

(No Model.)

4 Sheets—Sheet 1.

C. W. GAY.

MACHINE FOR BENDING PAPER BOX BLANKS.

No. 519,671.

Patented May 8, 1894.

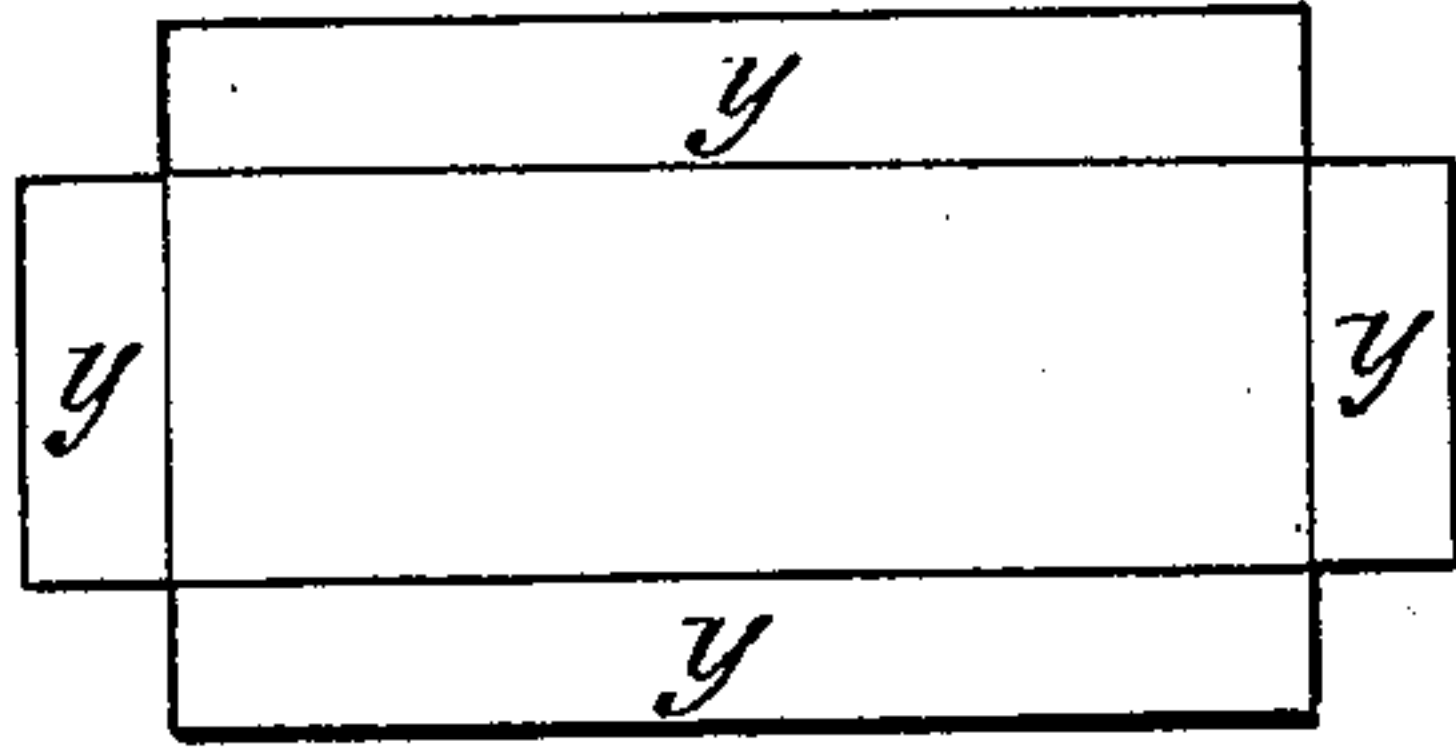


Fig. 9.

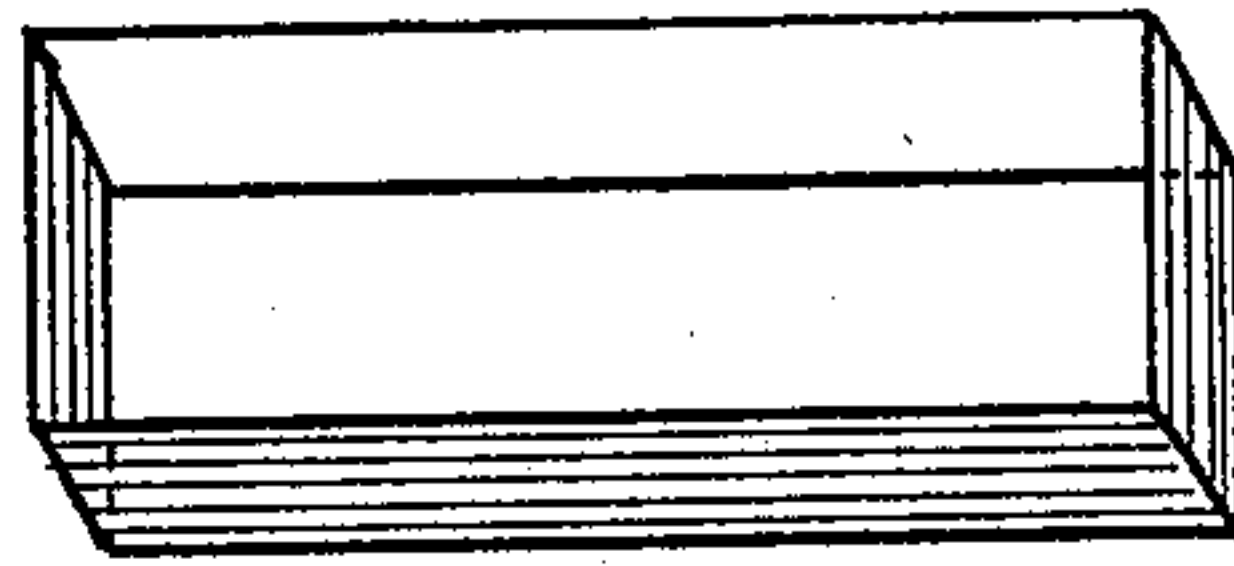


Fig. 10.

