

No. 765,585.

PATENTED JULY 19, 1904.

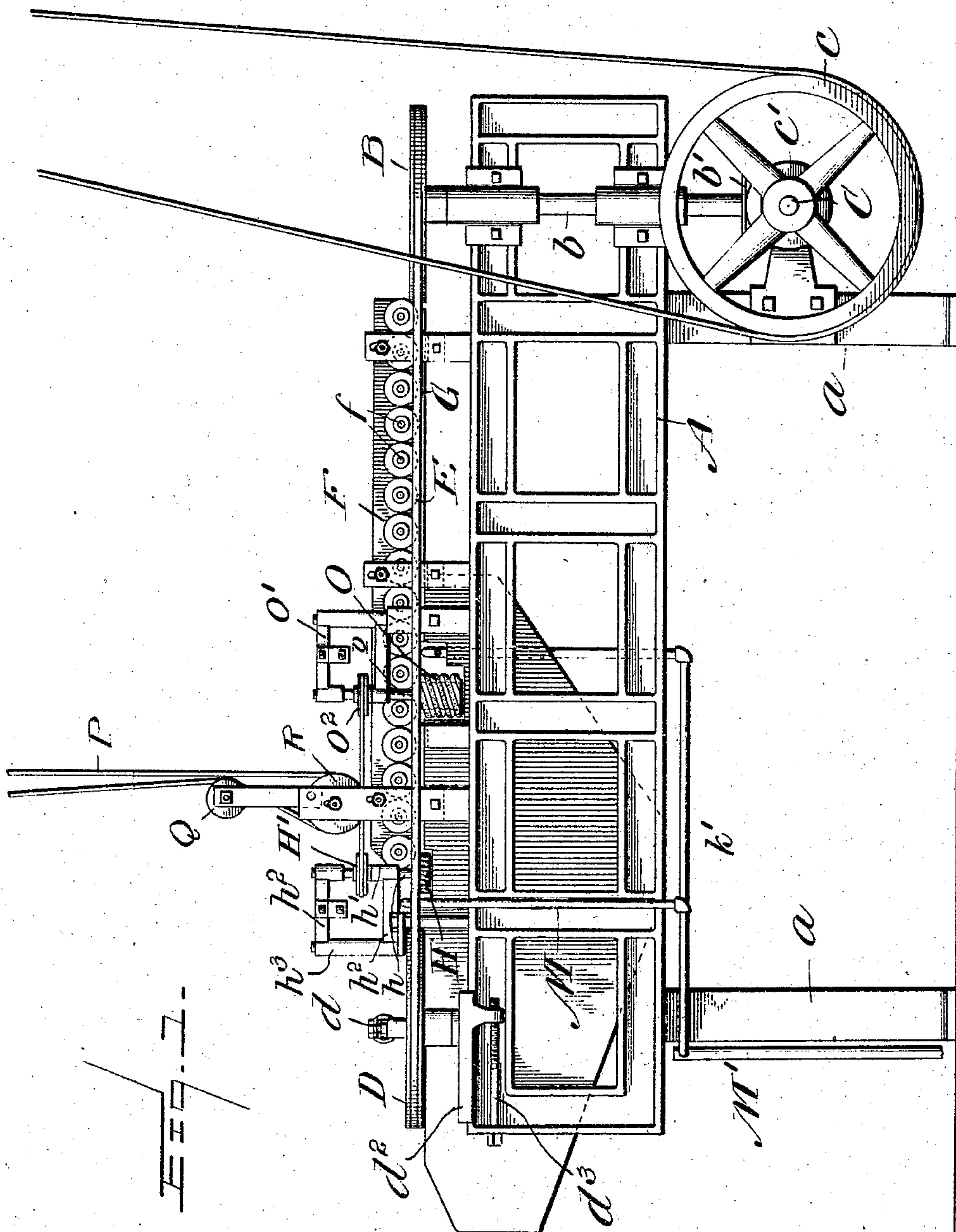
L. D. LORENTZ, J. C. BUCHANAN & A. O. TRAVIS.

TOBACCO STEMMING MACHINE.

APPLICATION FILED FEB. 11, 1904.

NO MODEL.

12 SHEETS--SHEET 1.



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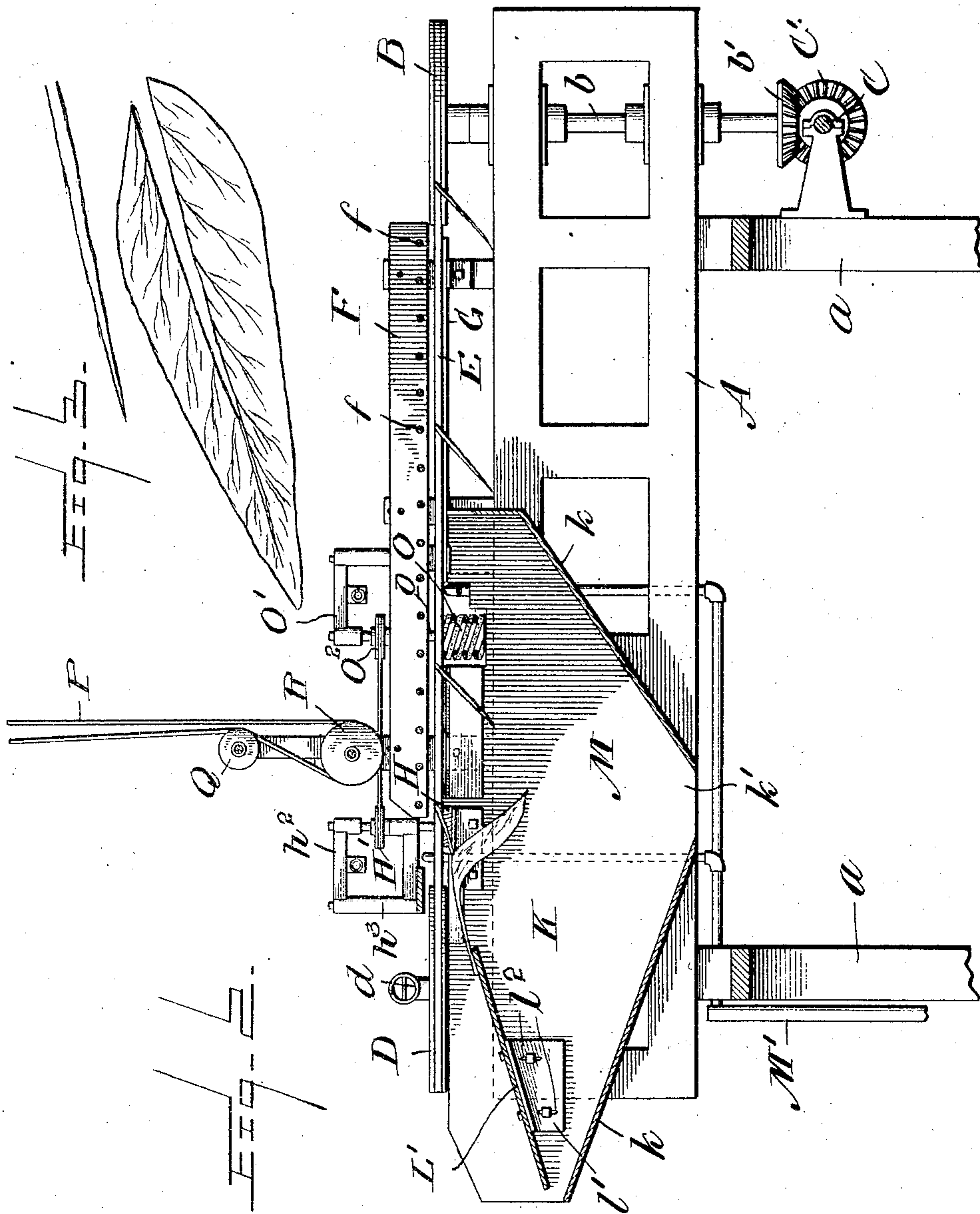
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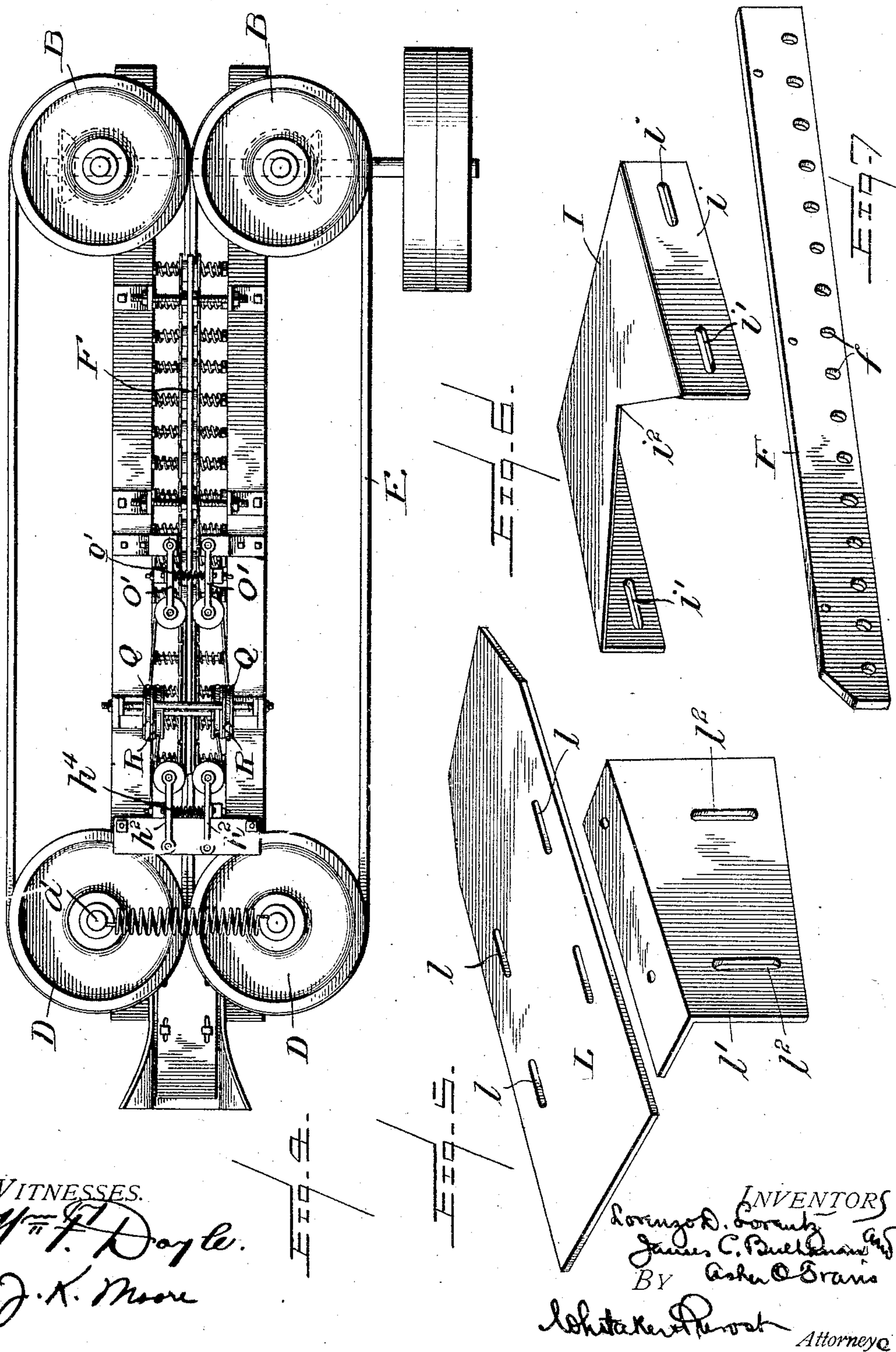
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12 SHEETS—SHEET 3.



