

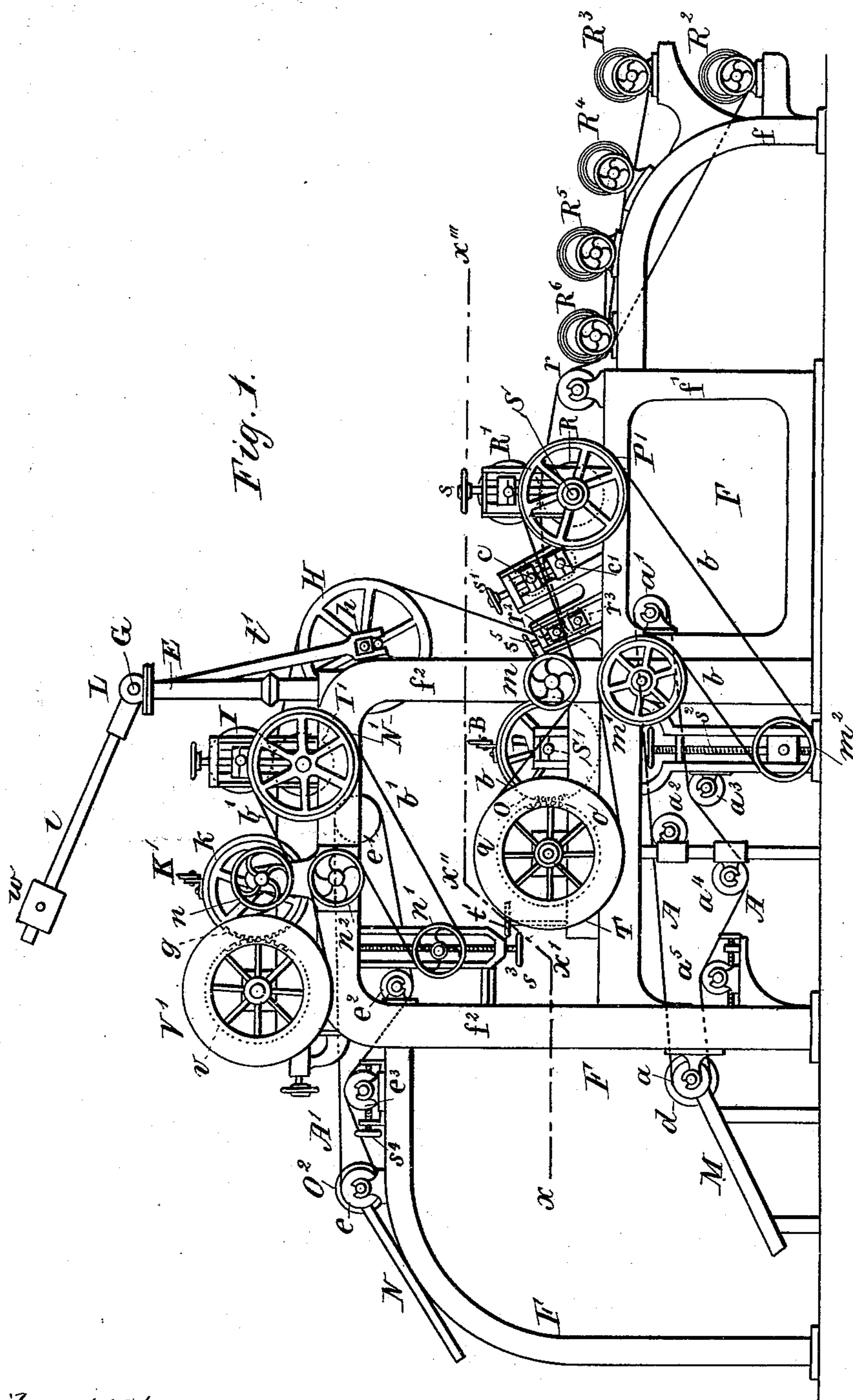
(No Model.)

5 Sheets—Sheet 1.

G. BROUSSIER.
PAPER CUTTING MACHINE.

No. 376,025.

Patented Jan. 3, 1888.



Witnesses
O. E. Foulter,
J. W. Knott.