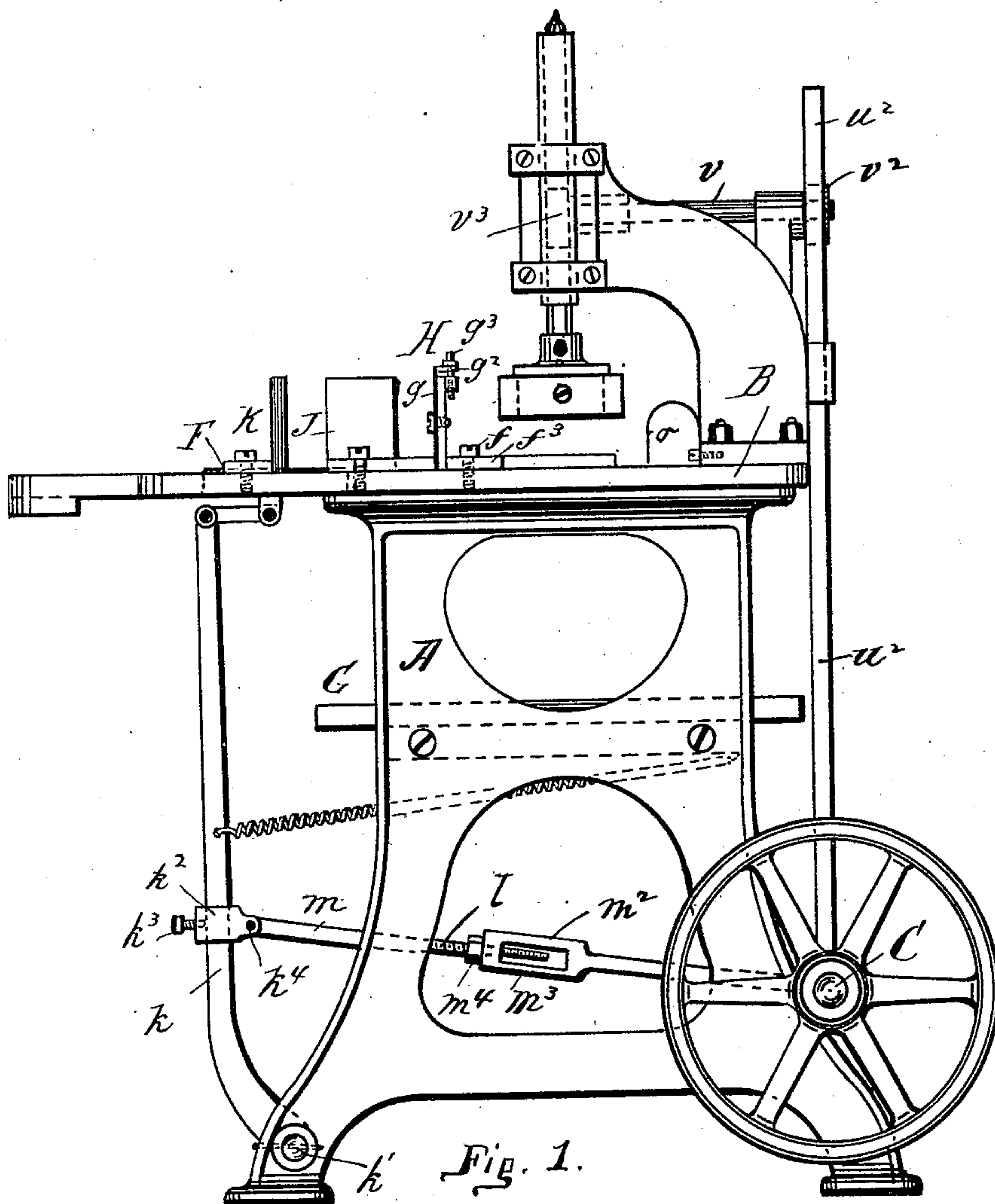


Fig. 1.

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(No Model.)