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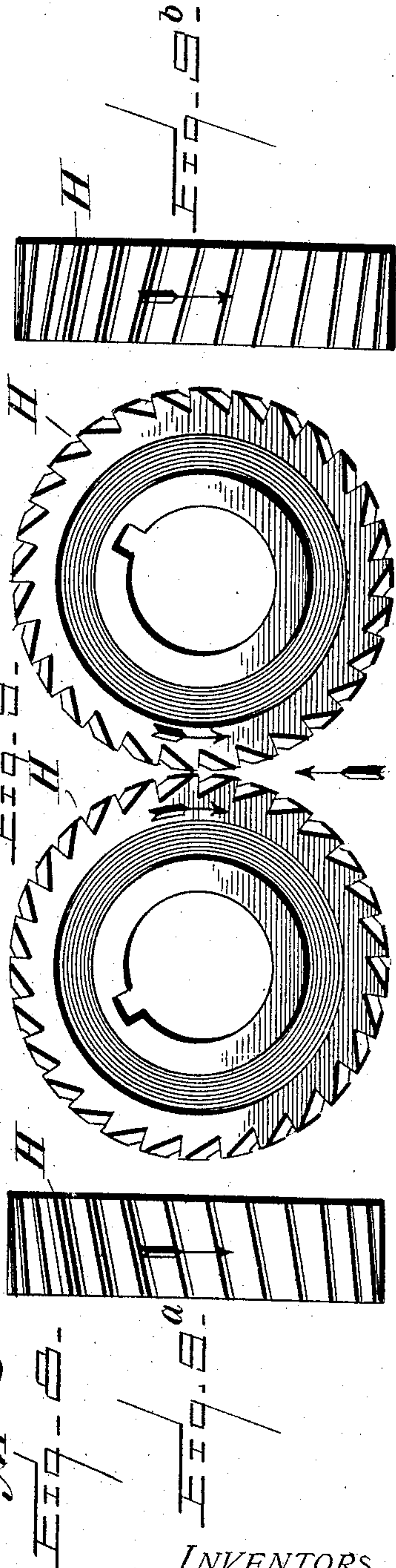
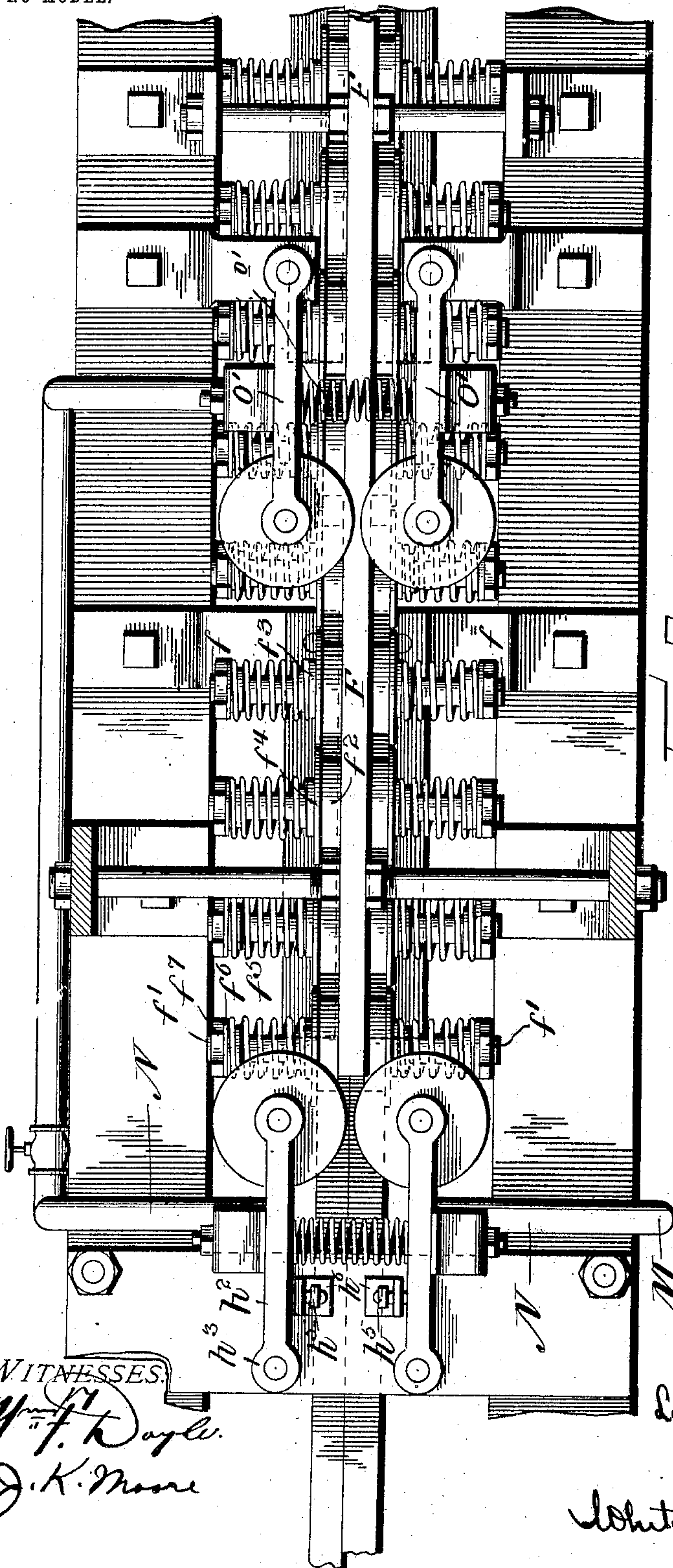
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12 SHEETS—SHEET 4.



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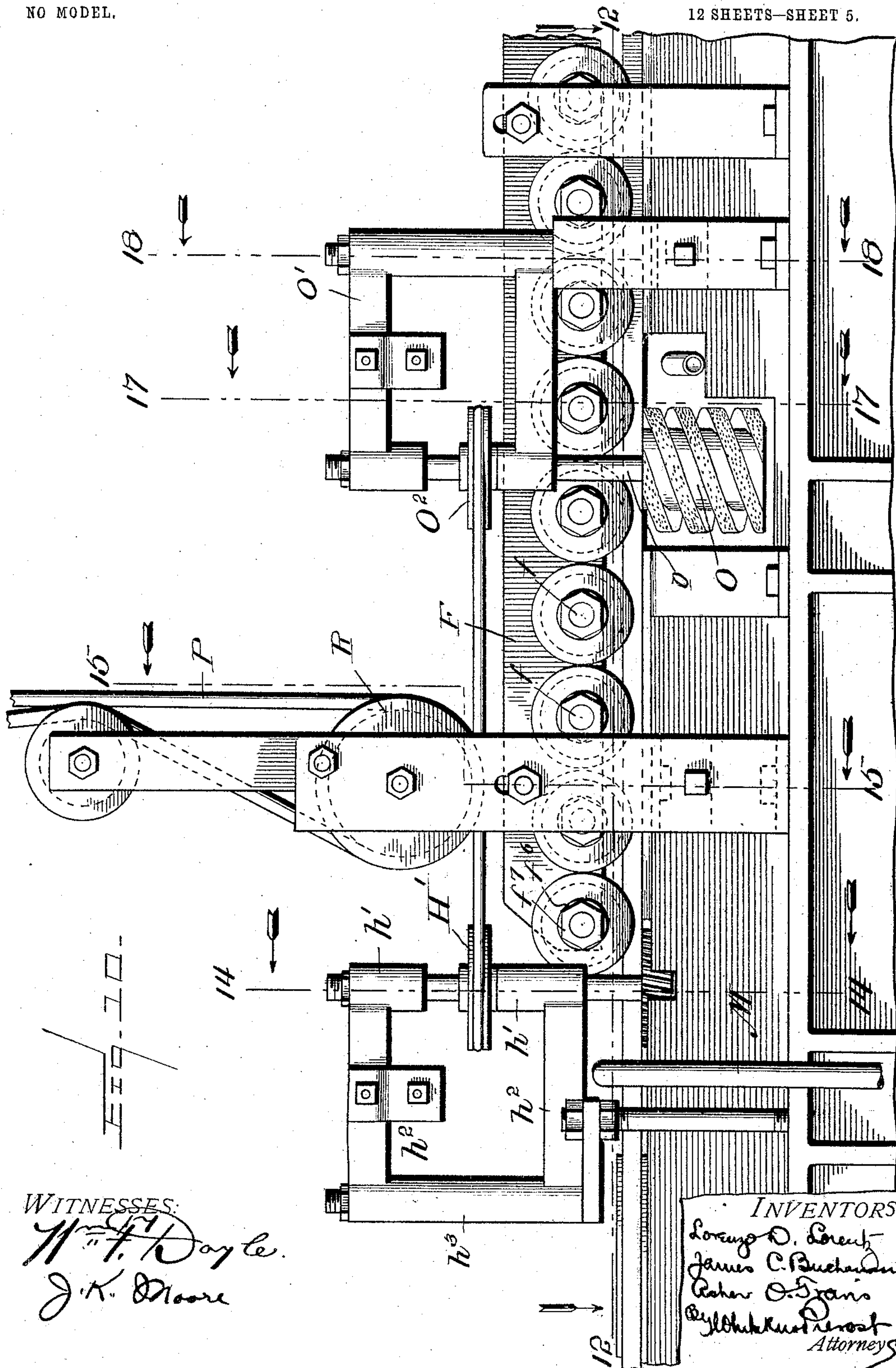
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12 SHEETS—SHEET 5.



