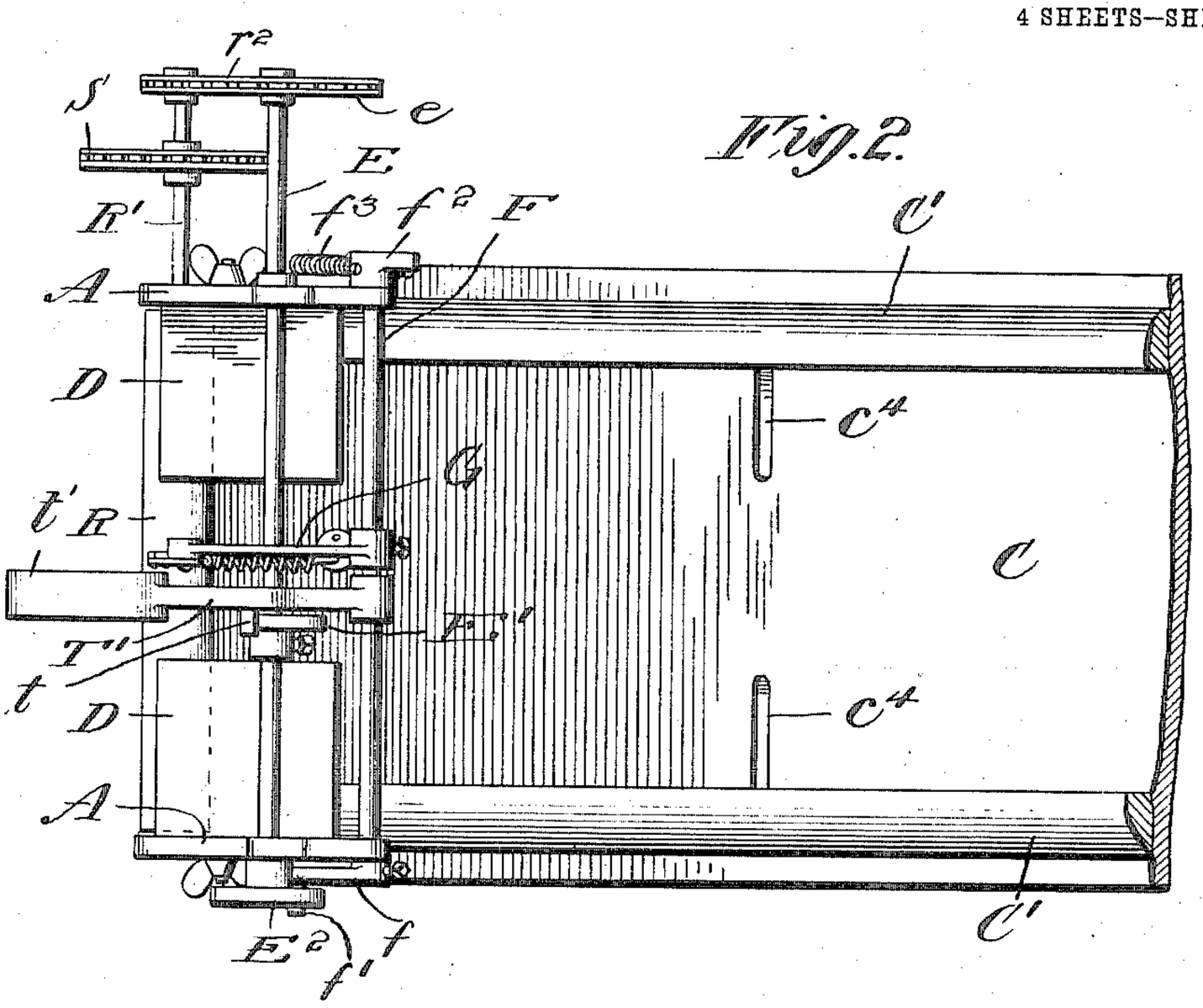

Fig. 2.