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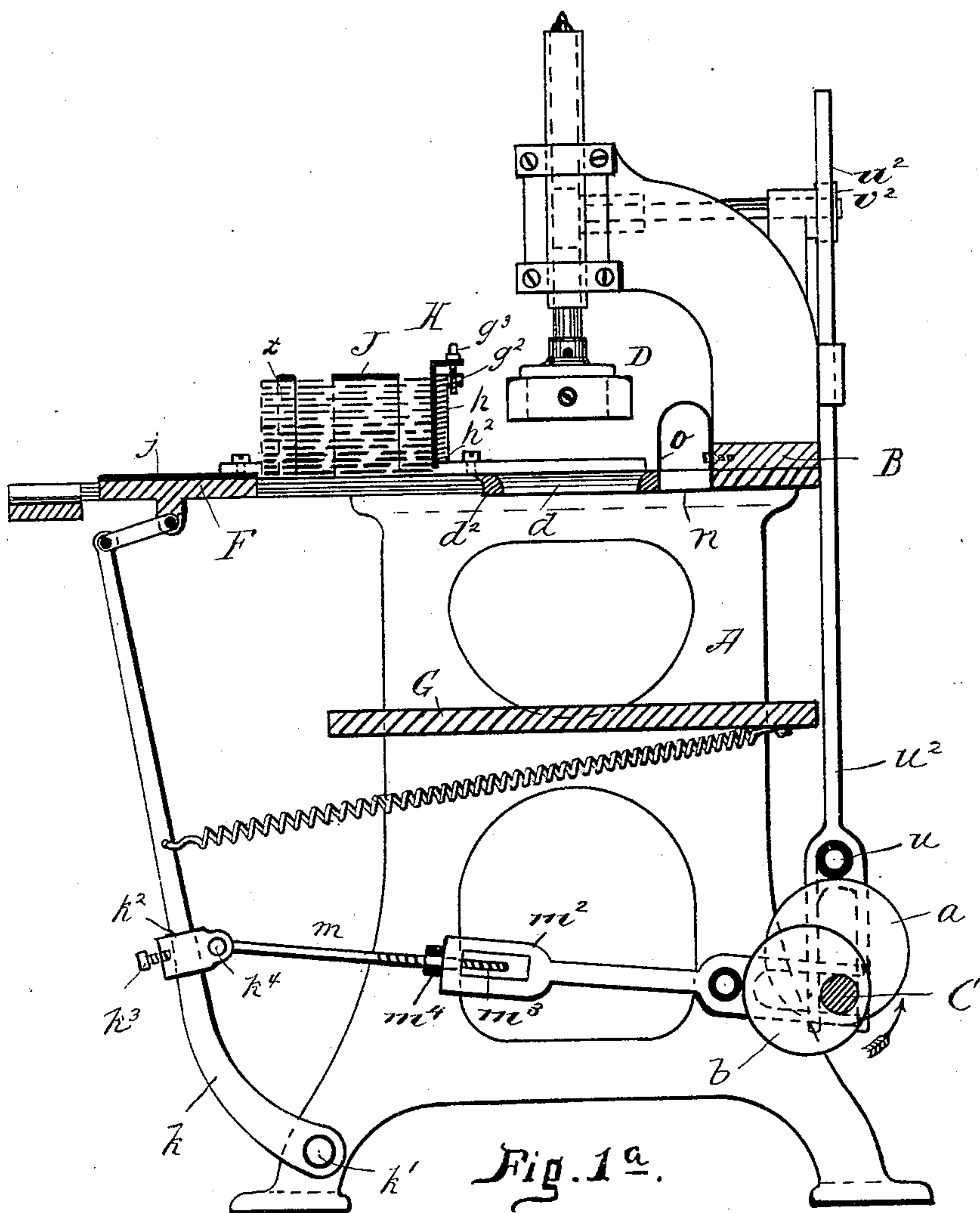


Fig. 1a.

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4 Sheets—Sheet 3.

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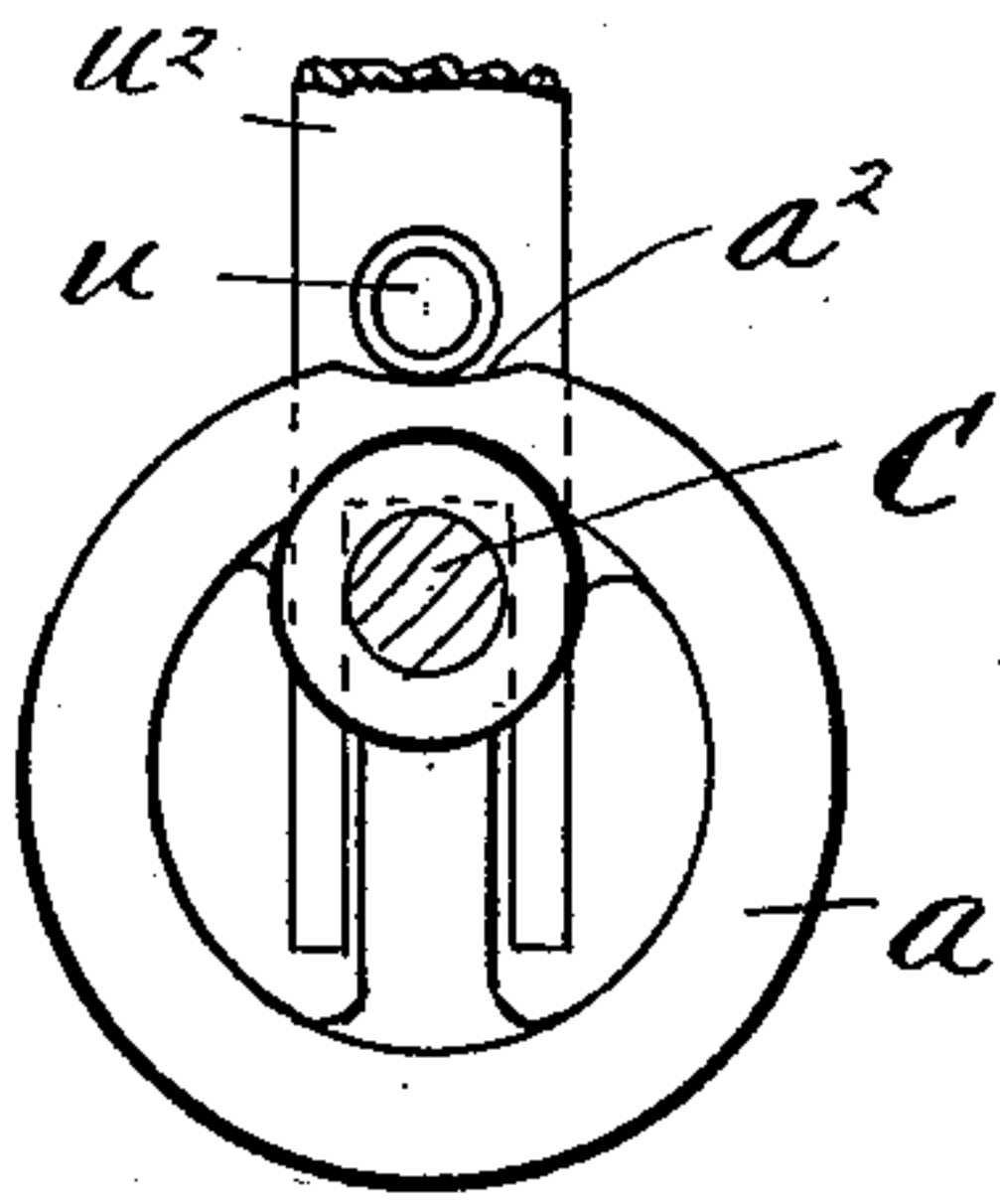


Fig. 7.