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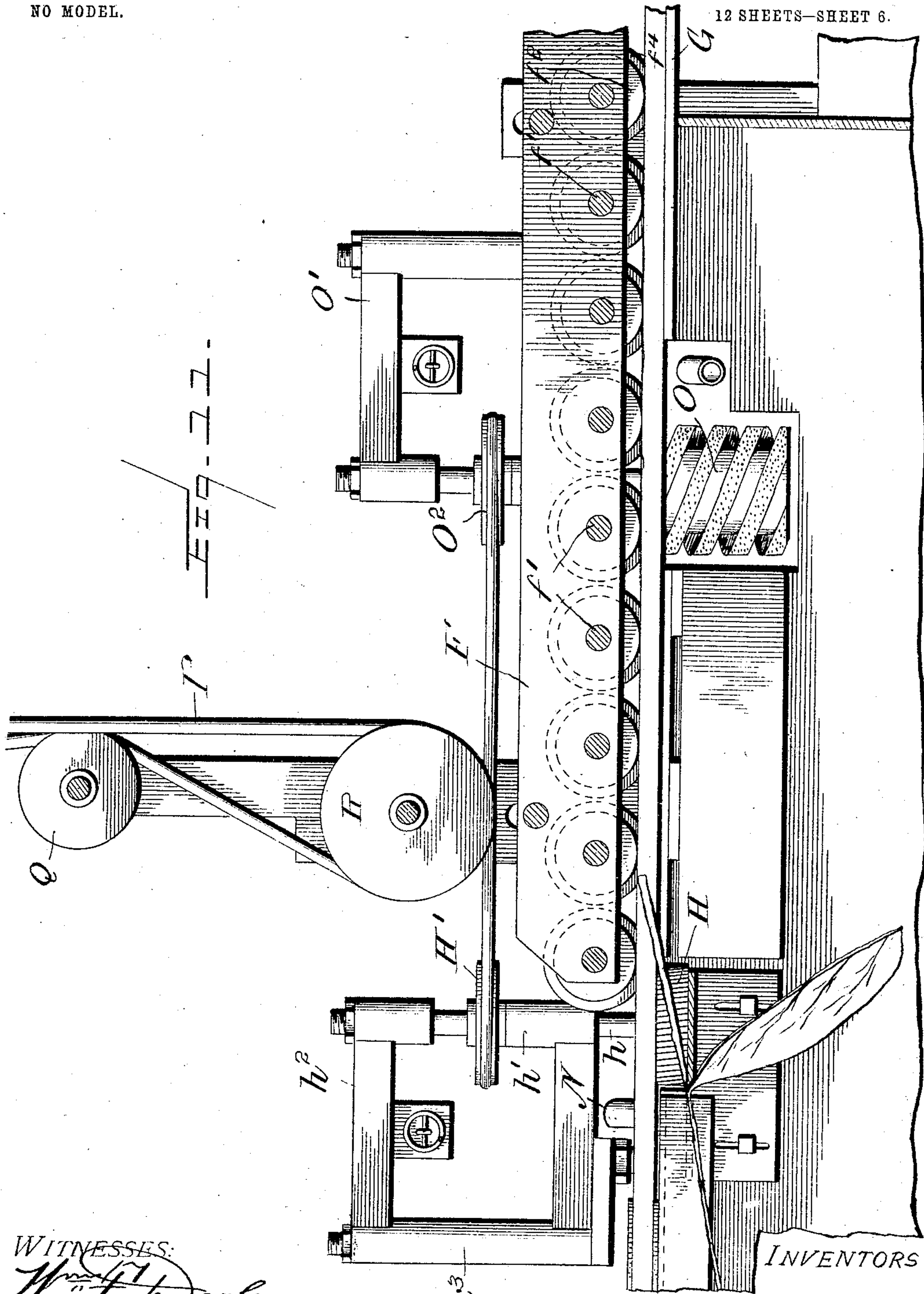
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12 SHEETS—SHEET 6.



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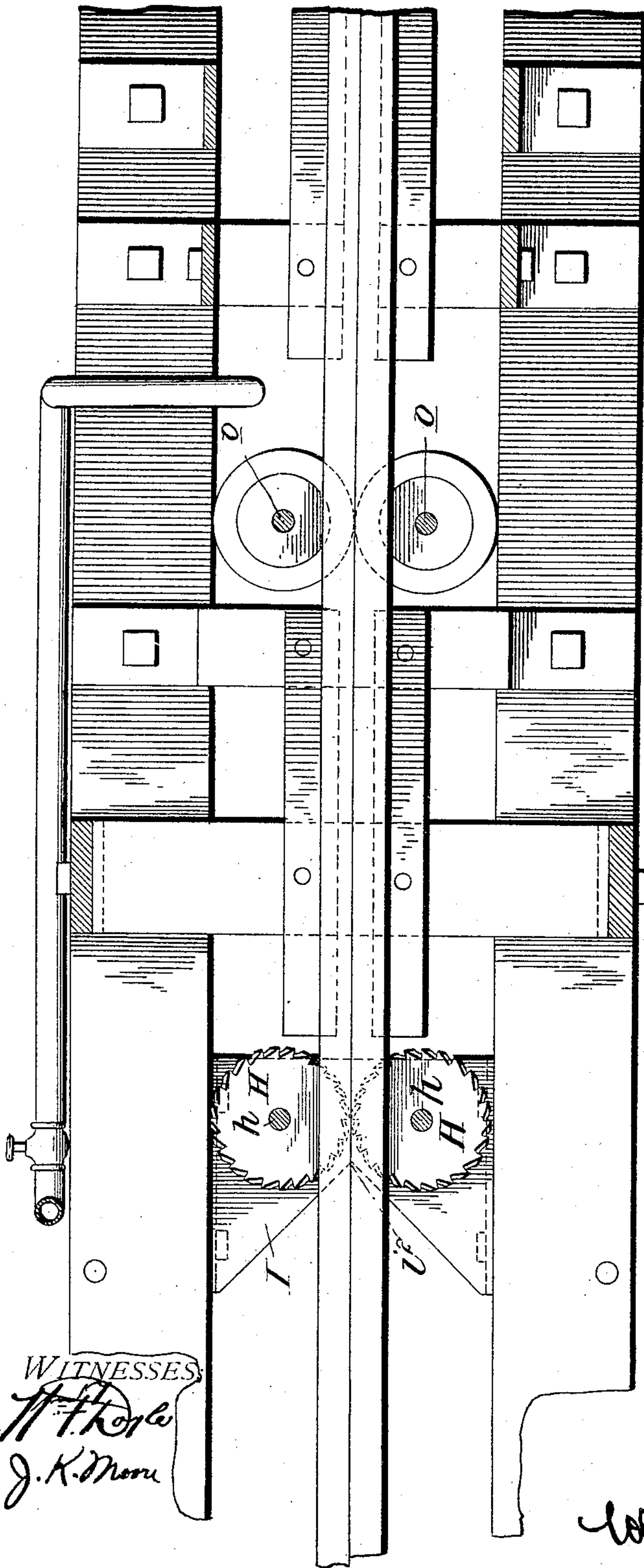
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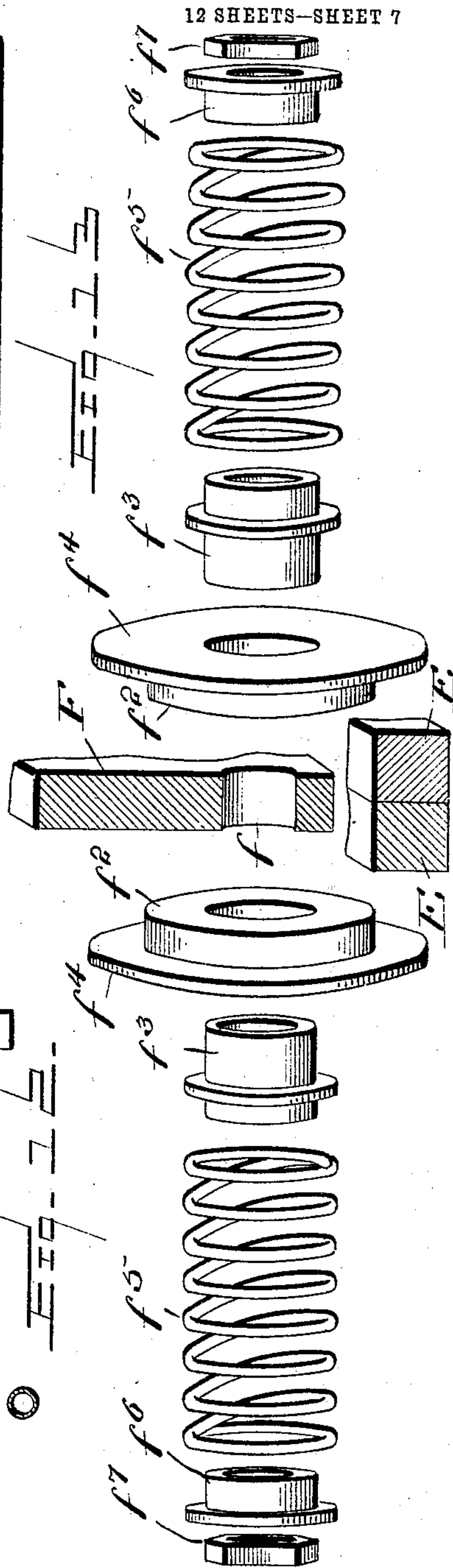
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12 SHEETS—SHEET 7