Inventor
Gustave Broussier
for Henry C. Coth
His atty

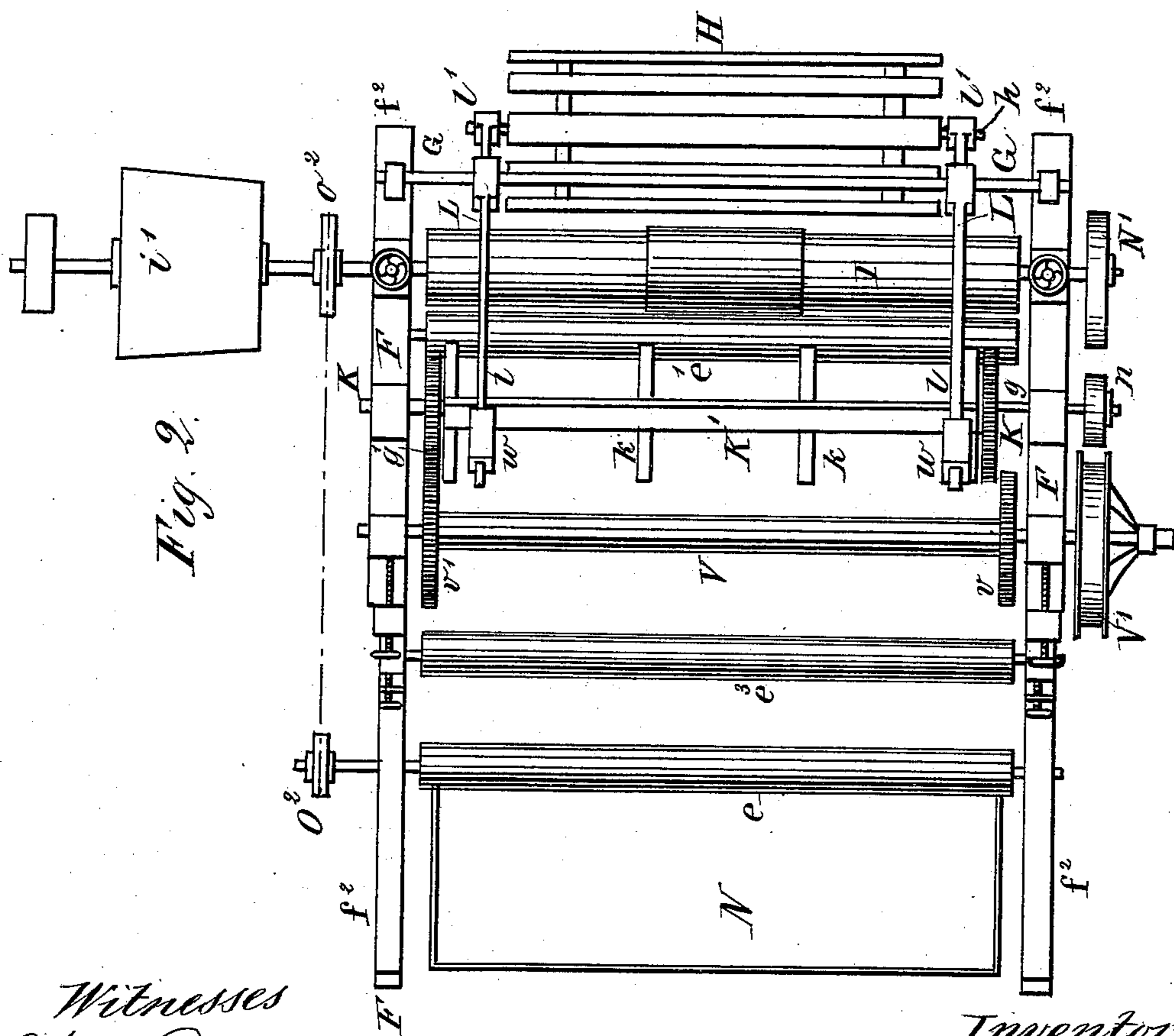
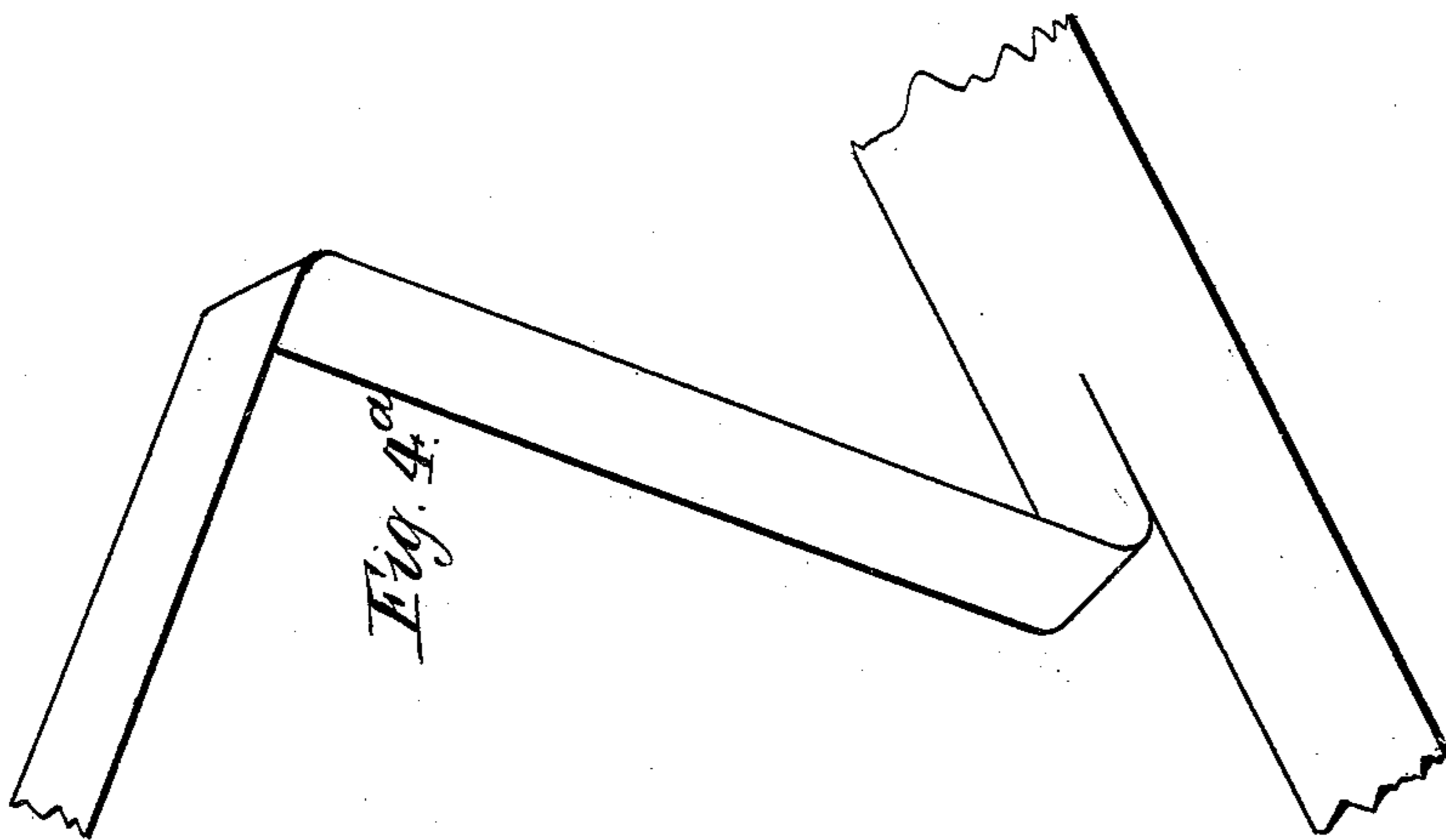
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5 Sheets—Sheet 2.