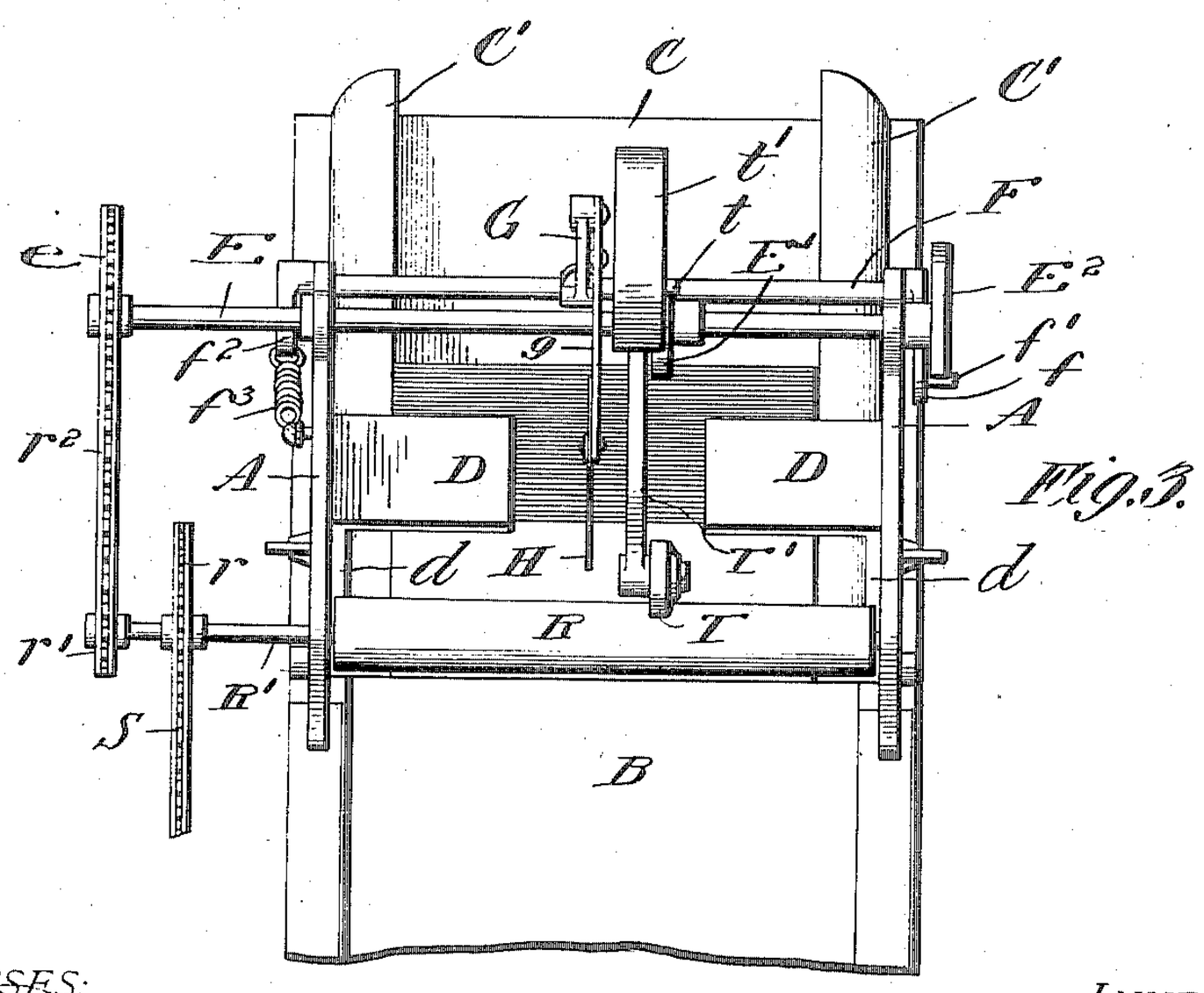

Fig. 3.

WITNESSES:
H. F. Coyle.
E. H. Hubbard.

INVENTORS.
Robert E. Kemper and
Arthur Kemper
BY
Whittemore & Hubbard Attorneys

No. 821,601. PATENTED MAY 22, 1906.

R. E. & A. KEMPER.

AUTOMATIC FEEDING DEVICE FOR SHEETS, CARDS, AND ENVELOPS.

APPLICATION FILED MAR. 10, 1905.

4 SHEETS—SHEET 3.

Fig. 4.