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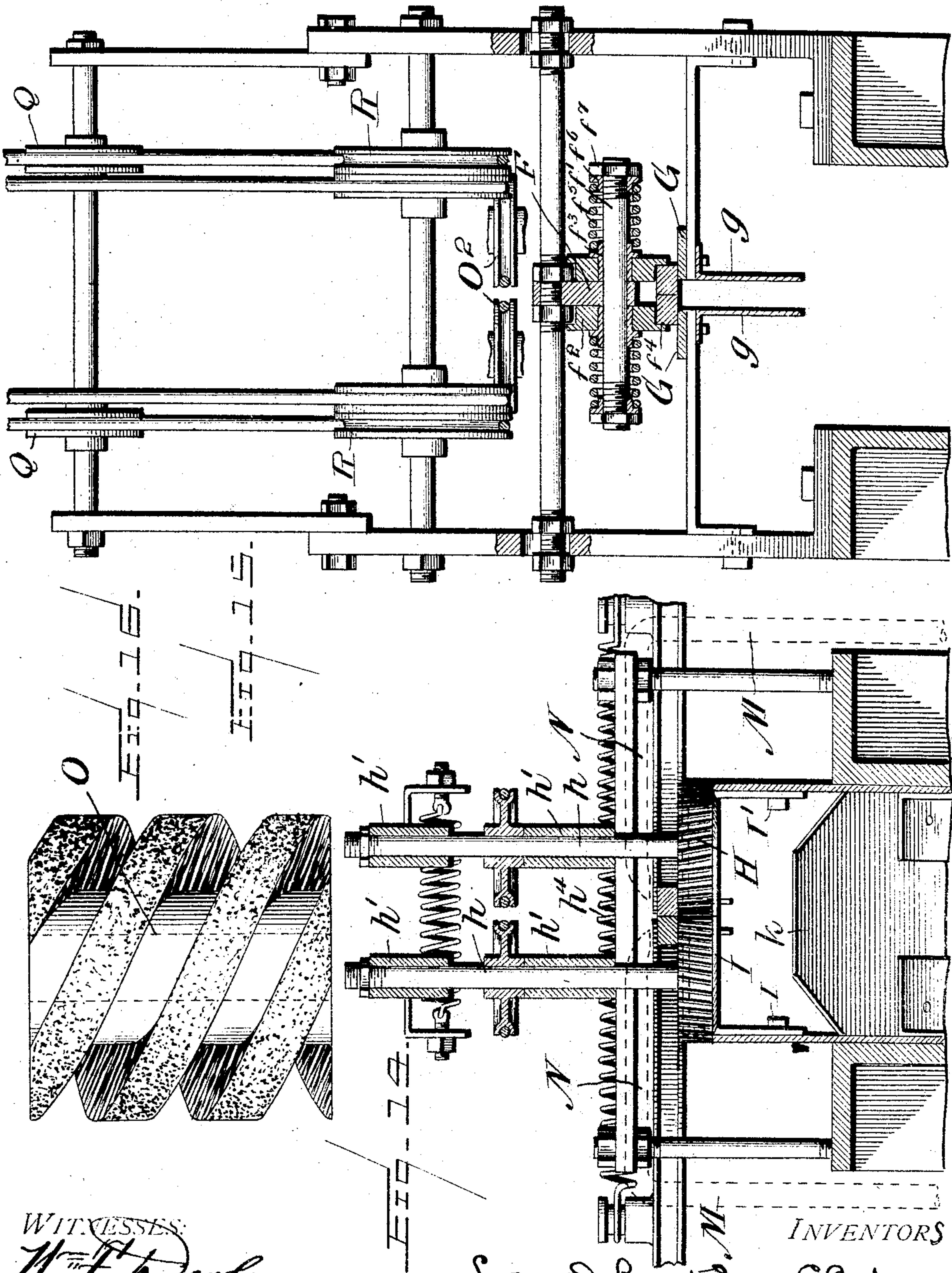
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12 SHEETS—SHEET 8.