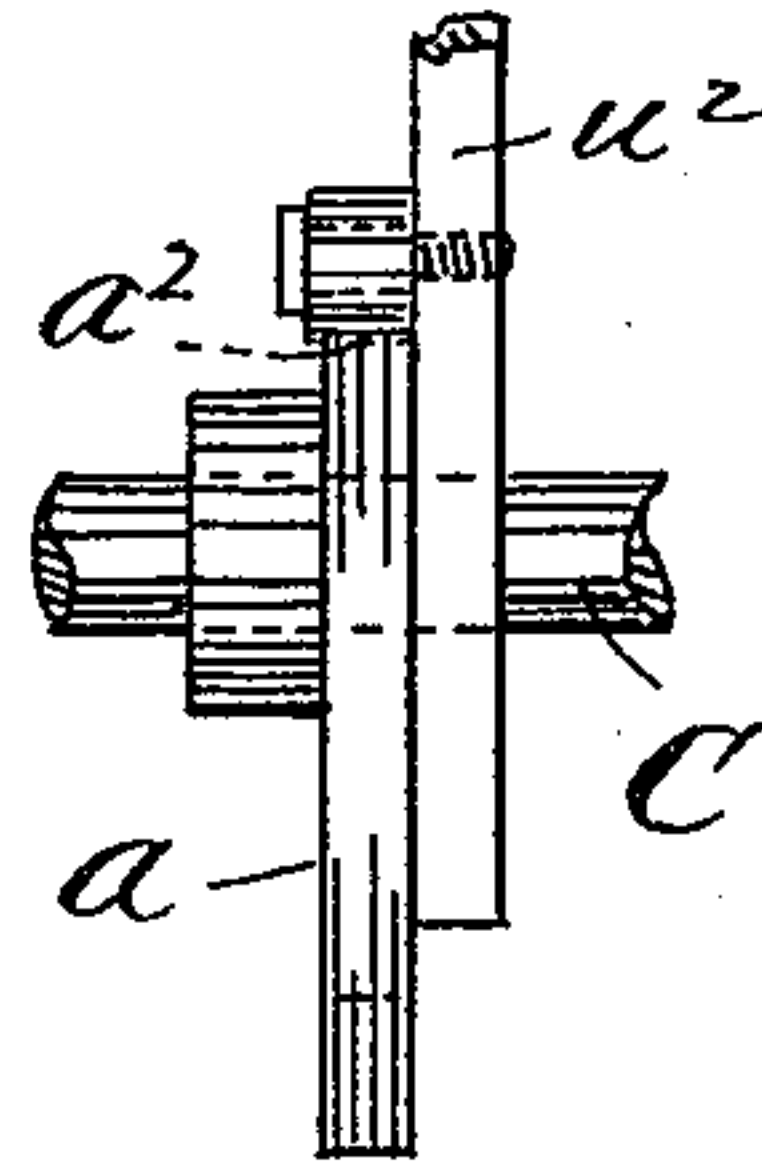


Fig. 8.