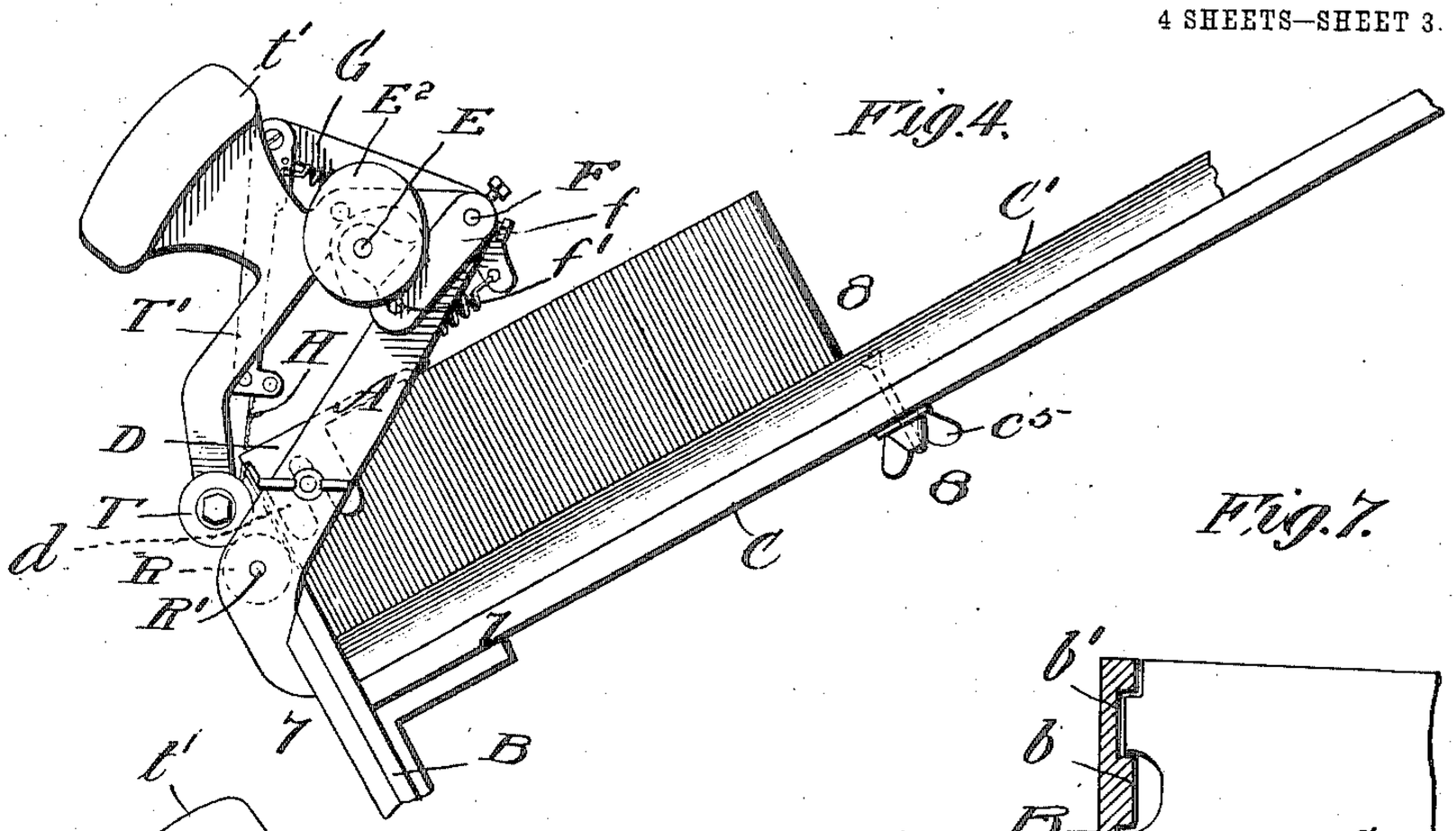

Fig. 7.

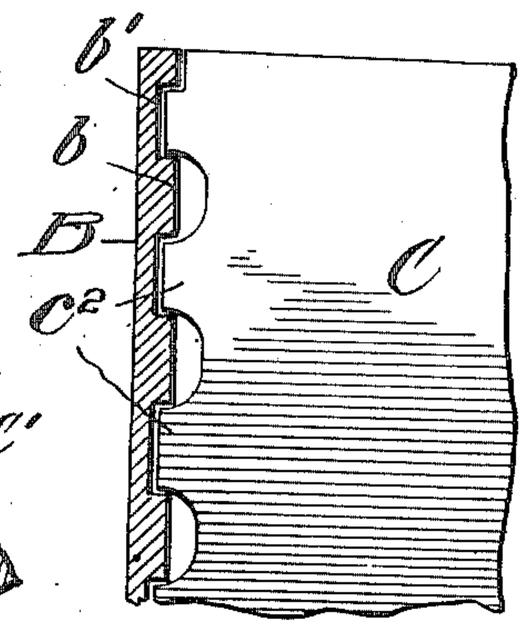

Fig. 5.

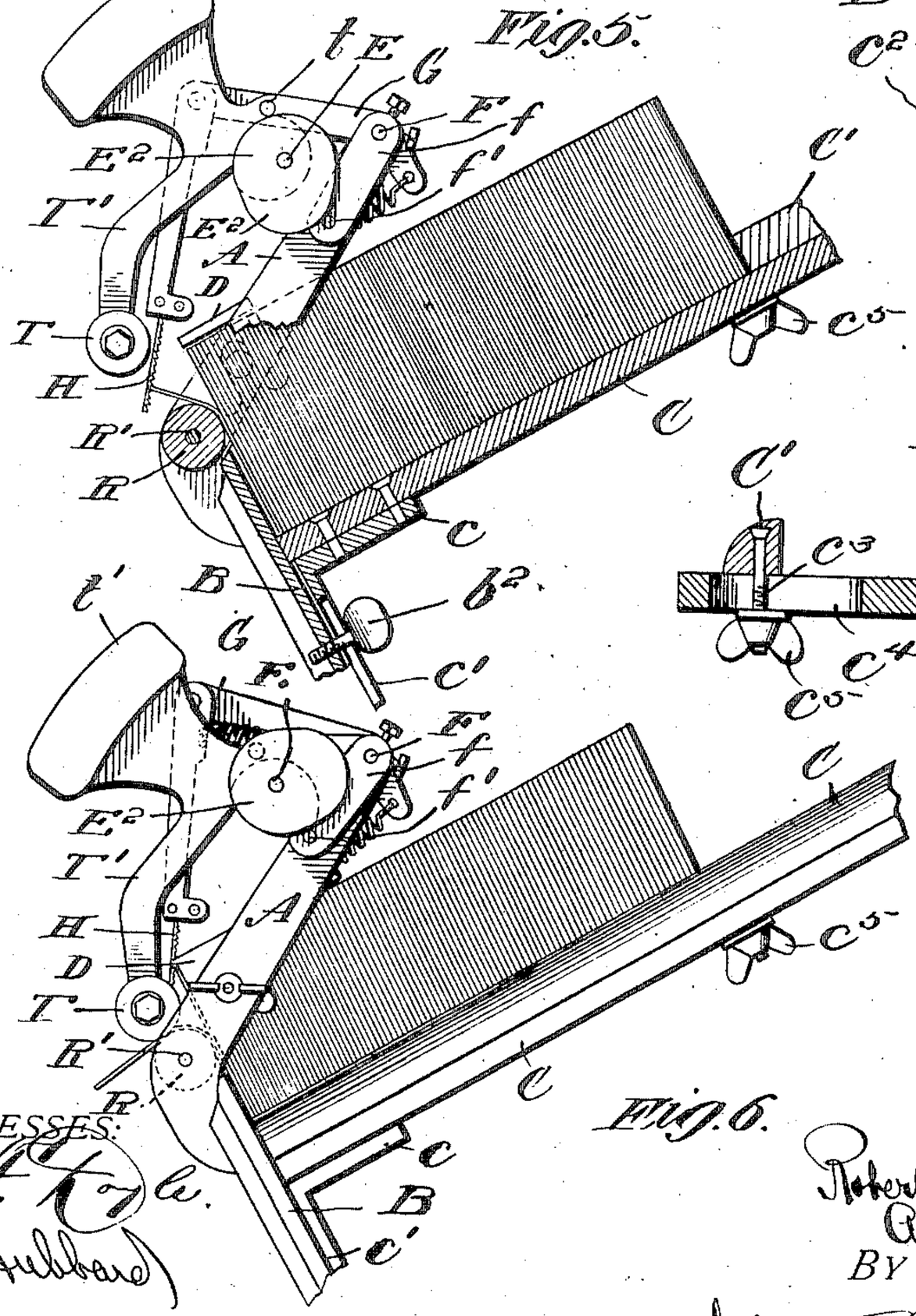

Fig. 8.