G. BROUSSIER.
PAPER CUTTING MACHINE.

No. 376,025.

Patented Jan. 3, 1888.



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(No Model.)

5 Sheets—Sheet 3.

G. BROUSSIER.
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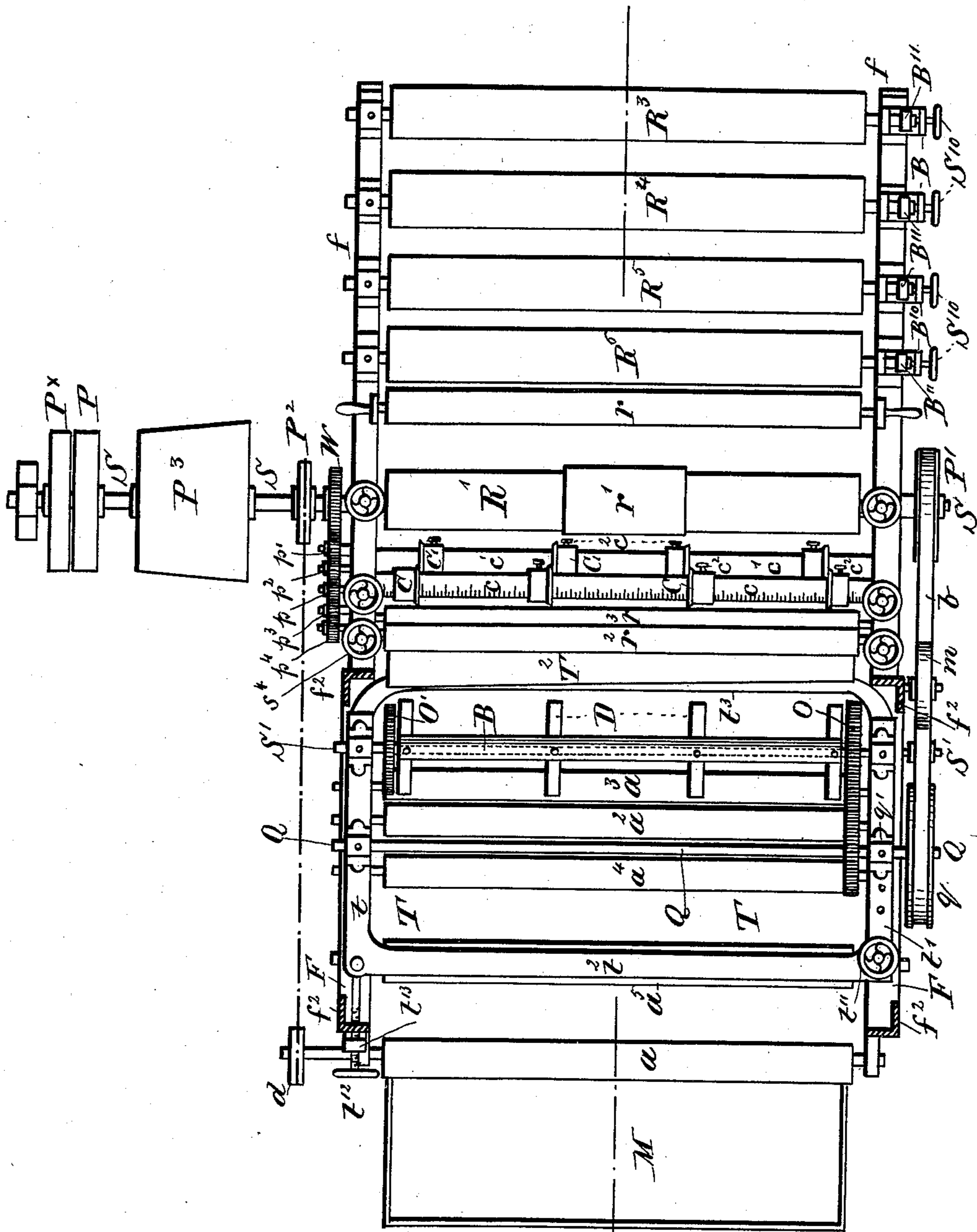


Fig. 3.

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Gustave Broussier
per Henry O. W.

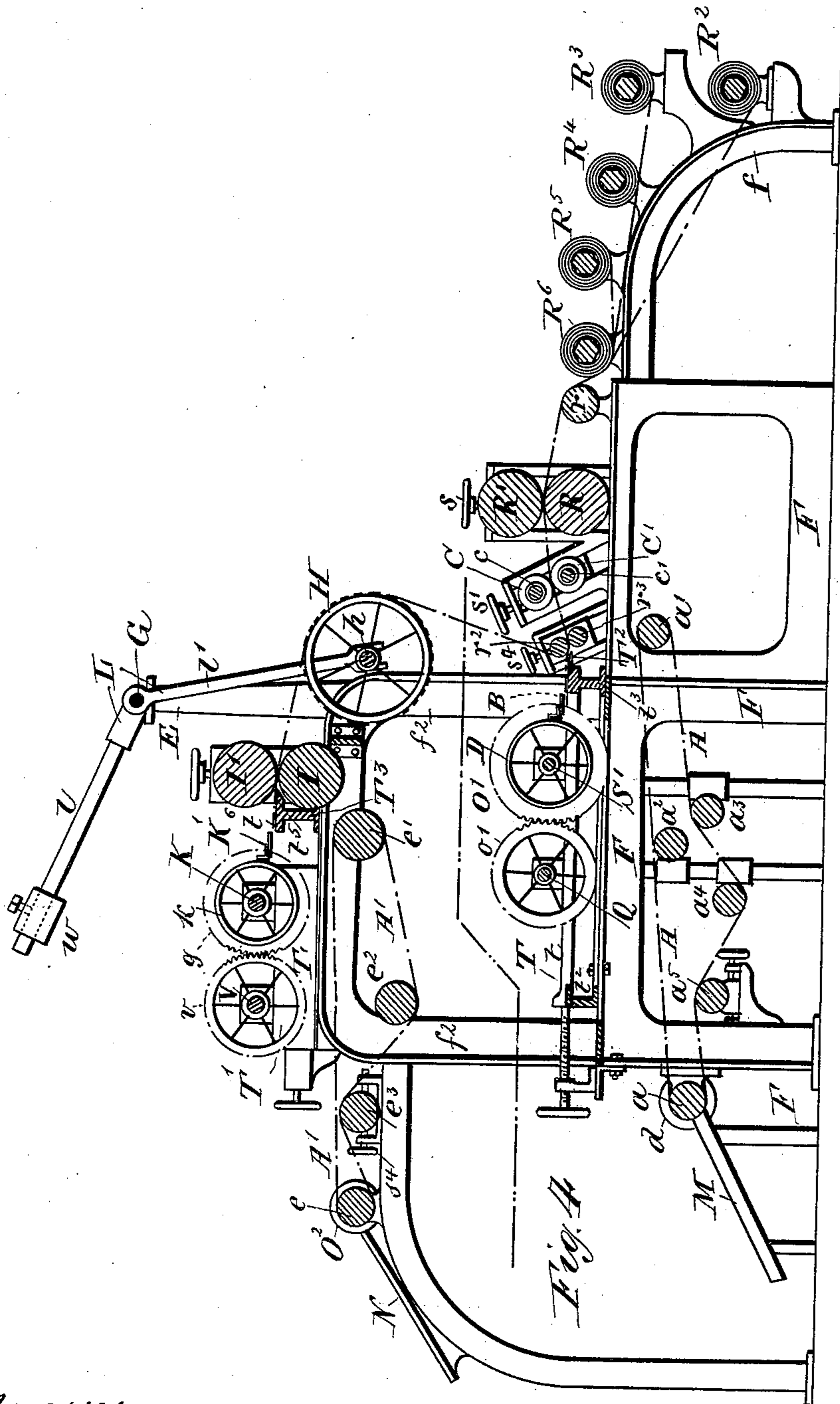
(No Model.)