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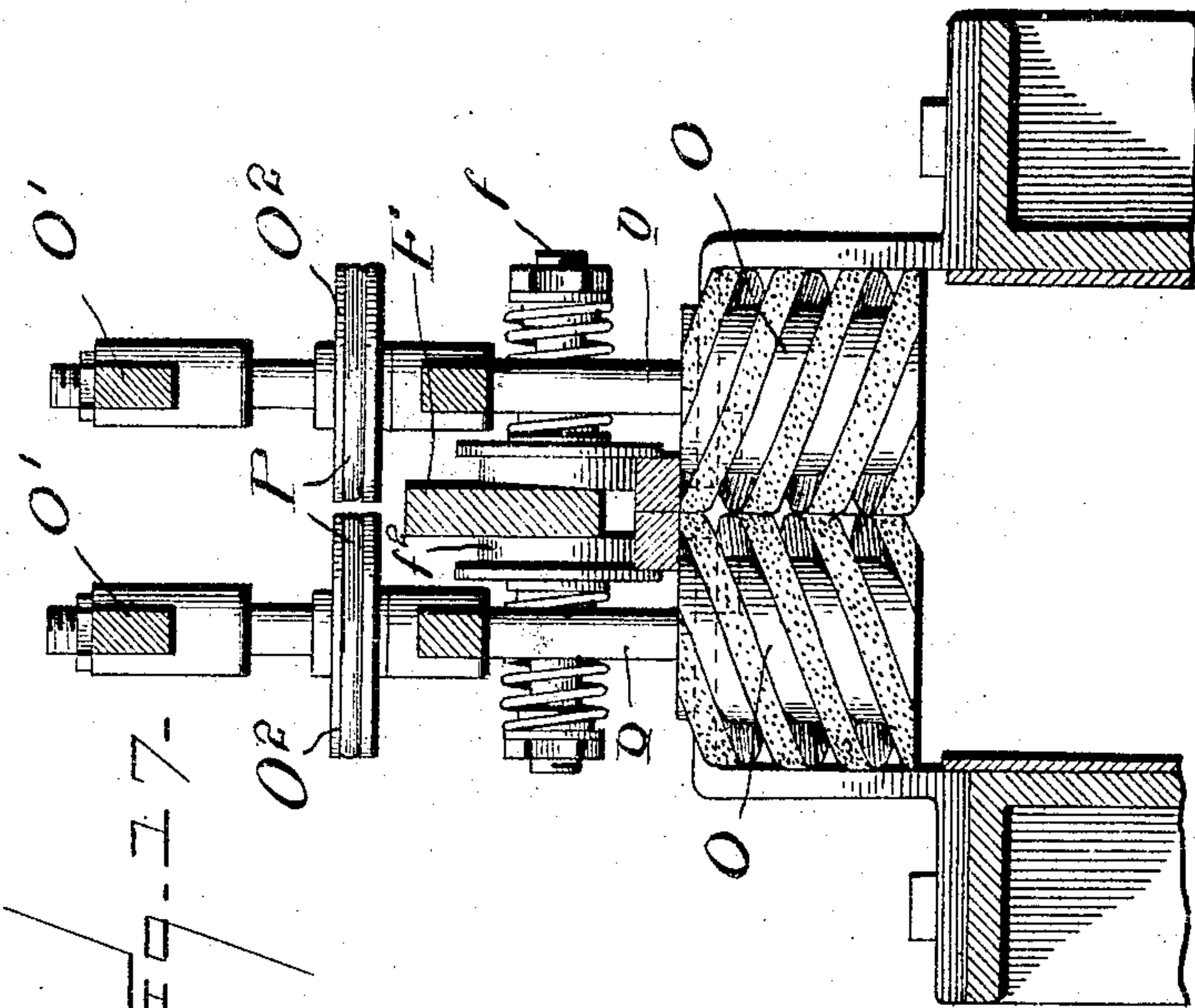
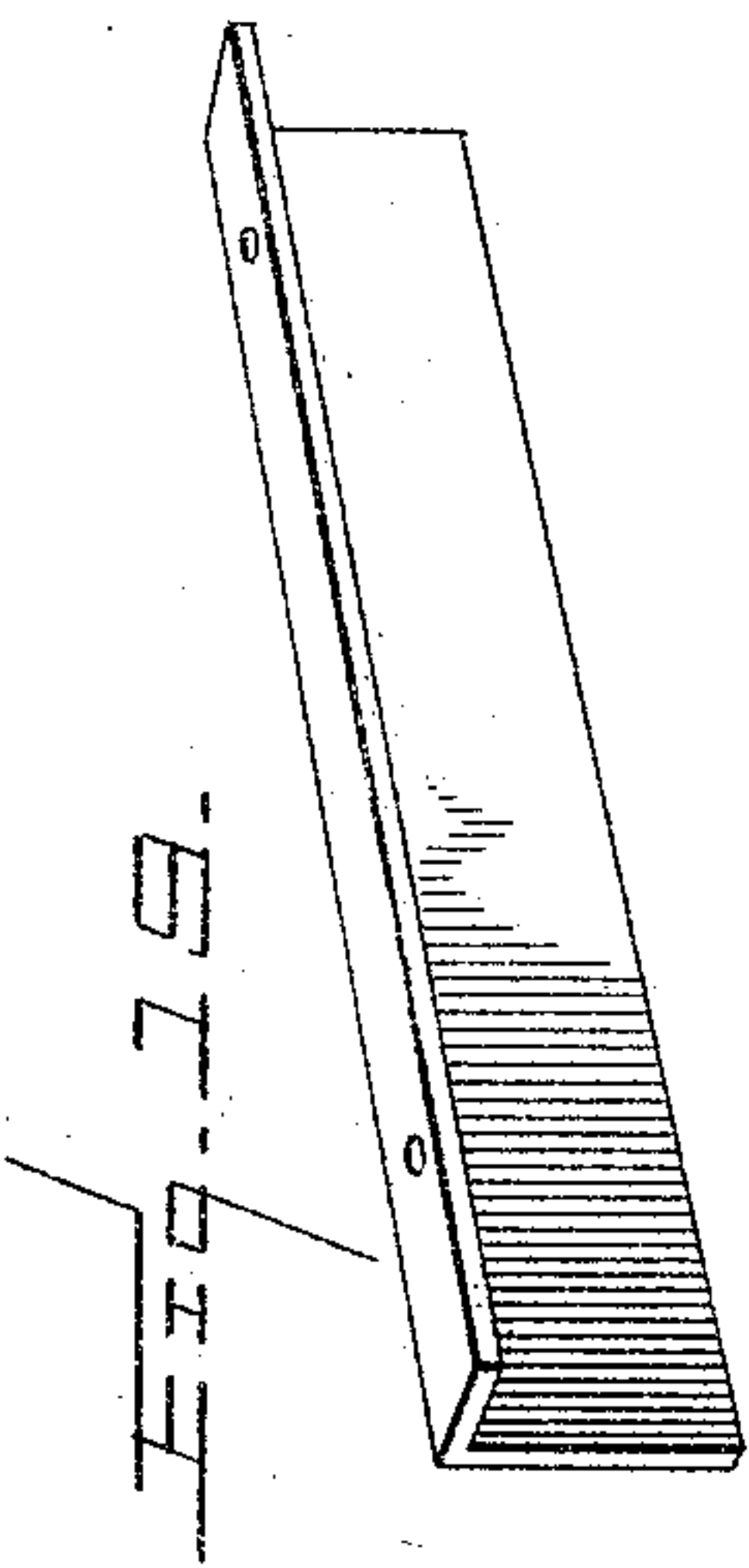
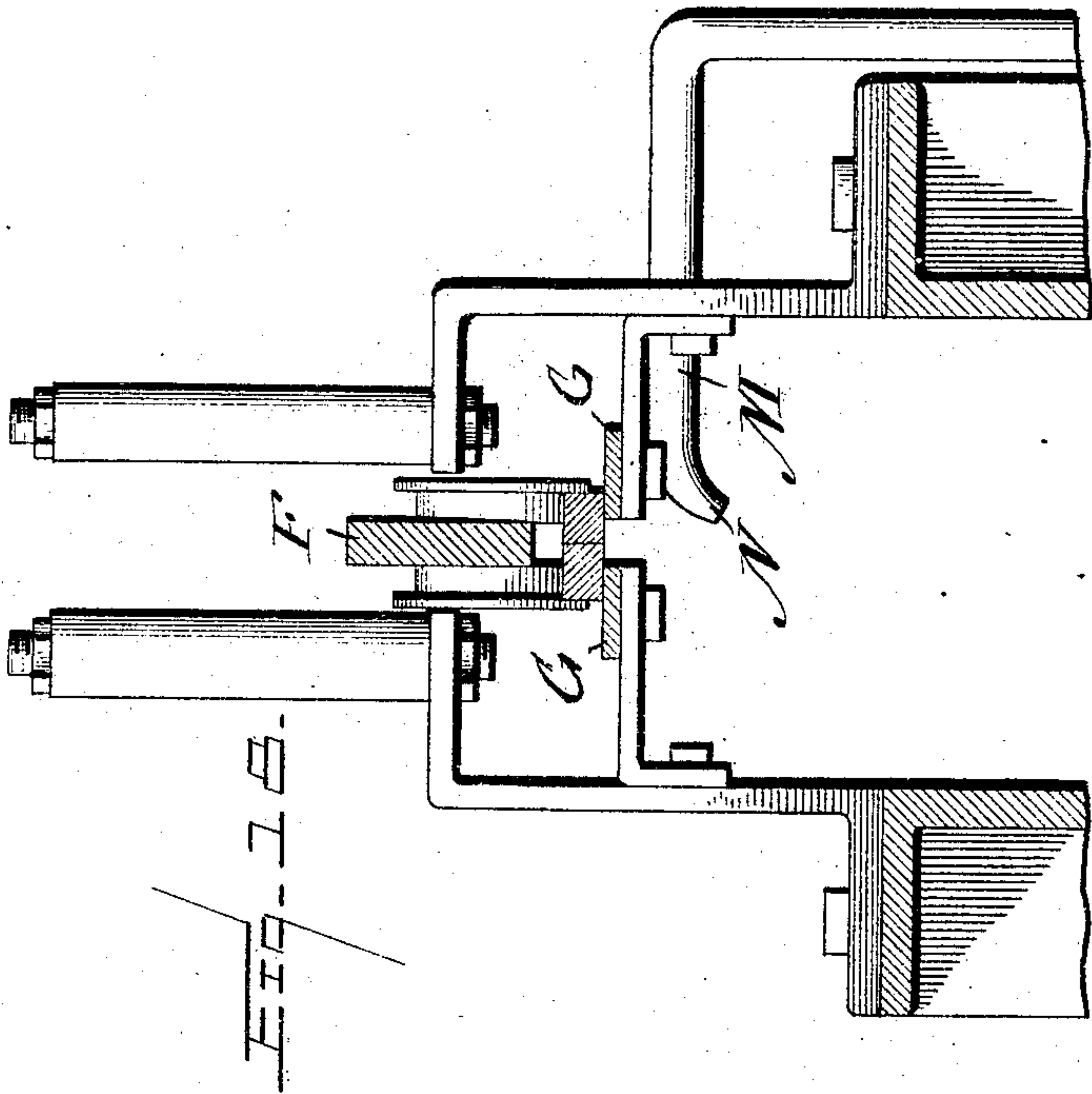
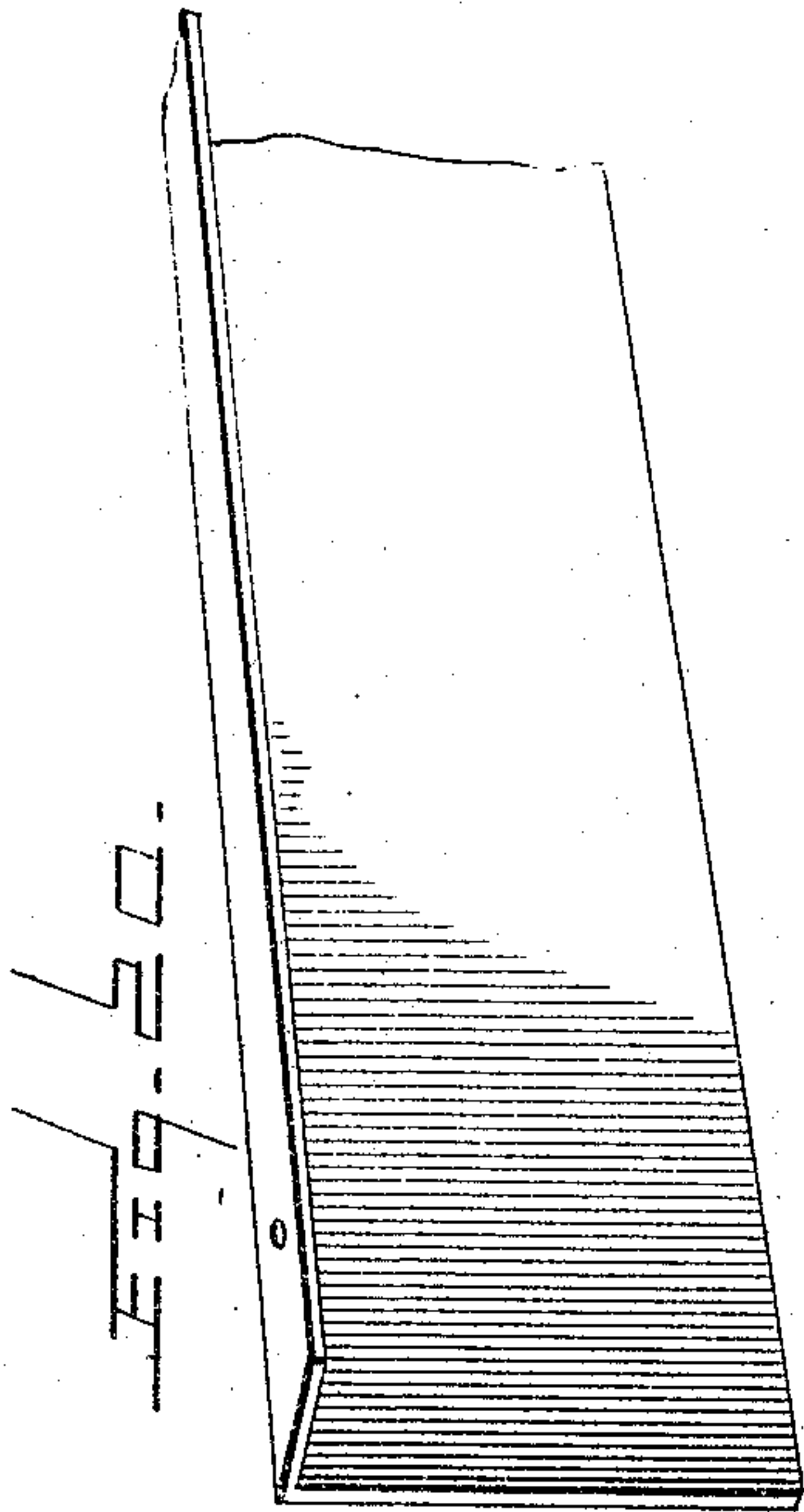
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12 SHEETS—SHEET 9.