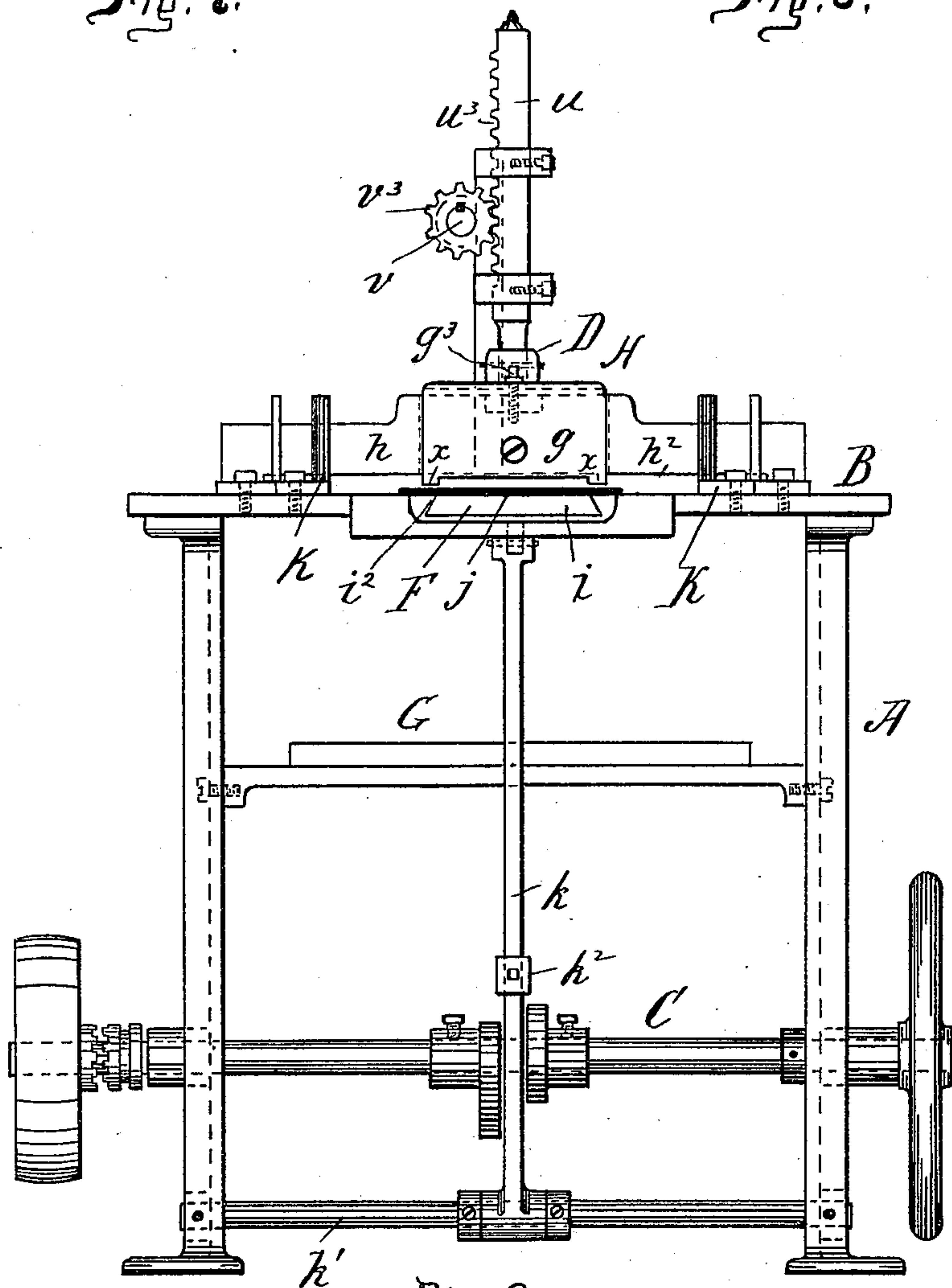


Fig. 2.