G. BROUSSIER.
PAPER CUTTING MACHINE.

5 Sheets—Sheet 4.

No. 376,025.

Patented Jan. 3, 1888.



Witnesses
G. M. Halladay
Paul M. Knobloch.

Inventor
Gustave Broussier.
per Henry Orth

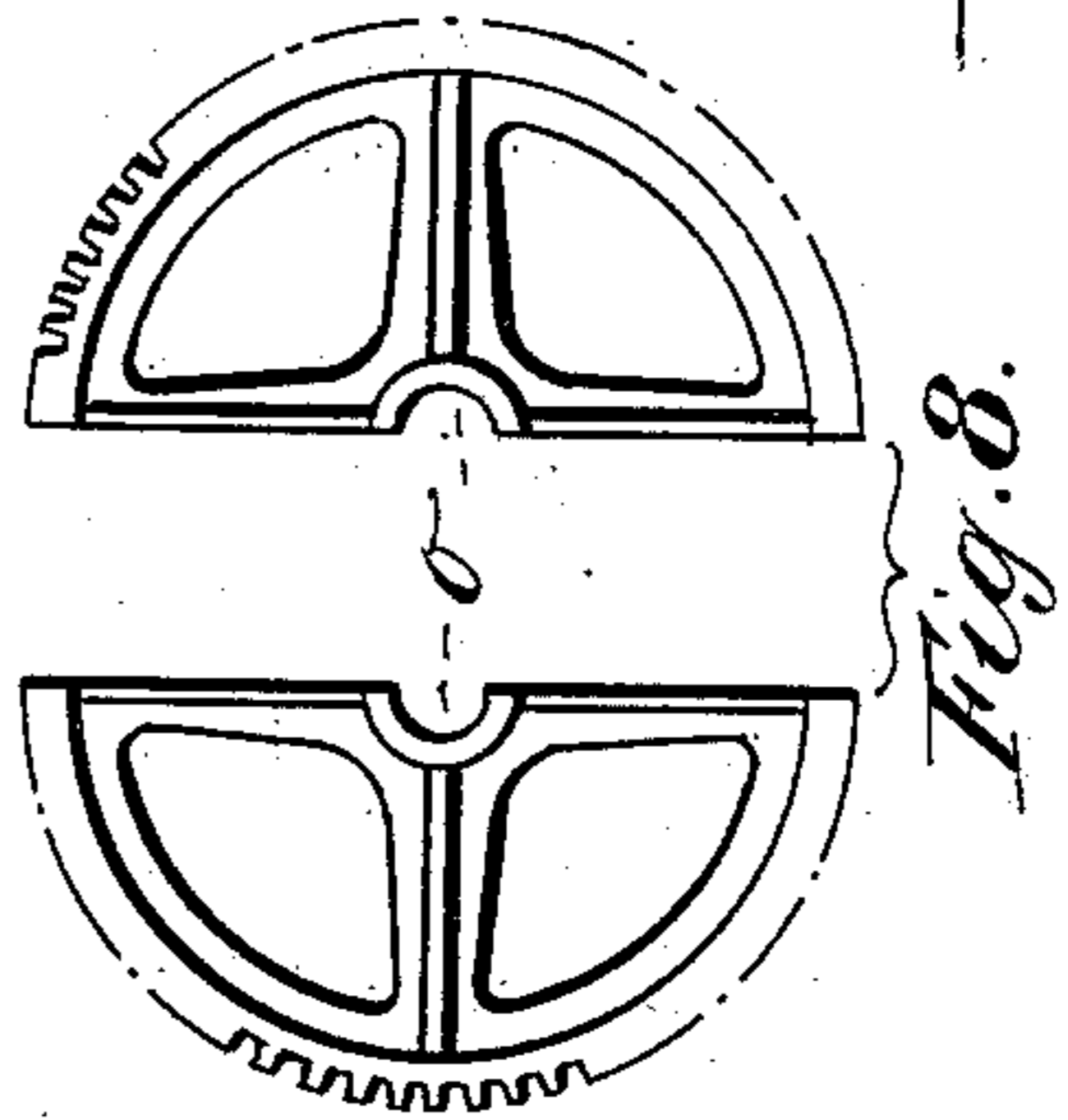
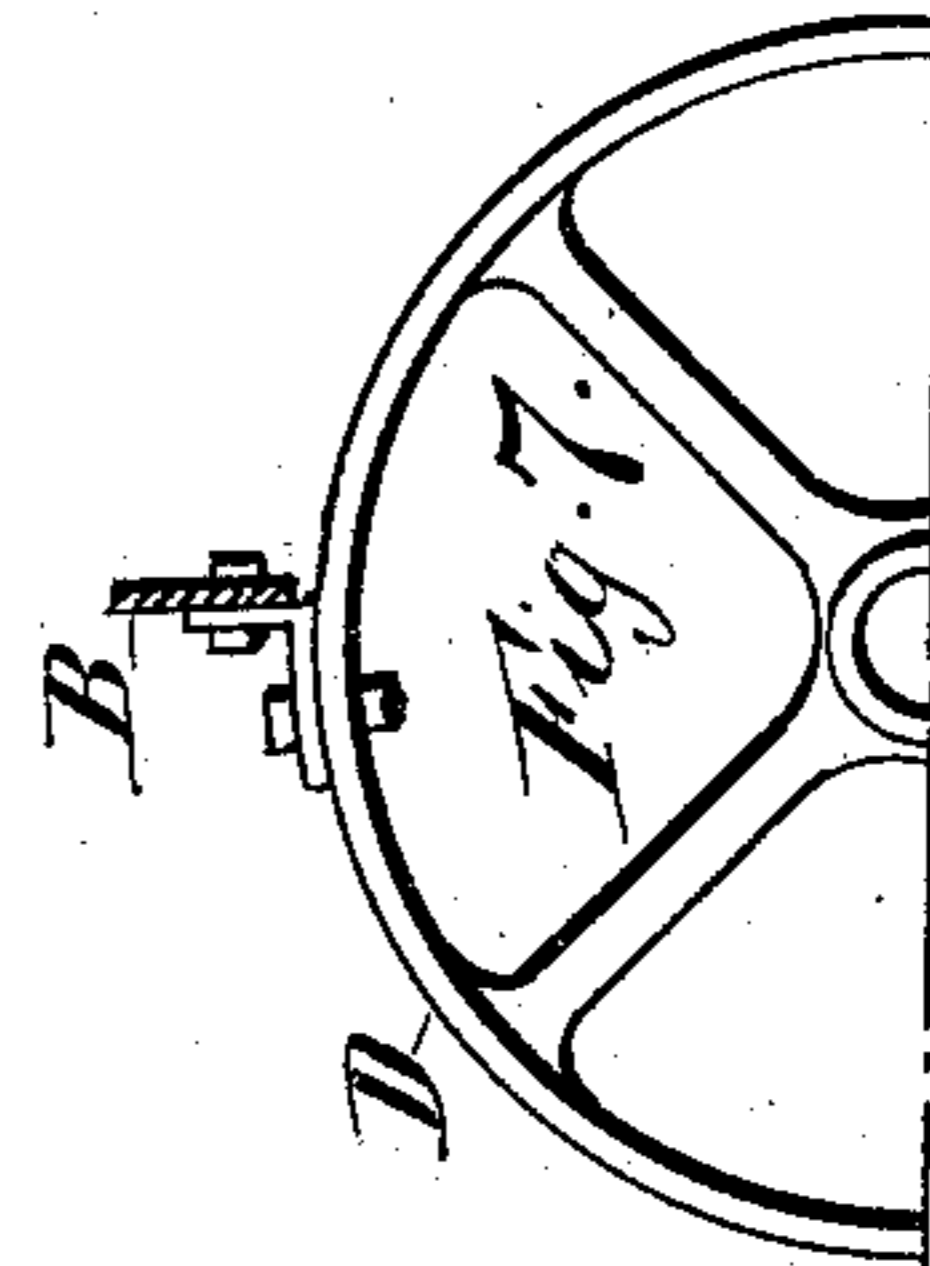
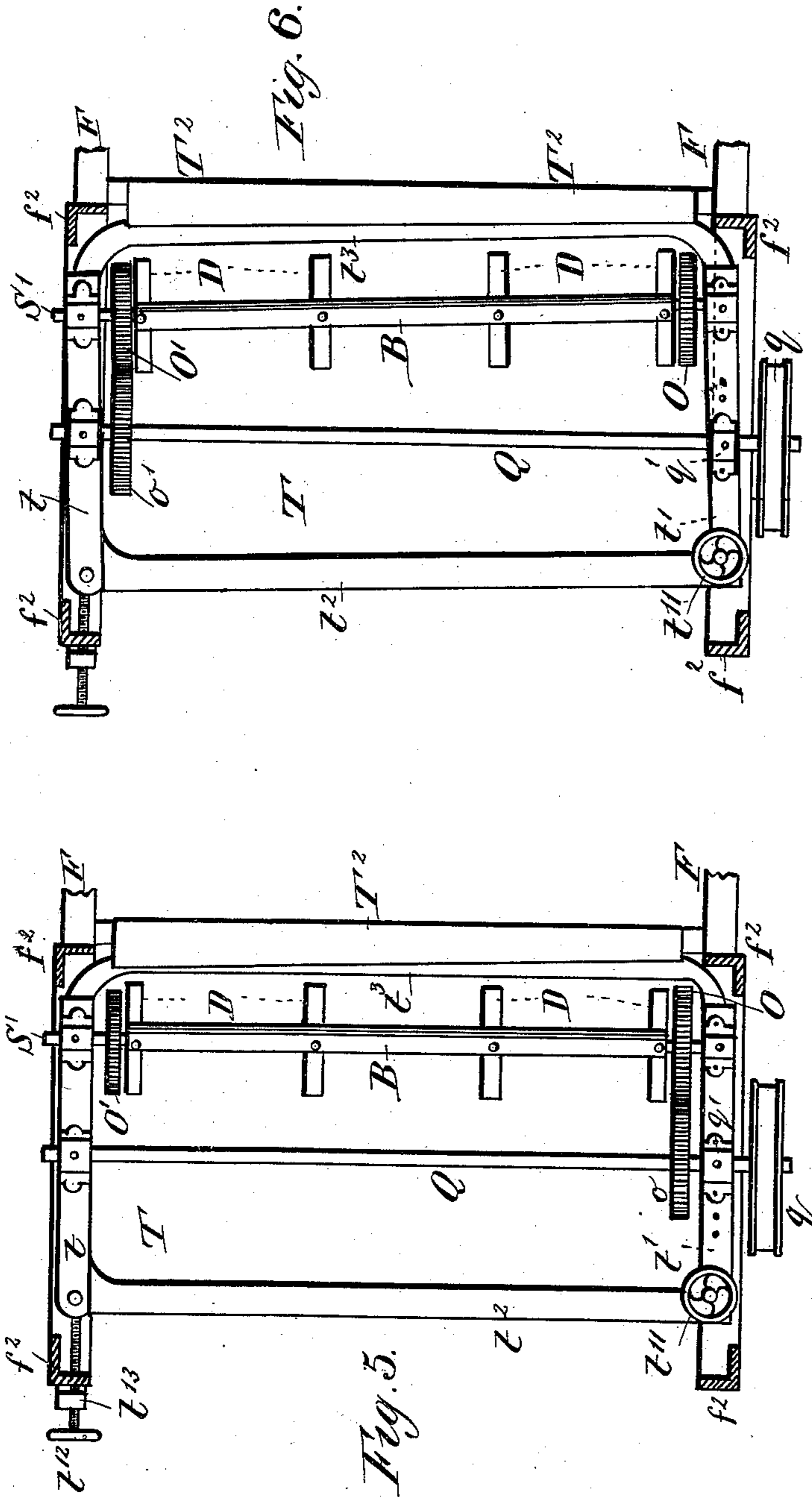
(No Model.)