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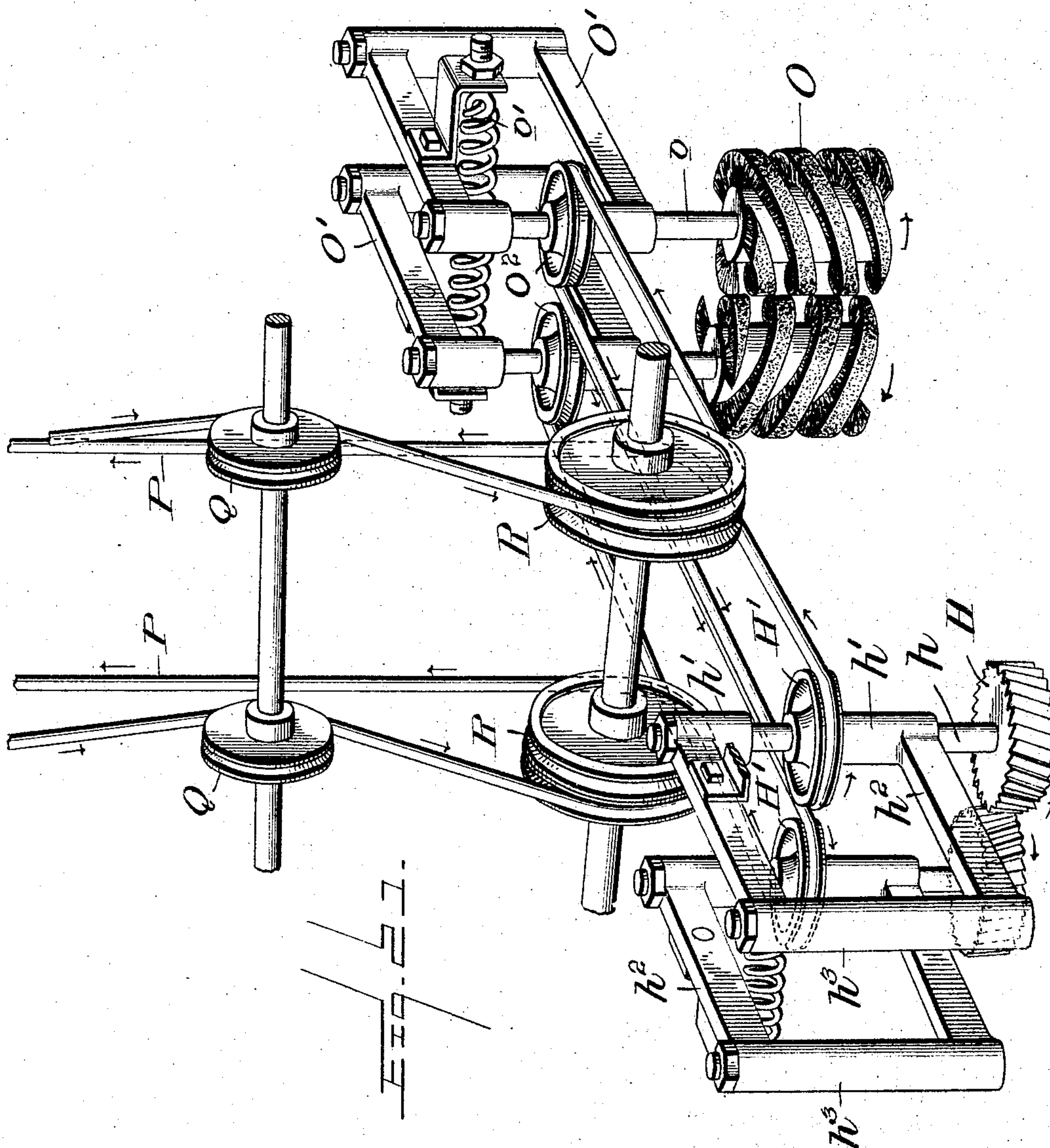
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TOBACCO STEMMING MACHINE.

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NO MODEL.

12 SHEETS—SHEET 10.



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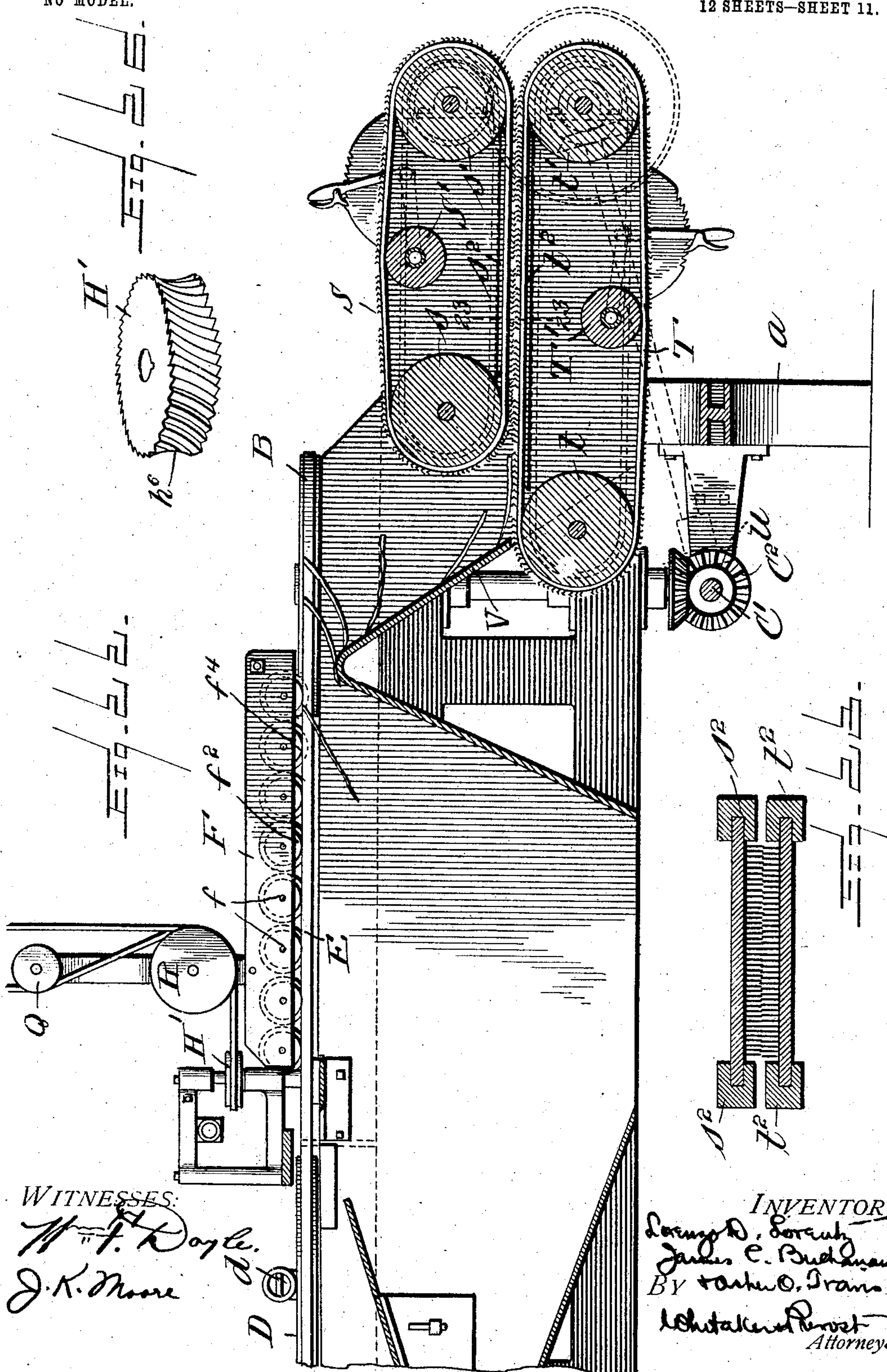
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12 SHEETS—SHEET 11.



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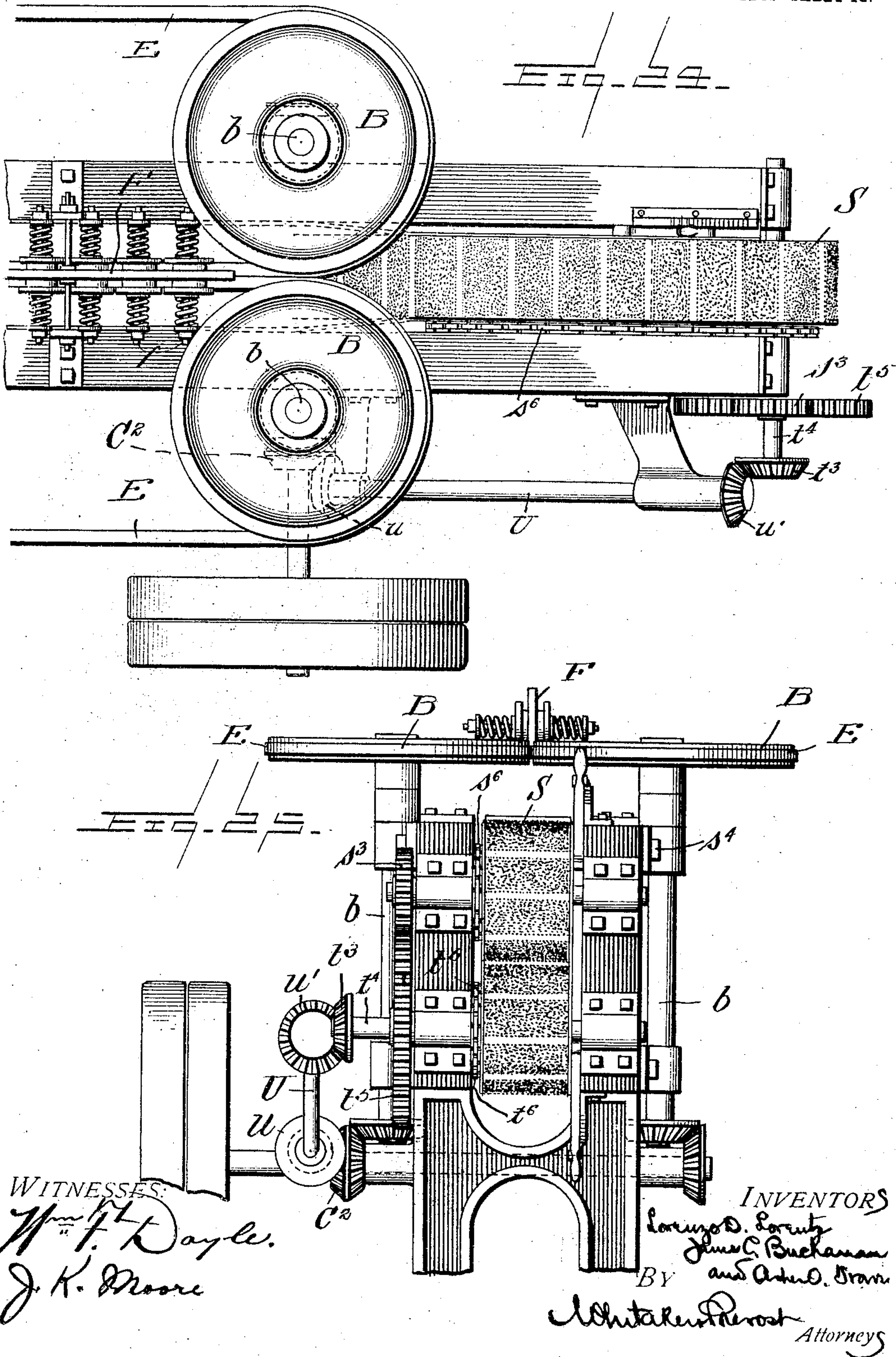
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TOBACCO STEMMING MACHINE.