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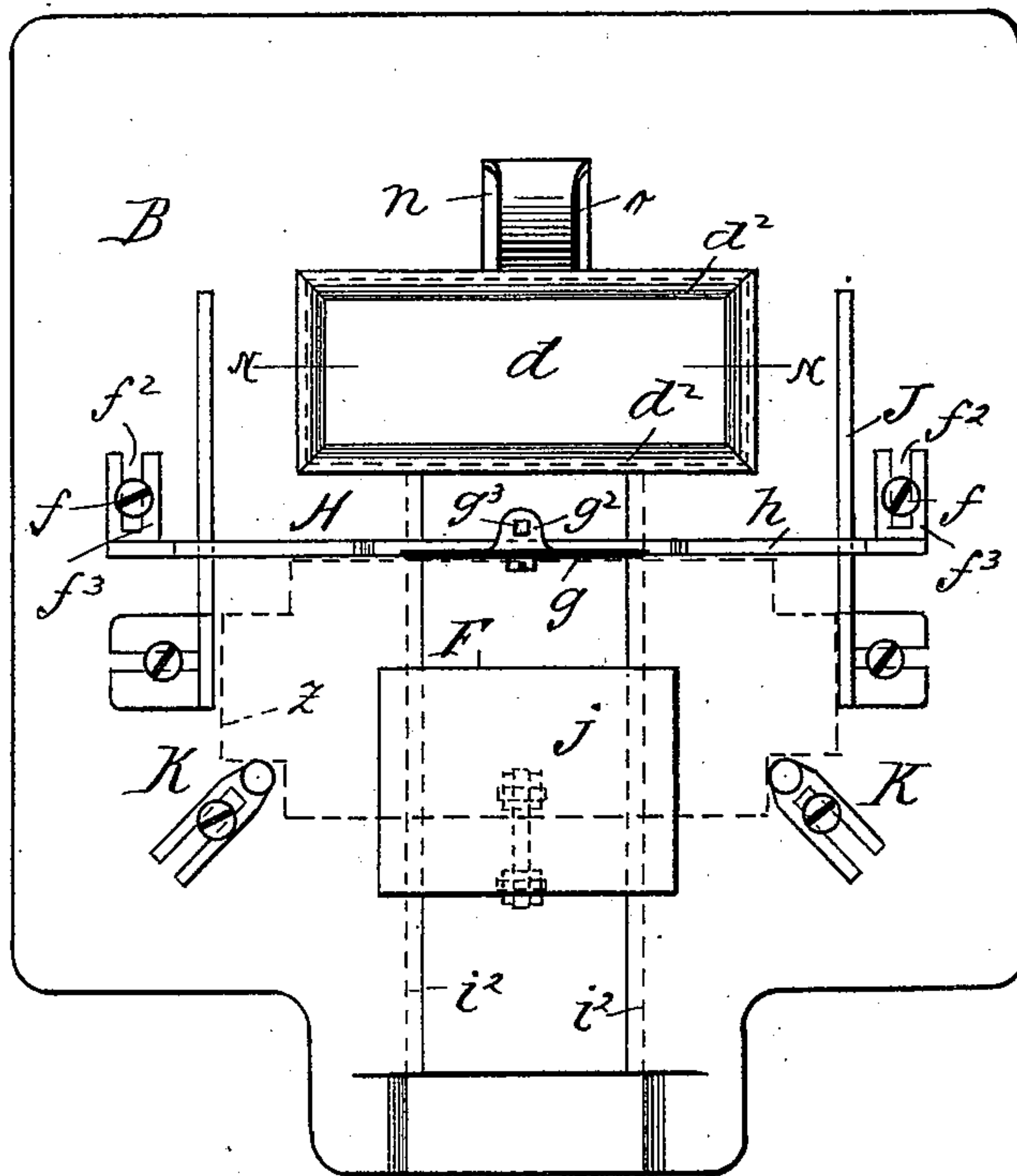
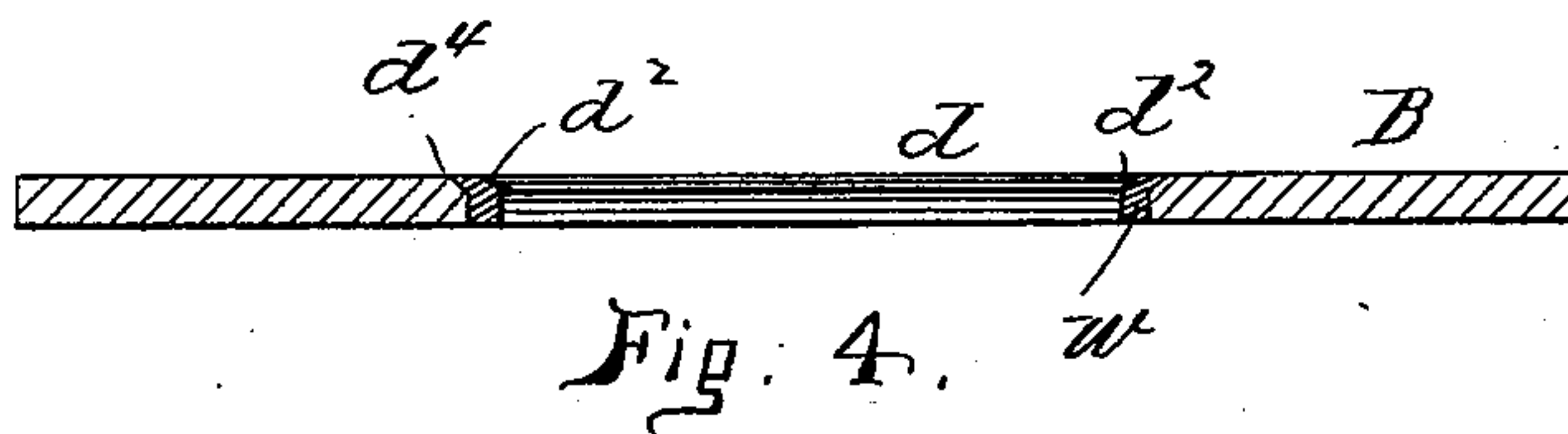
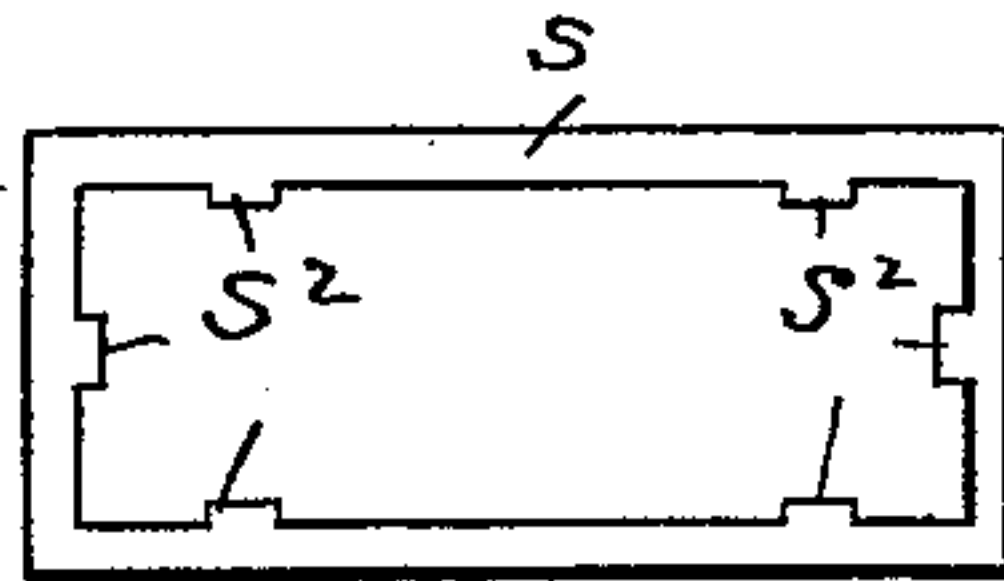
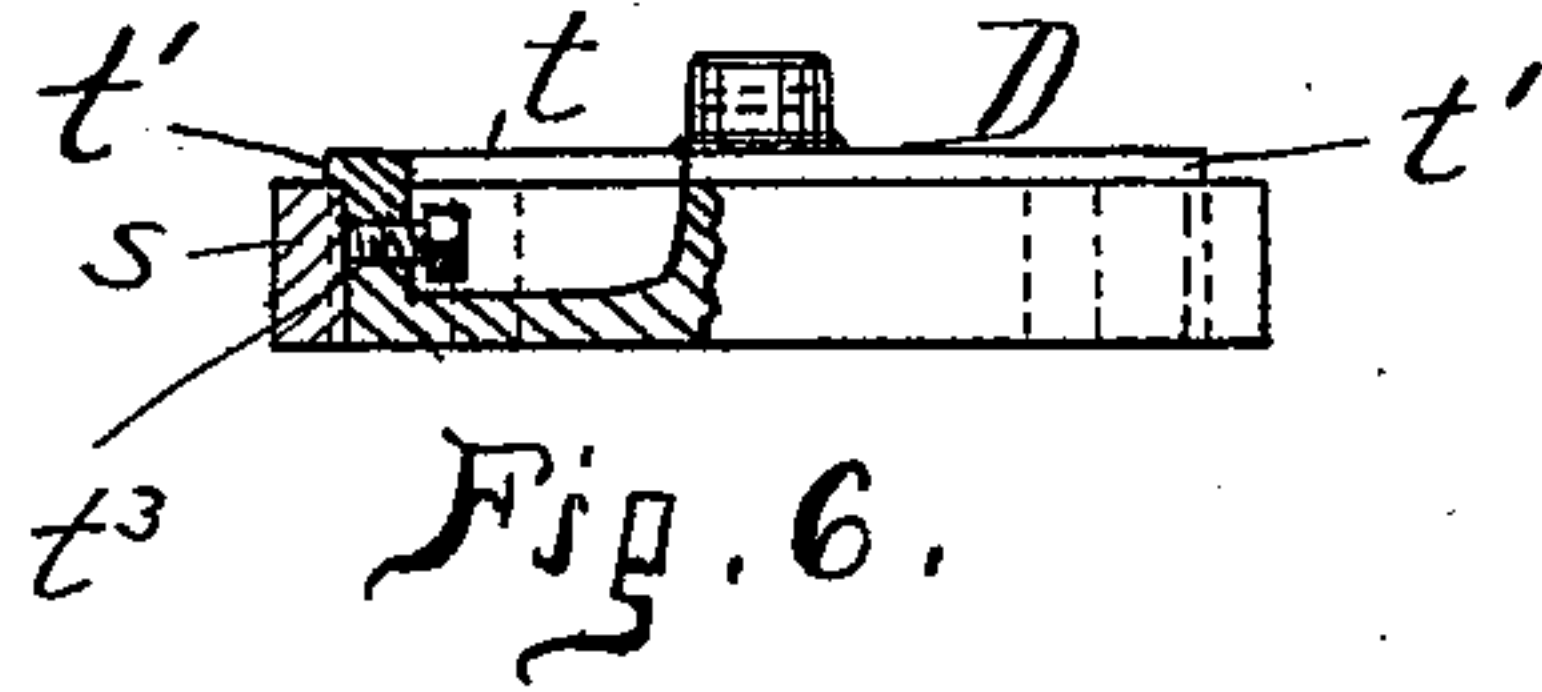
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Fig. 3.