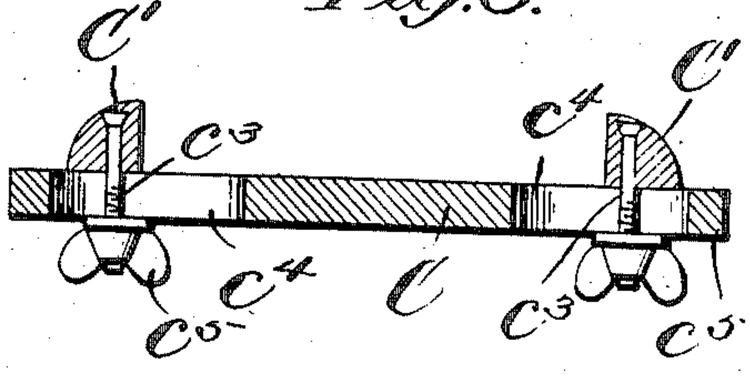

Fig. 6.

WITNESSES:

E. H. Hubbard

INVENTORS

Robert E. Kemper and
Arthur Kemper

BY

Whittemore Peirce & Co. Attorneys

No. 821,601. PATENTED MAY 22, 1906.

R. E. & A. KEMPER.

AUTOMATIC FEEDING DEVICE FOR SHEETS, CARDS, AND ENVELOPS.

APPLICATION FILED MAR. 10, 1905.

4 SHEETS—SHEET 4.

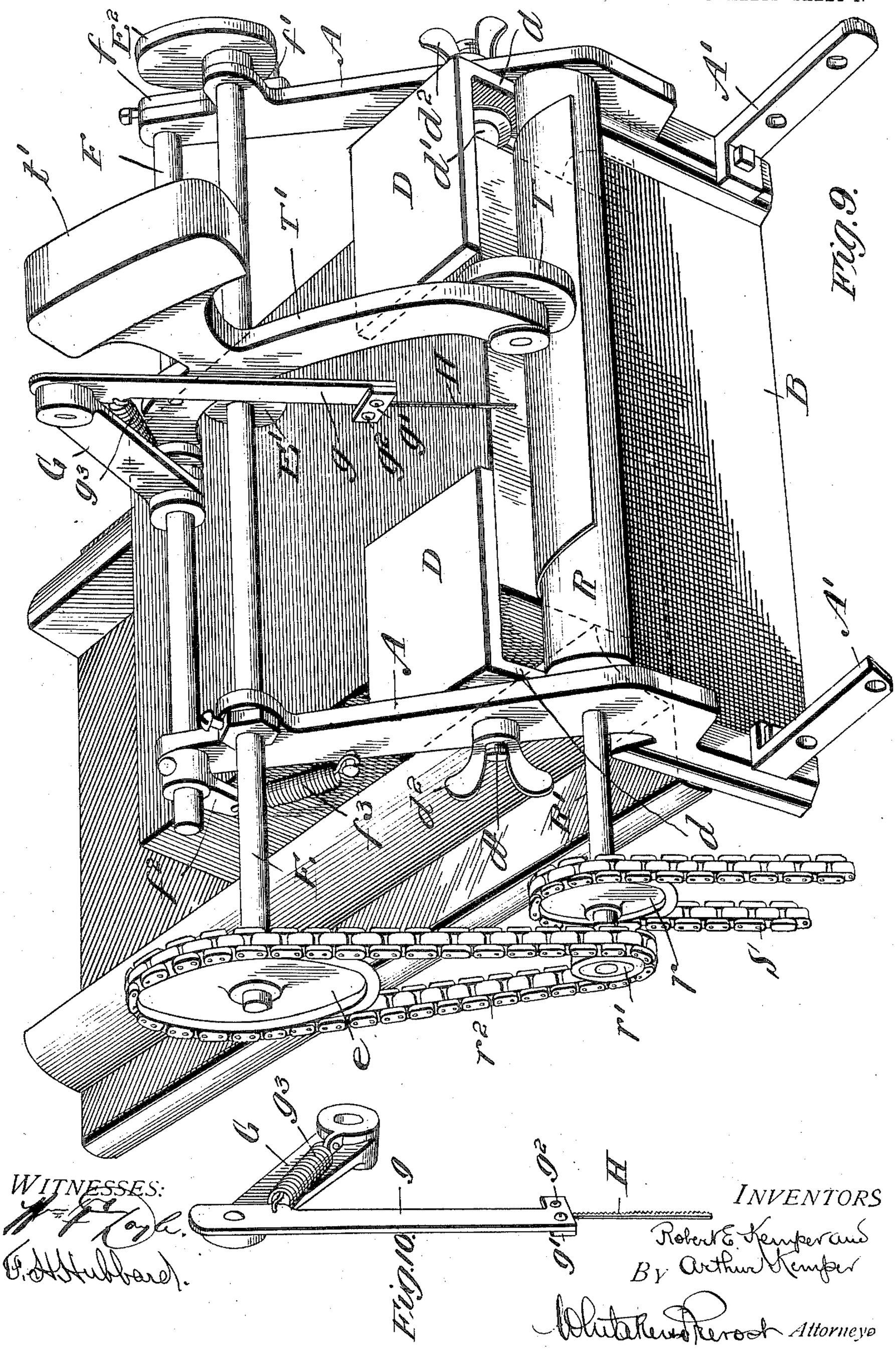

Fig. 9.