5 Sheets—Sheet 5.

G. BROUSSIER.
PAPER CUTTING MACHINE.

No. 376,025.

Patented Jan. 3, 1888.



Witnesses
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Inventor
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UNITED STATES PATENT OFFICE.

GUSTAVE BROUSSIER, OF PARIS, FRANCE.

PAPER-CUTTING MACHINE.

SPECIFICATION forming part of Letters Patent No. 376,025, dated January 3, 1888.

Application filed December 20, 1883. Serial No. 115,168. (No model.) Patented in France December 20, 1881, No. 146,443; in Germany May 1, 1882, No. 21,713; in England May 1, 1882, No. 2,059; in Spain May 1, 1882, No. 3,156; in Italy May 6, 1882, XVI, 14,170; in Sweden May 6, 1882; in Austria-Hungary May 9, 1882, No. 16,223 and No. 26,671, and in Norway May 27, 1882.

To all whom it may concern:

Be it known that I, GUSTAVE BROUSSIER, a citizen of the French Republic, and a resident of Paris, in the French Republic, have invented certain new and useful Improvements in Paper-Cutting Machines, (and for which I have received Letters Patents in the following countries: in France, No. 146,443, under date of December 20, 1881; in Germany, No. 21,713, under date of May 1, 1882; in Austria-Hungary, No. 16,223 and No. 26,671, under date of May 9, 1882; in England, No. 2,059, under date of May 1, 1882; in Italy, No. 14,170, under date of May 6, 1882; in Spain, Nos. 3,156 and 265, under date of May 1, 1882; in Norway, under date of May 27, 1882, but not numbered, and in Sweden, under date of May 6, 1882, also not numbered;) and I 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, reference being had to the accompanying drawings, and to letters or figures of reference marked thereon, which form a part of this specification.

My invention relates to improvements in paper-cutting machines; and it has for its object to provide means whereby strips of paper of different widths and lengths may be cut from a web or from a number of superposed webs; and it has for its further object to provide means whereby the strips or bands of paper cut longitudinally from a web or webs may be cut into sections at right angles or on lines oblique to the lateral edges of such strips or bands.

The invention has for its further object to provide means for readily adjusting the cutters or the cutter-shafts to adapt the machine to cut strips of different widths from webs fed thereto, either from a storing-drum or direct from a paper-making machine, all as hereinafter more fully described, and as shown in the accompanying drawings, in which—

Figure 1 is a side elevation; Fig. 2, a top plan view of the upper cutter-frame; Fig. 3, a sectional plan view on line $x'x''x'''$ of Fig. 1, and Fig. 4 a vertical longitudinal central section, of a paper-cutting machine embodying

my improvements. Fig. 4^a shows, by an isometric view, a web of paper partially cut into strips. Figs. 5 and 6 are detached top plan views of the cutter-frame, showing the same in different positions. Fig. 7 is a side elevation of one-half of one of the disks or wheels that carry the revolving cutter blade or blades, the blade being shown in section; and Fig. 8 shows one of the two-part gear-wheels in elevation.

The several parts of the machine are mounted and arranged to operate upon a suitable frame, F, constructed of any appropriate material.

$R^2 R^3 R^4 R^5 R^6$ are web rollers, upon one or more or all of which is or may be wound a web of paper of any desired length and of such width as will conveniently pass through the machine, said rolls being mounted on the feed end of the machine and rotate in suitable bearings secured to arms f , extending rearwardly from the main frame. These rolls $R^2 R^3$, &c., are so arranged relatively to one another that the web of paper wound upon each of them will be delivered in superposed layers to a guide-roll, r , which guides the superposed webs of paper to a pair of drawing-rolls, $R R'$. The upper roll, R' , has, preferably, a portion thereof extending from its longitudinal center toward its extremities of slightly greater diameter than said extremities, as shown at r' , Fig. 3, to prevent the wrinkling or puckering of the superposed webs of paper, and said portion, as well as the remaining portion of the roll, may be covered with felt, rubber, or other suitable flexible or elastic material, if desired, in which case the lower roll, R , will have a like covering. The upper roll, R' , is mounted in bearing blocks that are adjustable vertically toward and from the bearings of roll R , by means of set-screws s , in the well-known manner, to adapt said roll for adjustment relatively to roll R , according to the number of superposed webs of paper passing between them.