APPLICATION FILED FEB. 11, 1904.

NO MODEL.

12 SHEETS—SHEET 12.



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UNITED STATES PATENT OFFICE.

LORENZO D. LORENTZ, JAMES C. BUCHANAN, AND ASHER O. TRAVIS,
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PNEUMATIC TOBACCO STEMME COMPANY, OF WASHINGTON, DIS-
TRICT OF COLUMBIA, A CORPORATION OF VIRGINIA.

TOBACCO-STEMMING MACHINE.

SPECIFICATION forming part of Letters Patent No. 765,585, dated July 19, 1904.

Application filed February 11, 1904. Serial No. 193,117. (No model.)

To all whom it may concern:

Be it known that we, LORENZO D. LORENTZ, JAMES C. BUCHANAN, and ASHER O. TRAVIS, citizens of the United States, residing at Wash-
5 ington, in the District of Columbia, have in-
vented certain new and useful Improvements
in Tobacco-Stemming Machines; and we do
hereby declare the following to be a full, clear,
and exact description of the invention, such
10 as will enable others skilled in the art to which
it appertains to make and use the same.

This invention consists in the novel features
hereinafter described, reference being had to
the accompanying drawings, which illustrate
15 one form in which it has been contemplated
to embody the invention, and said invention
is fully disclosed in the following description
and claims.

Referring to the said drawings, Figure 1
20 is a side view of a leaf-stemming machine em-
bodying the invention. Fig. 2 is a vertical
longitudinal sectional view of the same. Fig.
3 is a detail view illustrating the appearance
of the stem and leaf portion or strip after
25 passing through the machine. Fig. 4 is a top
plan view of the machine. Fig. 5 is a per-
spective view, drawn to an enlarged scale, of
the adjustable feeding-plate and one of the lat-
eral adjustable supports for the same. Fig. 6
30 is a similar view of the stemming-plate located
beneath the rotary knives or cutters. Fig. 7
is a similar view, drawn to a smaller scale, show-
ing the longitudinal roller-supporting bar or
backbone of the machine. Fig. 8 is an en-
35 larged top plan view of a portion of the ma-
chine, showing the feed-belts, the compressing-
rollers therefor, and the cutters and stem-clean-
ing brushes. Fig. 9 is a top plan view of the
rotary cutters drawn to an enlarged scale.
40 Figs. 9^a and 9^b are edge views of the two cut-
ters. Fig. 10 is a side elevation of the por-
tion of the machine shown in Fig. 8. Fig. 11
is a vertical longitudinal sectional view of the
same. Fig. 12 is a horizontal longitudinal
45 section on line 12-12 of Fig. 10. Fig. 13 is
an enlarged perspective view, partly in sec-

tion, showing the belts, the central roller-sup-
porting bar or backbone, and one pair of com-
pressing-rollers and attached devices, the
parts being separated and the shaft for said 50
rollers being removed. Fig. 14 is a vertical
transverse section on line 14-14, Fig. 10. Fig.
15 is a similar section on line 15-15, Fig. 10.
Fig. 16 is an enlarged detail view of a form
of stem-cleaning brush which may be used 55
with the machine. Figs. 17 and 18 are trans-
verse sections on lines 17-17 and 18-18, respec-
tively, of Fig. 10. Figs. 19 and 20 are de-
tails of parts of the mechanism. Fig. 21
is a perspective view illustrating the rotary 60
cutters and rotary brushes for cleaning the
stems and the driving mechanism therefor.
Fig. 22 is a partial longitudinal central verti-
cal section of a slightly-modified form of the
machine, showing a modified form of stem- 65
cleaning mechanism. Fig. 23 is a vertical
transverse sectional view on line 23-23 of Fig.
22. Fig. 24 is a top plan view of the rear
portion of the machine shown in Fig. 22.
Fig. 25 is an end elevation of the same. Fig. 70
26 is a detail view of a slightly-modified form
of rotary cutter.

In the drawings, A represents the main sup-
porting-frame of the machine, carried upon
suitable legs or standards *a a* and formed in 75
any desired way to support the working parts
of the mechanism. At the rear of the frame
A are two vertical shafts *b b*, carrying large
grooved driving-wheels B B at their upper
ends and provided at their lower ends with 80
miter-gears *b'*, meshing with similar miter-
gears *c'* on a driving-shaft C, provided with a
band-pulley *c* for supplying power thereto and
driving the grooved wheels B B the parts
being so arranged that the wheels B B turn 85
toward each other.

At the front of the machine are two similar
grooved wheels D D, mounted to turn loosely
on studs *d d'*, supported by sliding plates *d''*,
engaging the main frame and provided with 90
screws *d'''* for adjusting the studs and wheels
D D toward or from the wheels B B, one of

said screws d^3 being shown in Fig. 1. A pair of feeding-belts E E are placed on the wheels D and B in pairs, so as to have parallel contiguous portions extending longitudinally of the machine, and these belts are so arranged as to grip the butt-ends of the leaf-stems between them, and thus carry them from one end of the machine to the other.

In order to hold the parallel contiguous portions of the belts together and enable them to firmly grip the butt-end of each leaf-stem presented to the front wheels D D, so as to prevent the stems from pulling out of the belts, a series of compressing-rollers are employed, disposed vertically in pairs opposite to each other and provided with peripheral flanges, which hold the belts firmly together. The construction of these rollers is well illustrated in Figs. 8, 10, 11, and 13.

F represents a longitudinal supporting-bar supported above the center of the machine and provided with a series of apertures f to receive the studs which carry this compression-roller, said bar, which is termed sometimes the "backbone," being shown detached in Fig. 7. Transverse studs f' f' are mounted in the apertures f , and upon each of these studs are placed two opposing compressing-rollers f^2 f^2 , each provided with a bushing f^3 , and each having a single peripheral flange f^4 on the outer side of the roller. Springs f^5 f^5 are placed on the stud f' on the outer sides of the rollers and are held in place by collars f^6 and nuts f^7 , all as clearly shown in the figures above referred to, particularly in Fig. 13, in which the parts are shown detached. It will be seen that the belts E E will be held between the flanges f^4 f^4 of the rollers, which can yield laterally against the springs to permit a stem to pass between them in the belts, but cause the belts to maintain a firm grip on the stems. The belts E will also be held from rising by the rollers themselves, which engage the upper faces of the belts, and the belts are prevented from moving downward away from the rollers by horizontal guides G G, supported beneath the belts, but separated far enough to permit the stems to pass between them without touching them, as shown in Fig. 15. To further guide the stems and prevent them from moving laterally when passing through the machines, vertical guides g g extend downward below the guides G G, leaving a narrow channel sufficiently wide for any stem to pass through.

In front of the first pair of rollers and practically beneath the same are located the rotary knives or cutters H H for assisting in removing the leaf portions from the stems and severing the lateral fibers of the leaves as the latter are drawn through the machine by the feed-belts E E. The cutters are mounted on substantially vertical axes and are arranged side by side, as shown, and are so arranged that they may separate sufficiently

to permit a stem to enter and pass through between them. To this end the cutters H H are mounted on the lower ends of two shafts h h , each of which is mounted in bearings h' h' , secured to arms h^2 h^2 , connected to a sleeve h^3 , mounted on a shaft or stud secured to the main frame in any desired manner, the construction providing two laterally-swinging frames, which carry the cutters and permit them to move laterally toward and from each other. The knives are held together by a spring h^4 , connected to each of the swinging frames, and are held from coming into contact with each other by stops formed in this case by set-screws h^5 h^5 , carried by vertically-extending brackets h^6 h^6 , secured to the part of the frame which carries the swinging frames. By adjusting these screws h^5 h^5 the normal distance between the cutters can be accurately adjusted, as shown in Fig. 8.

The cutters H are provided with serrations or teeth, as illustrated in Figs. 9, 9^a, and 9^b, preferably inclined to the axes of the cutters, as shown, and the cutters are so driven that they rotate toward each other and toward the front of the machine, as indicated by the arrows in these figures. Beneath the cutters is a horizontal plate I, (see Fig. 6,) having lateral attaching-flanges i i , provided with slotted openings i' i' to enable it to be secured in position and adjusted longitudinally of the machine by means of suitable screws. The plate I is also provided with an angular recess i^2 , the apex of which is located below a point midway between the cutters and slightly in advance of a line connecting their axes, as shown in Fig. 12. During the operation of stemming the leaf portions pass below this plate and the plate serves to support the stem, which passes over it, and to guide it centrally between the cutters. (See Fig. 2.)

Below the carrying-belts is a hopper K, which extends forward beyond the front belt-wheels D D and rearward of the cutter a corresponding distance and is provided with converging inclined bottom portions k k , leaving a discharge-aperture k' at the lowest point for the discharge of the leaf portions into a suitable receptacle. At the front of this hopper is a vertically and longitudinally adjustable feed-plate L supported therein, over which the leaves fed to the machine pass, and by regulating the angle of this plate the angle at which the leaves are held in the belts is determined, and by adjusting the plate toward or from the cutters the amount of the stem taken out of the leaves can be very accurately gaged. This plate is shown in detail in Fig. 5, and as therein shown it is provided with longitudinally-disposed slots l l , through which extend screws connecting it to brackets l' l' , which are provided with vertical slots l^2 l^2 , through which extend screws connecting them to the main frame. By means of these slots it will be seen that the plate L can be adjusted to-

ward or from the cutters and also secured at any desired angle to the plane of the belts.