Fig. 10.

WITNESSES:

E. Hoyle.

C. A. Hubbard.

INVENTORS

Robert E. Kemper and

By Arthur Kemper

White Kew & Perock Attorneys

UNITED STATES PATENT OFFICE.

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

AUTOMATIC FEEDING DEVICE FOR SHEETS, CARDS, AND ENVELOPS.

No. 821,601. Specification of Letters Patent. Patented May 22, 1906.

Application filed March 10, 1905. Serial No. 249,494.

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 Feeding Devices for Sheets, Cards, and Envelops; 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 in which we have contemplated embodying our invention, and said invention is fully disclosed in the following description and claims.

Referring to the said drawings, Figure 1 represents a side elevation of a printing-press, showing our improved automatic feeding device attached thereto. Fig. 2 is a top plan view of the feeding device detached. Fig. 3 is a front elevation of the same. Fig. 4 is a side elevation of the feeding device. Fig. 5 is a similar view partly in section; and Fig. 6 is a similar view to Fig. 4, said Figs. 5 and 6 showing the parts of the mechanism in different positions to effect the separation and feed of a sheet, card, or envelop. Fig. 7 represents a section on line 7 7 of Fig. 4. Fig. 8 represents a section on line 8 8 of Fig. 4. Fig. 9 is a perspective view of the feeding device, taken from the front and drawn to an enlarged scale. Fig. 10 is a detail perspective view of a portion of the separating devices.

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

In Fig. 1 we have shown our improved feeding device attached to a platen printing-press of the type shown and described in our former application for Letters Patent of the United States, filed January 20, 1905, and given Serial No. 241,953, and arranged to feed the envelops, cards, sheets of paper, or the like directly into the press automatically in the same manner as they would be fed by hand, the automatic feeding device being connected to and driven by a moving part of the printing-press and in time therewith, as hereinafter described.

Referring to the automatic feeding device itself, A A represent two side frames, which are connected to a transverse plate B, the rear face of which is provided with alternating vertically-disposed ribs *b* and recesses *b'*. (See Fig. 7.) This plate B forms a stop-plate, against the rear face of which a quantity of sheets, cards, envelops, or the like are fed, and it will be seen that by forming said face with ribs and recesses, as described, the area in contact with the articles to be fed and the consequent surface friction in feeding the article nearest the plate, as hereinafter described, will be greatly reduced. It will be seen that the stop B engages only a portion of the front face of the first of the sheets, cards, or envelops placed in the hopper, leaving the other portions free to be bent forward and separated by the separating device hereinafter described.

C represents an inclined hopper or feed-plate upon which the articles to be fed are supported on edge in a substantially vertical or slightly-inclined position, which is adjustably connected to the framework of the feeding device. In this instance the feed-plate is formed of wood and is provided with a bracket *c* beneath the same, secured thereto and having a downwardly-extending slotted arm *c'*, engaging the rear face of the plate B and rigidly secured thereto by a wing or thumb screw b^2 to provide for easy adjustment. The feed-plate or hopper C is also provided on its front edge with projections c^2, extending into the recesses *b'* of the stop-plate B to prevent the articles from falling between said plates, and the upper face of the feed-plate C is provided with longitudinally-arranged and laterally-adjustable guides C' C' for the sheets, cards, or envelops, said guides being provided with securing-screws c^3, extending through transverse slots c^4 in the feeding-plate or hopper C and provided with wing or thumb nuts c^5 c^5 (see Fig. 8) for securing said lateral guides in position.

The side frames A A are each provided with adjustable retaining devices for engaging the upper edges of the sheets, cards, or envelops to prevent any one of them, except the one separated, as hereinafter described, from being drawn out of the hopper. Each of these retaining-plates consists of a flat plate

D, disposed parallel to the top face of the hopper or feed-plate C and having at one edge a downwardly-extending slotted arm *d*, the slot in which is disposed substantially vertically and engages a securing-bolt *d'*, which extends through one of the side frames A and is provided with a thumb or wing nut d^2, as shown, for clamping the retaining device rigidly in its adjusted position.

E represents a cam-operating shaft mounted in bearings in the side frames A A and provided at one end with a sprocket-wheel *e* for operating the same. The shaft E is provided with cams E' and E^2, as hereinafter described, secured to and rotating with said shaft.

In rear of the cam-shaft E is a rock-shaft F, mounted in bearings in the side frames A and provided at one end with an operating-arm *f*, carrying a pin (or roller) *f'*, engaging the cam E^2 on the cam-shaft for rocking the shaft F in one direction. Said rock-shaft F is provided at the other end with an arm f^2, to which a spring f^3 is connected, the other end of the spring being connected to side frame A, so as to draw upon the arm f^2 and keep the pin or roller *f'* in contact with the cam E^2.

In using the feeding device a number of sheets, cards, or envelops are placed on edge upon the hopper or feed-plate C and pushed downward beneath the retaining devices D D until the first of said articles engages the stop-plate B. We provide a separating device of peculiar construction for separating the first of the series of cards, &c., and pushing it into position to be grasped by the feeding devices and removed from the hopper and delivered, as hereinafter described. This separating device consists of a small bar or strip of metal provided on one edge or face with one or more teeth, the height of which is preferably not greater than the thickness of the material to be fed. We prefer to use a fine piece of steel which has a certain amount of flexibility and which is provided, preferably on one of its longitudinal edges, as shown, with a series of very minute projections or teeth not greater in height than the teeth of a very fine file, although they do not need to be so close together as in a file.