C and C' are disk-cutters or knives mounted upon shafts $c c'$, the relative arrangement of said cutters being such as to produce a shear-cut when operating together on the paper

webs, one from above and one from below the superposed webs, and the shaft c , that carries the upper cutter, C , is adjustable vertically toward or from the lower cutter-shaft, c' , by means of sliding bearings and set-screws s' , as shown in Figs. 1, 3, and 4, the same as the upper drawing-roll, R' , to adapt said cutters to cut varying numbers of superposed webs of paper. The cutters C C' are adjustable longitudinally of their shafts by means of set-screws c^2 , passing through their hubs, as shown in Fig. 3.

In practice I prefer to graduate one or both shafts to inches and any desired fractions thereof, so that the cutters may be set to cut any desired width of strip within the limits of the machine from a full width (the lateral rough edges being trimmed off) to a strip or band an inch or more in width, or to cut strips of different widths, as required or desired.

From the cutters C and C' the trimmed continuous web or superposed webs, or the continuous strips or bands, or superposed layers of such, pass between guide-rolls r^2 r^3 , and thence to a guide-bar, T^2 , Figs. 4, 7, 8, and 9, secured to the main frame F at opposite ends and lying within a rabbet of an adjustable cutter-frame, T ; or one or more of said webs or strips may be carried upward as they issue from between the guide-rolls r^2 r^3 to a cutter above, as presently explained. The bearings of the upper roll, r^2 , are also adjustable vertically by means of screws s^1 , so as to admit of the passage of a greater or less number of webs or strips of paper, as will be readily understood. The web or webs or strips of paper, as they pass from the guide-rolls r^2 r^3 over the guide-bar or feed-table T^2 , are cut transversely by revolving cutters mounted in an adjustable cutter-frame, T , which I will now describe.

The cutter-frame T is of rectangular form, and is pivoted at one corner on a screw, t'' , on which it is adapted to swing, and may be adjusted to adjust the cutter-blades mounted thereon to any desired angle within certain limits relatively to the webs or strips of paper fed thereto to cause the cutters to cut a straight or oblique cut. Any suitable means may be employed to lock the frame into position when adjusted.

In suitable bearings in the side bars, t t' , is mounted a cutter-shaft, S' , that carries at each end within the frame a spur-wheel, O and O' , respectively, and a suitable number of disks, D , upon which are secured one or more cutter-blades, B , (one only being shown in the drawings,) the number of such cutter-blades depending on the length of sheets to be cut from the web or strips. The cutter-blade is so arranged relatively to the inner edge of the rear transverse bar, t^3 , of the frame T that the said edge of the bar serves as the stationary cutter, between which and the revolving cutter B the paper is cut. In suitable bearings in said frame T and in rear of the cutter-shaft S' is mounted a shaft, Q , from which the cutter-shaft is driven, as hereinafter described. The said shaft Q carries at its outer end, out-

side of the frame T , a belt-pulley, q , and, according to the adjustment of the table T , a spur-wheel, o or o' . Both these spur-wheels are constructed in two sections, Fig. 14, so that either one or the other may be readily applied to or removed from the shaft Q , as may be necessary. To this end the adjacent radial arms of the two halves of the wheels are provided with flanges, in which are formed bolt-holes for the reception of bolts, by means of which the two sections of the wheel are bolted together, and they are rigidly secured to their shaft in any well-known manner, such as by means of a key or pin or other well-known means.

When the frame T is adjusted by means of the set-screw t^2 , so that the cutter will cut a square cut or one at right angles to the straight edge of the web or webs or the strips, as in Fig. 7, the spur-wheel o is employed to transmit the rotation of the shaft Q to the cutter-shaft S' . When, on the other hand, the frame is adjusted to cut an oblique cut, then the wheel o is removed and that o' applied, whose teeth are slightly oblique, and the bearing q' of the shaft Q , on the side of the driving-pulley q —i. e., on the side bar, t' —of the frame, is shifted to bring said shaft on a proper line or parallel with the shafts of the driving-gear, as shown in Fig. 8.

By means of the described arrangement of cutters C C' B and the adjustable cutter frame T it will be seen that a web or a number of webs of paper may not only be cut lengthwise into as many strips as is possible within the capacity of the cutter-shafts c c' , but the said web or webs or strips may be cut crosswise, either at right angles to their straight edges or at oblique angles to said edges, according to the use made of the cuttings.

In the manufacture of envelopes the oblique cross cut is of great advantage, inasmuch as a material saving of paper is effected, a rhomboid-shaped sheet being thereby obtained, from which the blanks for the envelopes may be more economically cut or stamped.

As the web or webs or strips are cross-cut they fall upon an endless belt, A , that delivers them to an inclined table, M , on which they are stacked according to size and then removed.

In order to give the machine a greater scope as to the sizes, either in width or length of the sheets to be cut, the frame F is extended vertically or carries a superposed frame, f^2 . At the rear end of the upper frame-section, and on opposite sides thereof, are secured standards E , in which is mounted a fulcrum-shaft, G . Upon opposite ends of this shaft are rigidly secured angle-levers L , the upper arms, l , of which carry adjustable weights w , while the lower arms, l' , of said levers are provided with or form bearings for the shaft h of a guide or tension drum, H , which is thus free to oscillate on the standards E under the varying tension of the paper. In front of the drum H are mounted two drawing-rolls, I I' , similar

in every respect to the drawing-rolls R R' previously described. K is a knife or cutter-shaft carrying disks *k*, to the periphery of which one or more knives, K', are secured, the arrangement being the same as that previously described, and said cutter-shaft, like the cutter-shaft S', is or may also be mounted upon an adjustable frame, T', in order to cut the continuous strips into rectangular sheets, or, if desired, into sheets or rhomboidal form. On the right of the cutter shaft K is arranged a guide-bar, T³, of double T-iron, the right-hand beveled edge, *t*³, of the upper horizontal portion of which projects between the drawing-rolls I I' to receive the strips of paper, while the left-hand edge, *t*⁶, of said upper horizontal portion constitutes the stationary cutter, and, together with the cutter K', cuts the strip transversely. It is evident that by means of this arrangement any number of continuous webs of paper fed from rolls R R' to cutters C C', and by them cut into given widths, may, after leaving the said cutters and the guide-rolls *r*² *r*³, be taken up and carried over drum H to drawing-rolls I I', and thence to cutter or cutters K', and cut into sheets of different lengths from those cut by the knives below, so that the same machine will cut a greater variety of sizes of sheets, and will cut them either rectangular or in rhomboidal form, or said machine may be made to cut rectangular and rhomboidal sheets at the same time, or any number of sheets may be taken to the upper mechanism after leaving the feed-rolls R R'.