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UNITED STATES PATENT OFFICE.

CHAUNCEY W. GAY, OF SPRINGFIELD, MASSACHUSETTS.

MACHINE FOR BENDING PAPER-BOX BLANKS.

SPECIFICATION forming part of Letters Patent No. 519,671, dated May 8, 1894.

Application filed June 23, 1893. Serial No. 478,619. (No model.)

To all whom it may concern:

Be it known that I, CHAUNCEY W. GAY, a citizen of the United States, residing at Springfield, in the county of Hampden and State of Massachusetts, have invented new and useful Improvements in Machines for Bending Paper-Box Blanks, of which the following is a specification.

This invention relates to machines for bending paper box blanks, of the class wherein a reciprocating bending or folding plunger, movable into and out from a folding frame, turns up the marginal portions of the substantially rectangular blank at or about right angles to the main portion thereof.

The invention particularly relates to means whereby the blanks are successively moved, one at a time, to the bending devices, provision being made that but one blank at a time may be so fed; to arrangements of adjustable and interchangeable parts whereby blanks of different shapes and sizes and of varying thicknesses may be successfully handled and operated upon by and in the machine, but little time and trouble being necessary to place the machine in condition therefor; and generally to details of construction for the improvement of subordinate features, all as will hereinafter be rendered manifest; and to these ends the invention consists in constructions and combinations of parts all substantially as will hereinafter fully appear and be set forth in the claims.

Reference is to be had to the accompanying drawings in which the present improvements are illustrated, Figure 1 being a side elevation of the machine, while Fig. 1^a is a vertical section taken from front to rear centrally through the machine. Fig. 2 is a front elevation, while Fig. 3 is a plan view of the machine, the plunger, however, being understood as removed. Fig. 4 is a sectional view across the top or main table of the machine at the bending aperture, the plane of section being indicated by line *n—n*, Fig. 3. Fig. 5 indicates a jacket or removable section for the bending plunger. Fig. 6 is a side view and partial vertical section of the plunger with the removable jacket indicated as applied thereupon. Figs. 7 and 8 are respectively face and edge views of the operating cam for the plunger. Fig. 9 is a plan view of the blank, the internal lines thereof

which form the boundary of a rectangle indicating the creases or scores formed in the blank, as usual. Fig. 10 is a perspective view, of blank with the upturned marginal portions.

Similar characters or letters indicate corresponding parts in all of the views.

In the drawings, A represents the framing of the machine the same having at its top the table, B.

C represents the driving shaft which has thereon two cams, one, *a*, for actuating the plunger, D, and the other, *b*, for actuating the sliding feed device, F, which forces the blanks horizontally across the table to the position over the aperture, *d*, through which, by the plunger, they are forced for the upturning of their edges.

It will be here remarked that the rectangle, bounded by the scoring of the blanks, corresponds to the size of the aperture, *d*, and that the outlined portions, *y, y*, lie beyond the borders of the said aperture before the plunger descends. The descent of the plunger forces the blanks through said aperture they being then free to fall into a nested pile upon the sub-table, G, under the main table, B.

The blanks are placed upon the table, B, somewhat in advance of and in line with, the aperture, *d*, the rear edge of the pile lying against, or in proximity to, the vertical gage, H, while the gages and guides, *j, j*, lie alongside and against the lateral edges of the blanks, while at the front corners thereof the gages, *k, k*, are provided.

The gage, H, will be herein termed the gate-gage, and it is adjustable as a whole forwardly and rearwardly, being held in its set position by the set-screws *f*, which pass through the slots, *f*², in the foot-lugs, *f*³, thereof. The body or main upright portion of this gage, H, has, within its face a shallow dovetailed recess, or slide-way, within which the plate, *g*, is fitted for vertical adjusting movement, the upper edge of the said plate, *g*, having the right angular lug, *g*², through which the adjusting screw, *g*³, has suitable engagement, the same also having an engagement with the main transverse plate. The lower edge *h*² of the main plate, *h*, is somewhat above the top of the table,—except at its end portions at which the foot-lugs, *f*³, are provided. The lower edge of the gate-plate, for the greater

portion of its length, is also above the level of the table in an extent considerably greater than the thickness of a single blank, with the slight depending projections, x, x , which are removed from the top of the table in an extent substantially the same as, or a little greater than, the thickness of the blank,—see Figs. 1^a and 2.

The parallel side guide-gages, J, J, are laterally adjustable and the front corner gages, K, K, are adjustable diagonally all for the retention in place and proper guidance of the blanks, one at a time, whether the blanks are larger or smaller or of varying widths proportionate to their lengths, as manifest.