In the drawings, G represents an actuating-arm secured to the rock-shaft F near the central portion of said shaft and provided at its outer end with a depending arm *g*, pivotally connected thereto and preferably provided at its lower end with a clamping device to hold the toothed strip or bar H. The clamp referred to consists in this instance of a clamping-plate *g'* and screws g^2 g^2, connecting it with the arm *g*. A spring g^3 is connected to the depending arm *g* and drawing the same rearwardly, so as to normally hold the toothed edge or face of the separator H against the top edge of the first sheet, card, or envelop in the hopper and at an inclination thereto, as shown in the drawings.

R represents the main feed-roller, which extends across the front of the machine adjacent to the upper edge of the stop-plate B. This roller may be made of wood, rubber, paper, or any desired material which will afford the proper frictional surface, and it is so adjusted that it will be engaged by the first article (card, envelop, &c.) in the hopper. The shaft R' of the roller is provided with a driving wheel or sprocket *r*, by which the feeding mechanism is to be driven from a rotary part of the printing press or machine with which it is used by means of a sprocket-chain S, as shown, (although said shaft could be turned by hand, if desired.) The shaft R' is also provided with a sprocket-wheel *r'*, connected by a sprocket-chain r^2 to the sprocket-wheel *e* on cam-shaft E for operating said cam-shaft, the parts being properly timed.

T represents a pressure-roller which may be formed of metal or of any other suitable material and is mounted to turn on a stud carried by a pivoted arm T', which is in this instance loosely mounted at its rear end on the rock-shaft F, and said arm T' is provided with a pin or friction-roll *t*, which engages the upper part of the cam E' on cam-shaft E for raising and lowering the arm T' and pressure-roller T. The arm T' is preferably held in operative engagement with its cam E' by gravity, and to provide the requisite pressure we prefer to weight the arm T' by forming a heavy lug or weight *t'* thereon, as shown in the drawings. A spring could be substituted for this weight, if desired; but we prefer the weight.

The side frames A A may be supported in any desired manner in accordance with the use to which the apparatus is to be put. We have shown the said side frames provided with brackets A' A', secured thereto and adapted to be screwed or bolted to the side frames of the platen printing-press illustrated in our former application for patent, above referred to, and in Fig. 1 the apparatus is shown attached to the said press, the sprocket-chain S for operating the feeding device being connected to a sprocket S' (shown in dotted lines, Fig. 1) on the main driving-shaft of the press, the sprocket wheels S' and *r* being so proportioned that the cam-shaft E will make one revolution for each impression made by the press. We wish it to be understood, however, that the use of the feeding apparatus is not limited to our special form of press, as it may be used with other forms of presses, whether platen-presses, cylinder-presses, or other forms, or for any other purpose in connection with printing-presses, or other machines, or for other purposes generally for which it may be found to be adapted.

In preparing the feeding device for use it must first be adjusted to conform to the size of the card, sheet, or envelop for which it is

to be used. To this end the lateral guides C′ C′ of the hopper or feed-plate will be adjusted to accommodate the width of the article and the feed-plate or hopper C will be adjusted vertically with respect to the stop-plate B, so that about one-third the vertical width of the articles will be above the feed-roller R, although the exact distance may differ somewhat with articles of varying stiffness and the parts will be adjusted to secure the best results. The cards, sheets, or envelops are then placed on edge in the hopper and pushed down until the first one engages the stop-plate B and the feed-roller R with the face of each which is to be printed to the rear. The retaining devices D are also adjusted so as to just clear the top edges of the articles to be fed and hold them from being moved upwardly.

The parts of the apparatus being in the position illustrated in Fig. 4, the toothed separating device will rest angularly upon the upper edge of the package or stack of articles to be fed, and as the machine is operated the cam E^2 will move arm *f* rearward, thus rocking shaft F and depressing the arm G and the yieldingly-mounted arm *g* and toothed separating device H. The tooth (or one of the teeth, if more than one is provided) of the separating device H will engage the upper edge of the first article in the hopper and bend it forward over the feed-roller R, as shown in Fig. 5. In the meanwhile cam E′ on the camshaft E has raised the pressure-roller T, and said cam E′ now permits said pressure-roller to descend upon the bent-over sheet, as shown in Fig. 6. The feed-roller R is rotated during the entire movement of the other parts, but it has no effect on the sheets in the hopper, as its frictional bearing against them is so slight as they are held in the hopper. When, however, the pressure-roller T descends upon the bent-over sheet or envelop or card, it presses it firmly against the roller R, and the further rotation of said roller draws or rolls the article out of the hopper and permits it to fall as soon as its bottom edge escapes from the pressure-roller. During the feeding movement proper of the roller R and pressure- roller T the cam E^2 permits the spring f^3 to return the rock-shaft F, thus raising the separating device out of engagement with the sheet or article which it has just separated and bringing it into engagement with the next one in the stack. The tooth or teeth of the separating device being shaped like those of a fine file or saw—that is to say, being provided on one side with an abrupt feeding-face and on the other side with a longer inclined shoulder—will draw easily upward over the edge of the first article in the hopper, but will engage its top edge and bend it forward on the downward movement, and the spring g^3 is so light as to permit the arm *g* to swing outward with the sheet or envelop as it is bent over the roller R and into position to be engaged and pressed upon said roller by the pressure-roller T.