It is obvious that instead of delivering the paper from rolls upon which such is wound, either by the paper-making mechanism or otherwise, the continuous sheets may be fed to the machine directly from the paper-making machine.

If desired, the upper cutting mechanism may be provided with a set of cutters similar to those C C' and mounted on the right of the feed-rolls I I', to still further extend the scope of the machine, and I have deemed it unnecessary to show such an arrangement, as it is within the province of any skilled mechanic to apply the same from the description of the construction and function of the cutters C C'. The cut sheets fall upon an endless apron, A', that delivers the same upon a table, N, in a manner and for purposes similar to those described with reference to the apron or belt A and table M.

The operating mechanism of the machine is driven from the shaft S of the drawing feed-roll R of the lower set of drawing feed-rolls, said shaft carrying a loose and fast pulley, P^x P, the latter being belted to and driven from any suitable prime motor. The shaft S also carries a cone-pulley, P³, a gear-wheel, W, and belt-pulleys P' P². The cone-pulley P³ is belted to a like pulley, *i*', on the shaft of the drawing-roll I, through which the upper portion of the mechanism is driven, while the gear-wheel W meshes with a pinion, *p*', on the journal of the cutter-shaft *c*'. The pinion *p*' meshes

with an idler, *p*², and the latter with a pinion *p* on the upper cutter-shaft. The pinion *p* on the upper cutter-shaft meshes with a second idler, *p*³, and the latter with a pinion *p*⁴ on the journal of the lower guide-roll, *r*³. The knife-shaft S' carries a gear-wheel, O and O', at its opposite ends within the cutter-frame T, that mesh with one of the wheels, *o* or *o*', detachably secured to a counter-shaft, Q, that is mounted in bearings formed on the adjustable cutter-frame T, one of said bearings, *q*', being adjustable, as hereinabove fully described. In this manner, when the table is turned to cause the knives to cut obliquely to the straight edges of the continuous strips, there is no derangement in the driving-gearing, as plainly shown in Fig. 8.

The shaft Q carries a grooved or flanged pulley, *q*, that is driven by a belt, *b*, from belt-pulley P' on shaft S, above referred to, the belt *b*, Fig. 1, passing under and around tension-pulleys *m* *m'* *m*², the latter being adjustable in its bearings by means of a set-screw, *s*², as shown in Fig. 1, for obvious purposes. The endless apron or belt A travels over rollers *a* *a'* and over tension-rollers *a*² *a*³ *a*⁵ and under a tension-roll *a*⁴, the roll *a*⁵ being adjustable horizontally toward or from the roll *a*, to give the apron or belt the proper tension. The shaft of the latter roll carries a belt-pulley, *d*, that is belted, with the pulley P², on shaft S, above referred to, and as shown in Fig. 3, through which pulley P² the apron or belt A is operated.

As previously stated, the shaft of the roll I of the upper pair of drawing-rolls carries a conical pulley, *i*', that is belted with a like pulley, P³, mounted on the main driving-shaft S. The upper cutter-shaft, K, like cutter-shaft K', carries also two gear-wheels, *g* *g'*, that mesh with either the gear-wheel *v* or the gear-wheel *v'* on a counter-shaft, V, according to the adjustment of the cutter-frame, to cause the cutter to cut straight or obliquely. When cutting straight, the gear-wheels *v* *g* mesh with each other, and when the cutter cuts obliquely the wheels *v'* *g'* mesh with each other, the shaft V being first properly adjusted by adjusting its bearings on the adjustable frame. The counter shaft V carries a grooved or flanged driving-pulley, V', that is belted to a like pulley, N', on shaft of drawing-roll I, the belt *b'* passing under, around, and over tension-pulleys *n* *n'* *n*², respectively, the pulley *n'* being adjustable vertically by means of a set-screw, *s*³, as shown in Fig. 1. Finally, the feed apron or belt A' passes over rollers *e* *e'* and under and over tension-rolls *e*² *e*³, the latter of which is adjustable horizontally toward or from roller *e* by means of set-screws *s*⁴ to maintain the apron or belt at proper tension. The shaft of roller *e* carries a pulley, O², belted to a pulley, *o*², on shaft of drawing-roll I.

It will thus be seen that all the operative parts of the machine are driven from the same shaft.

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

1. A paper-cutting machine comprising a set of circular cutters for cutting the webs of paper longitudinally, a cross-cutter to which a portion of the longitudinally-cut webs of paper are fed and by which they are cut transversely, a second cross-cutter for cutting transversely the remaining webs of paper, and a delivery apron and table for each of said cross-cutters.

2. The combination, with the frame T, arranged to revolve on a pivot, t'' , said frame carrying a cutter-bar, t^3 , the cutter-shaft S', the cutter disks D, mounted thereon, one or

more cutter-blades secured to said disks and co-operating with the stationary cutter-bar t^3 , and the spur-wheels O and O' on said shaft, of the shaft Q, having its bearings adjustable on the frame T, the spur-wheels o and o' for said shaft, and the driving-pulley q , said parts being arranged substantially as and for the purpose specified.

In testimony that I claim the foregoing I have hereunto set my hand this 5th day of December, 1883.

GUSTAVE BROUSSIER.

Witnesses:

ROBT. M. HOOPER,
FREDERIC MATRAY.