The slide, F, consists of the slide-block, i , movable in suitably formed dovetailed or other slide-ways, i^2 , and the thin plate, j , the bulk of which is above the top surface of the table, B. The thickness of this plate is so slight that it may readily move under the gate-gage; it is, in fact, thinner than a box-blank. The reciprocatory movement is imparted to the slide by the means which will be now set forth, to wit:—The lever, k , at its lower end is pivoted for a fore-and-aft movement on the girder, k' , the upper end of this lever being linked to the slide. The cam operated thrust-rod, m , is connected to the said lever, k , at a point intermediate the ends thereof. I prefer to make the connection between the thrust-rod m , and the lever, k , an adjustable one whereby a longer or shorter stroke of the sliding plate may be had to accord with the different sizes of work to be carried out by the machine. Therefore I provide a sliding block or clasp, k^2 , to surround the lever, the same being held in its set position by the set screw, k^3 , and to the ear-lugs of this block a thrust-rod is pivotally connected as indicated at, k^4 . Of course it will be plain that the stroke of the slide will be varied according as the slide-clasp, k^2 , is farther from, or nearer to, the center of movement, k' , of the lever, k . The thrust-rod is formed in sections having a turn-buckle connection as seen at m^2 , m^3 , and m^4 , whereby the thrust-rod may be extended or shortened to accord with the place of its connection with the lever, k . To the rear of the opening, d , a table, B, is furthermore apertured as indicated at n , within which is the U-formed spring, o , it being secured to the table by its rear member while its forwardly presented member is free for yielding movements rearwardly.

The blanks are placed within the gages upon a table, as indicated by the dotted lines, z , in Figs. 1^a and 3. The slide, in its forward movement, carries the plate entirely forward of the pile of blanks and on its rearward working movement contacts with the forward edge of the lowermost blank carrying that blank, only, under and rearwardly beyond the gate-gage. By the provision of only the two short projections, x, x , for this gate-gage there is smaller resistance and less liability of clogging, as the single blank is forced rear-

wardly to its position for being bent, than would be the case if the entire lower edge of the plate, g , extended into proximity to the level of the upper surface of the lowermost blank. Practice has shown this to be a very advantageous form of the gate-gage. Just before the slide reaches its rearward limit of movement the rear edge of the blank is brought to contact with the yielding back-gage, o , the blank being finally brought to juxtaposition as said gage, o , slightly yields and is positively held until the descent of the plunger, which forces the blank through and discharges it below the bending aperture, d . This back gage having considerable scope of yielding movement is self-conforming to blanks of different sizes, as plain.

In order that the plunger may have an accelerated movement on the end of its down stroke, whereby the blanks may, after being bent, be discharged with a greater certainty onto the sub-table, G, I form the cam, a , which actuates the plunger with the abrupt depression or drop a^2 , see Figs. 7 and 8. This cam works against the roller stud, u , of the vertical reciprocatory thrust-rod u^2 , which has the rack-teeth, u^3 ; the shaft, v , suitably mounted, has at its ends the pinions, v^2 , and v^3 , the former engaging the racked thrust-rod and the latter engaging the rack-teeth of the plunger shaft.

No novelty is claimed in the form of the plunger actuating device, as it is quite common in envelope and other machines, except, however, in so far as it is unusually advantageous for the peculiar work for which it is designed by reason of the formation stated for insuring the impetus at the conclusion of the down stroke.

The boundaries of the bending aperture, d , are beveled, as indicated at d^2 , whereby any shear action to cut the paper-board blanks, is avoided.

In order that the bending aperture and plunger may have dimensions which correspond the one to the other, but which may be varied for different sized or shaped blanks we provide removable rectangular frames or sections, as indicated at w , which may be fitted within the recess,—which may be of any standard size,—in the main table, B; and the plunger may have its body, t , of a given standard and comparatively small size, externally shouldered as at t' , and said body may be adapted to receive rectangular frames or jackets, s , having the varied external dimensions. These jackets may be formed of rectangular castings with the outer surfaces properly finished; and in order to avoid time, labor, and expense of finishing, the entire inner surfaces of the jackets whereby they may fit the body of the plunger, the jackets are provided with the ribs at intervals, the inner surfaces, only, of which need to be planed, these planed surfaces affording sufficient bearing upon the outer surface of the plunger body to fulfill all requirements. The jackets are held

upon the plunger body by the internally applied set screws, t^3 , see Fig. 6. The removable sections, w , are supported within the aperture of the table, B, by the external flange, d^4 , which
 5 sits within the beveled or rabbeted upper, inner edge of the boundary of said aperture. The blanks, having been bent up into box-form and discharged, are removed from time to time from the sub-table G, and carried to
 10 the corner-stay attaching machine, the operative thereat, of course, not being required, now, to bend up the marginal portions of the blank by hand, before staying, as has heretofore usually been necessary.

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

1. In a machine for bending box blanks in combination, a table with an aperture through
 20 which the blanks are forced to be bent, and a plunger of a horizontal reciprocatory plate for forcing the blanks singly and successively to the position over the aperture, and a spring gage at the rear of the said aperture, substantially as described.

2. In a box blank bending machine, the combination with the table with the aperture, the blank feed slide and the plunger, and an actuating cam therefor with an abrupt depression, and a medium of connection between the
 30 cam and plunger, all combined and arranged whereby the latter will have an accelerated movement at the conclusion of its stroke, substantially as and for the purpose set forth.

35 3. In a box blank bending machine, the combination with the table with the aperture, d ,

through which the blanks are forced to be bent, and the aperture, n , at the rear thereof, of the blank feed slide and the spring gage stop, o , in said recess, n , substantially as described. 40

4. In a box blank bending machine, the combination with the table having the rectangular aperture, d , and removable and interchangeable frame sections, of the plunger
 45 comprising the rectangular body and the rectangular jacket or frame with the internal planed ribs, and devices for confining the jacket on the body, substantially as described.

5. The combination with the plunger body, 50 t , having the external shoulder, t' , of the jacket, s , having the internal planed ribs, s^2 , and the one or more internally applied set screws, t^3 , substantially as described.

6. The combination with the table having 55 the apertures d and n , the plunger and the spring gage, o , at the rear, the parallel side guide-gages, J J, which are laterally adjustable, the gate-gage, H, comprising the plate, h , which is adjustable forward and rearward
 60 and having the vertically adjustable part, g , the lower edge of which is slightly above the top of the table, the lugs or gages, K K, at the front which are diagonally adjustable and the reciprocating plate, j , movable in a plane just
 65 below the lower edge of the said vertically adjustable part, g , substantially as described.

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Witnesses:

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