When used in conjunction with and operated from a printing-press, as indicated in Fig. 1, the apparatus will feed the articles successively to the press exactly as they would be fed by hand.

The inclination of the hopper or feed-plate C is such that the weight of the articles held therein will cause them to be pressed downward, so as to keep the first article, which is the bottom one of the stack, in contact with the stop-plate and feed-roller, as will be readily understood. When a sheet or article is fed, the retaining devices D will prevent the next adjacent sheet or sheets from being drawn out of the hopper, as will be readily seen.

It is obvious that the rock-shaft F may be provided with one or more duplicates of the separating devices—to wit, arm G, swinging arm *g*, and separator H—to engage the top edge of the first sheet, card, or envelop at different points transversely of their length, but we have found that one set of said separating devices is ordinarily sufficient.

We do not desire to be limited to the exact details of construction herein described and shown, as variations may be made therein without departing from the spirit of our invention.

In the foregoing specification and in the following claims when we refer to the separator engaging the "edge" of the sheet, card, envelop, or other article which is fed we mean the edge proper as distinguished from the marginal portions of the articles adjacent to the edge.

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

1. In an automatic feeding device for sheets, cards, and envelops, the combination with means for supporting a plurality of articles to be fed, of feeding mechanism located adjacent thereto, a separating device comprising a blade of metal 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.

2. In a feeding device for sheets, cards, and envelops, the combination with means for holding a plurality of articles to be fed, of a feeding-roller, adjacent to said holding means, a separating device movable transversely across the edge of the first of said articles and constructed to engage said edge and bend the article into engagement with the said feeding-roller, a movable pressure-roller adapted to clamp said separated article against the

feeding-roller and means for positively moving said pressure-roller toward and from the feeding-roller, substantially as described.

3. In a feeding device for sheets, cards, and envelops, the combination with means for holding a plurality of articles to be fed, of a feeding-roller, adjacent to the first of said articles, a pressure-roller, means for moving said pressure-roller toward and from said feeding-roller, means for driving one of said rollers, and a separating device movable transversely across the edge of the first of said articles and constructed to engage said edge and bend a portion of the article into position to be engaged between the said rollers, substantially as described.

4. In a feeding device for sheets, cards, and envelops, the combination with a hopper comprising an inclined feeding-plate, a stop adjacent to the lower end of said plate, a feeding-roller, adjacent to said stop, adapted to engage the lowest of the articles held in said hopper, a pressure-roller movable toward and from said feed-roller, and a vertically and forwardly movable separating device provided with a tooth or projection for engaging the first of the articles in the hopper and bending it forwardly between the feeding-roller and said pressure-roller, substantially as described.

5. In a feeding device for sheets, cards, and envelops, the combination with a hopper comprising an inclined feed-plate, a stop adjacent to the lower end of said plate, a feeding-roller, adjacent to said stop, adapted to engage the lowest of the articles held in said hopper, a pressure-roller movable toward and from said feed-roller, a separating device for engaging the article in the hopper nearest the feeding-roller and bending it forwardly between said roller and the pressure-roller, and means for retaining the other articles in said hopper from displacement, substantially as described.

6. In a feeding device for sheets, cards, and envelops, the combination with a hopper comprising an inclined feed-plate, a stop adjacent to the lower end of said plate, a feeding-roller, adjacent to said stop, adapted to engage the first of the articles held in said hopper, a pressure-roller movable toward and from said feed-roller, a separating device for engaging the article in the hopper nearest the feeding-roller and bending it forwardly between said roller and the pressure-roller, and retaining devices for engaging the upper edges of the next adjacent articles in the hopper to prevent their vertical displacement as the article nearest the roller is withdrawn, substantially as described.

7. In an automatic feeding device for sheets, cards, and envelops, the combination with a support for the articles to be fed having a part constructed to engage a portion only of the front face of the first of said articles, feeding mechanism located adjacent to said support, a separating device movable transversely across the free edge of the first of said articles and constructed to engage said edge to bend said first article into position to be engaged by said feeding devices, and retaining devices for preventing the removal of all of said articles except the one so separated substantially as described.

8. In an automatic feeding device for sheets, cards, and envelops, the combination with a hopper for supporting the articles in a vertically-disposed position comprising a bottom plate for supporting the lower edges of said articles, and a stop for engaging a portion only of the face of the first of said articles, feeding devices arranged in proximity to said stop, a separating device comprising a thin metal blade having one of its longitudinal edges provided with teeth and mechanism for moving said separating device longitudinally across the edge of the said first article in said hopper, to bend it into position to be engaged by said feeding devices, substantially as described.

9. In an automatic feeding device for sheets, cards, and envelops, the combination with a hopper for supporting the articles to be fed, upon edge, comprising a bottom plate for supporting the lower edges of said articles, a stop for engaging a portion of the face of the first of said articles and said hopper being so constructed as to advance the articles toward said stop as the articles adjacent thereto are removed, and feeding devices adjacent to said stop, of a separating device comprising a metal blade provided on one of its longitudinal edges with teeth, means for moving said blade across an edge of the article adjacent to said stop, and a retaining device for engaging the edges of said articles nearest to said stop, opposite the edges engaged by the supporting-hopper bottom, substantially as described.

10. In an automatic feeding device for sheets, cards, and envelops, the combination with a hopper for supporting the articles to be fed, upon edge, said hopper comprising an inclined bottom for supporting the lower edges of said articles, a stop for engaging a portion of the face of the first article, adjustable retaining devices arranged above the articles adjacent to said stop, feeding devices adjacent to said stop, a separating device consisting of a metal blade provided with teeth, and mechanism for moving said blade longitudinally across the top edge of the first article held in said hopper, to bend it into position to be engaged by the said feeding devices, substantially as described.

11. In an automatic feeding device for sheets, cards, and envelops, the combination with means for supporting a plurality of articles, feeding mechanism located adjacent thereto, a rock-shaft, an operating-arm con-

nected therewith, a separating device consisting of a metal blade pivotally connected to said arm and provided with a series of teeth or projections for engaging an edge of the first of said articles, and bending it into position to engage said feeding devices and a retracting-spring for said separating device, substantially as described.

12. In an automatic feeding device for sheets, cards, and envelops, the combination with a hopper for supporting a plurality of the articles to be fed, on edge, including a supporting-plate for engaging a portion of the face of the first article supported in the hopper, feeding devices adjacent to said stop, a separating device for engaging the first of the articles held in the hopper and bending it into position to engage said feeding devices, and means for adjusting said supporting-plate vertically with respect to said feeding devices, substantially as described.

13. In an automatic feeding device for sheets, cards, and envelops, the combination with a hopper for supporting a plurality of articles to be fed, on edge, including a supporting-plate for engaging the lower edges of the articles, of a stop adjacent to one end of said supporting-plate for engaging a portion of the face of the first of said articles, feeding devices adjacent to said stop, a separating device consisting of a metal blade provided on one of its longitudinal edges with teeth and movable transversely across an edge of the first of the articles held in the hopper, and constructed to engage said edge and bend the article into position to engage the feeding devices, and adjustable guides secured to the upper side of said supporting-plate to accommodate devices of varying width, substantially as described.

14. In an automatic feeding device for sheets, cards, and envelops, the combination with a hopper for supporting a plurality of articles, on edge, including a supporting-plate for engaging a portion of the front face of the first of said articles, feeding devices adjacent to said stop, a separating device for engaging the first of the articles held in the hopper and bending it into position to engage said feeding devices, means for adjusting said supporting-plate vertically with respect to said feeding devices to accommodate articles of different vertical width and adjustable side guides secured to the upper face of said supporting-plate for accommodating articles of different lateral width, substantially as described.

15. In an automatic feeding device for sheets, cards and envelops, the combination with a hopper for supporting a plurality of articles, on edge, including a supporting-plate for engaging the lower edges of said articles, of a stop adjacent to one end of said supporting-plate for engaging a portion of the front face of the first of said articles, feeding devices adjacent to said stop, a separating device for engaging the first of the articles held in the hopper and bending it into position to engage said feeding devices, retaining devices for engaging the upper edges of the articles held on said supporting-plate, and means for adjusting said supporting-plate vertically with respect to the feeding devices and said retaining devices, substantially as described.

16. In an automatic feeding device for sheets, cards, and envelops, the combination with a hopper for supporting a plurality of articles, on edge, including a supporting-plate for engaging the lower edges of said articles, of a stop adjacent to one end of said supporting-plate for engaging a portion of the face of the first of said articles, feeding devices adjacent to said stop, a separating device for engaging the first of the articles held in the hopper and bending it into position to engage said feeding devices, vertically-adjustable retaining devices, for engaging the upper edges of the articles held on the supporting-plate, and means for adjusting said supporting-plate vertically with respect to the feeding devices and said retaining devices, substantially as described.

17. In an automatic feeding device for sheets, cards and envelops, the combination with a hopper for supporting a plurality of articles, on edge, including a supporting-plate for supporting the lower edges of said articles, of a stop adjacent to one end of said supporting-plate for engaging a portion of the face of the first of said articles, feeding devices adjacent to said stop, a separating device for engaging the first of the articles held in the hopper and bending it into position to engage said feeding devices, retaining devices for engaging the upper edges of the articles supported in said hopper and means for adjusting said retaining devices vertically with respect to said feeding devices, substantially as described.

18. In an automatic device for feeding sheets, cards, and envelops, the combination with the hopper, and a feeding-roller located adjacent to one end of the same, of a pressure-roller, movable toward and from the feeding-roller, a pivoted arm carrying said pressure-roller, a rock-shaft, an operating-arm carried thereby, a separating device pivotally connected to said operating-arm, and provided with teeth or projections, a retracting-spring for said separating device, a cam-shaft and cams on said shaft for operating said pressure-roller-carrying arm, and said rock-shaft, substantially as described.

19. In an automatic device for feeding sheets, cards, and envelops, the combination with the inclined feeding-plate for supporting the lower edges of a plurality of articles, the stop-plate for engaging a portion of the outer face of the first of said articles, means for adjusting said feeding-plate vertically

with respect to said stop-plate, and lateral adjustable guides on said feeding-plate, of a feeding-roller above said stop-plate, a pressure roller movable toward and from the feeding-roller, a swinging arm carrying said pressure-roller, and provided with a weight, a rock-shaft, an operating-arm carried thereby, a separating device pivotally connected to said arm and including a metal blade having a longitudinal edge provided with a series of fine teeth or projections, a retracting-spring for said separating device, means for operating said rock-shaft and pressure-roller-carrying arm, and vertically-adjustable retaining devices provided with portions for engaging the top edges of articles supported on said feeding-plate, substantially as described.

20. In an automatic feeding device for sheets, cards, and envelops, the combination with means for supporting a plurality of articles to be fed, of feeding mechanism located adjacent thereto, 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, substantially as described.

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

ROBERT E. KEMPER.
ARTHUR KEMPER

Witnesses:
PETER KEMPER,
GEORGE G. KEMPER.