M represents air-tubes connected to a common air-pipe M', communicating with a supply of compressed air (not shown) and which may be an air-compressor or storage-tank. Said air-tubes lead to nozzles N N, which are so placed as to direct blasts of compressed air against the leaf portions on each side of the stems at the point where the cutters are acting upon the stems. These jets of air assist in the separation of the leaf portions from the stems and also carry the leaf portions or strips downward as fast as they are removed from the stems and cause them to drop in the hopper K. The downward pressure of these air-blasts is exerted on the leaf just in front of the cutters, and while the leaf-body is partly supported on the plate L the stemming action continues. When, however, the top end of the leaf is drawn off of the plate L, the air-blasts depress it, and thereby cause the stem, which is quite small as it nears the tip, to break. The stem then passes rearward with the belts, and the leaf in the condition shown in Fig. 3 with a portion of the stem left in the tip passes down into the hopper. It will thus be seen that by adjusting the plate L nearer to the cutters more of the stem will be taken out and by adjusting it away from the cutters less of the stem will be removed from the leaf. Mechanism is also provided for cleaning from the stems any small particles of tobacco which may adhere to them. One form of such mechanism is shown in the drawings, Figs. 1 to 21, inclusive, which consists of two rotary spiral brushes O, of suitable material, mounted on shafts *o o*, each supported in a swinging frame O', substantially like the frames which carry the cutter-shafts, said frames being pressed toward each other by a spring *o'*. These brushes are disposed in rear of the cutters, so that the stems after being drawn through the air-jets and rotary cutters will pass through the brushes O O, which remove any small particles of leaf adhering to them. The brushes O O are located above the rear part of the hopper K, so that the particles of leaf removed by them fall into the hopper and are delivered with the strips. The small particles or scraps may obviously be delivered separately, however, if found desirable.

For driving the cutters H H and brushes O O two round leather belts P P are shown, which are driven from a counter-shaft overhead (not shown) and engage suitable idle pulleys Q Q and R R and pulleys H' H' on the cutter-shafts and pulleys O² O² on the brush-shafts. The invention is in no wise limited, however, to this form of driving mechanism, as these moving parts can be driven in any other preferred or suitable manner. The manner of driving these parts is illustrated in Fig. 21, but will not be more particularly de-

scribed, as it forms no part of the present invention.

In Figs. 22 to 25, inclusive, a slightly-modified form of the machine is shown, the modification consisting chiefly in a different mechanism for removing particles of the leaf which may adhere to the stem, which may be denominated "stem-cleaning" mechanism. In this form of the invention the brushes O are dispensed with and the stems are first discharged from the carrying or feeding belts and then are passed longitudinally between two cleaning-belts provided with card-clothing, pins, or wires or other suitable devices. One of said belts is run at higher speed than the other, but having their adjacent portions moving in the same direction, and the action of the two belts removes all the portions of leaf from the stems, leaving them perfectly clean.

In the drawings, S represents the upper belt, supported by rollers *s s'*, and T represents the lower belt, of greater length than the upper belt and supported by rollers *t t'*. In order to keep the adjacent parallel portions of the belts from hooking into each other with their cards, teeth, or pins with which they are provided, each belt is preferably made with a selvage on each edge free from teeth for a width of about half an inch, and longitudinal guides *s² s² t² t²* are provided for engaging the selvages and guiding the belts, so as to keep them from interfering, as clearly shown in Fig. 23.

Adjustable belt-tightening devices are provided for each belt, as shown at S' T', for keeping the belts taut. The lower belt is run at a moderate or slow speed by any preferred gearing. As herein shown, the main driving-shaft C' is provided with a beveled gear C², engaging a beveled gear *u* on an inclined shaft U, the other end of which is provided with a beveled gear *u'*, engaging a similar gear *t³* on the shaft *t⁴* of the rear lower belt-roller *t'*. On the shaft *t⁴* is a large gear-wheel *t⁵*, which meshes with a pinion *s³* on the shaft *s⁴* of the rear roller *s'* of the upper belt, and thus drives the upper belt at a higher rate of speed than the lower belt. In order to prevent the belts S and T from slipping, it is preferred to connect the front and rear rollers of each belt by means of sprocket-chains *s⁶* and *t⁶*, respectively, engaging suitable sprocket-wheels on the roller-shafts, so that both front and rear rollers will be forced to rotate positively.

V represents a trough or guiding-chute which receives the stems as they are discharged from the feeding-belts and deposits them upon the lower cleaning-belt. (See Fig. 22.)

In making the belts S and T it is preferred to interrupt the series of teeth or pins or cards thereon, leaving transverse plain spaces, as shown, as it is found that a better effect is produced when this is done. It is, however,

not essential to the operation of the cleaning mechanism.

The stems and the particles of leaf removed therefrom will be discharged at the rear ends of the belts S and T, and as the stems are heavier than the leaf portions they will be thrown a considerable distance to the rear, while the scraps of leaf will be dropped almost vertically and may be caught in any suitable receptacle and disposed of in any preferred way.

In Fig. 26 is shown a modified form of rotary cutter H', in which the inclined cutting edges h^6 are curved inwardly from top to bottom, so that when the two cutters come together around a stem they will practically surround it. The edges h^6 are preferably also inclined to the axis of the cutter; but this is not essential.

In the specification the axes of the cutters are referred to as substantially vertical. In the drawings they are shown vertical; but they may be somewhat inclined in any direction without departing from the invention. Therefore they are described in the specification and claims as being substantially vertical or vertically disposed.

What is claimed, and desired to be secured by Letters Patent, is—

1. In a tobacco-stemming machine, the combination with horizontally-disposed cutters, having substantially vertical peripheral portions provided with cutting-surfaces, said cutters being arranged in the same horizontal plane, and mechanism for driving said cutters toward each other whereby the detached leaf portions are permitted to drop away from the cutters, substantially as described.

2. In a tobacco-stemming machine, the combination with horizontally-disposed cutters having substantially vertical peripheral portions provided with cutting-surfaces, said cutters being arranged in the same horizontal plane, mechanism for driving said cutters toward each other, and means for applying a jet of air to the leaf portions on each side of the stem adjacent to and in front of the meeting portions of said cutters, substantially as described.

3. In a tobacco-stemming machine, the combination with devices for gripping and feeding the leaves, of horizontally-disposed cutters having substantially vertical peripheral portions provided with cutting-surfaces, said cutters being arranged in the same horizontal plane and mechanism for driving said cutters toward each other whereby the detached leaf portions are permitted to drop away from the cutters, substantially as described.

4. In a tobacco-stemming machine, the combination with horizontally-disposed cutters, having substantially vertical peripheral portions provided with cutting-surfaces, said cutters being arranged in the same horizontal

plane, mechanism for driving said cutters toward each other, and a horizontally-disposed feeding mechanism located above said cutters and having continuous portions extending from a point in front of said cutters to a point in rear of the same, substantially as described.

5. In a tobacco-stemming machine, the combination with horizontally-disposed cutters, having substantially vertical peripheral portions provided with cutting-surfaces, said cutters being arranged in the same horizontal plane, mechanism for driving the cutters toward each other, whereby the stems are permitted to assume different angular positions with respect to the axes of the cutters while passing between the cutters, and mechanism permitting said cutters to yield away from each other to accommodate the varying diameters of the stems, substantially as described.

6. In a tobacco-stemming machine, the combination with feeding devices for gripping the stems of the leaves, and carrying them through the machine, of a pair of rotary cutters having substantially vertical axes, mechanism permitting the cutters to move toward and from each other and stops for limiting the inward movement of said cutters, substantially as described.

7. In a tobacco-stemming machine, the combination with feeding devices for gripping the stems of the leaves, and carrying them through the machine, of a pair of rotary cutters having substantially vertical axes, spring-actuated devices for holding said cutters in operative relation, but permitting them to yield away from each other, and independent stops for limiting the inward movements of said cutters, substantially as described.

8. In a tobacco-stemming machine, the combination with feeding devices for gripping the stems of the leaves, and carrying them through the machine, of a pair of rotary cutters having substantially vertical axes, spring mechanism for holding said cutters in operative relation but permitting them to yield away from each other, and independent adjustable stops for limiting the inward movement of said cutters, substantially as described.

9. In a tobacco-stemming machine, the combination with feeding devices for gripping the stems of the leaves and carrying them through the machine, of a pair of laterally-movable frames, a rotary cutter mounted in each frame, spring-actuated devices normally drawing said cutters and frames toward each other and adjustable devices for limiting the inward movement of said frames, substantially as described.

10. In a tobacco-stemming machine, the combination with horizontally-disposed cutters, having substantially vertical peripheral portions provided with cutting-surfaces, said cutters being arranged in the same plane, said cutting-surfaces being arranged substantially

parallel to each other, and angularly with respect to the axes of the cutters, and mechanism for driving said cutters toward each other, substantially as described.

5 11. In a tobacco-stemming machine, the combination with horizontally-disposed cutters, having substantially vertical peripheral portions provided with cutting-surfaces, said cutters being arranged in the same plane, 10 mechanism for driving said cutters toward each other and a support for the stem below the meeting portions of said cutters, substantially as described.

12. In a tobacco-stemming machine, the 15 combination with horizontally-disposed cutters, having substantially vertical peripheral portions provided with cutting-surfaces, said cutters being arranged in the same plane, mechanism for driving said cutters toward 20 each other, and a stem-supporting device located below said cutters and having a guiding-recess in line with the meeting portions of said cutters, substantially as described.

13. In a tobacco-stemming machine, the 25 combination with devices for gripping and feeding the stems of the leaves, of a pair of rotary cutters having substantially vertical axes arranged side by side and means for applying a jet of air to the leaf on each side of 30 the stem adjacent to and in front of the meeting portions of said cutters, substantially as described.

14. In a tobacco-stemming machine, the combination with devices for gripping and 35 feeding the stems of the leaves, of a pair of rotary cutters having substantially vertical axes arranged side by side and air-nozzles arranged on opposite sides of the travel of the leaves, and forward of said cutters, substantially as 40 described.

15. In a tobacco-stemming machine, the combination with the gripping and feeding devices, of a pair of cutters located adjacent to the travel thereof and having substantially 45 vertical axes and a leaf guiding and supporting plate located below and a distance in advance of said cutters, substantially as described.

16. In a tobacco-stemming machine, the 50 combination with the gripping and feeding devices, of a pair of cutters located adjacent to the travel thereof and having substantially vertical axes, a leaf guiding and supporting plate forward of said cutters, and means for 55 adjusting said plate toward and from the cutters, substantially as described.

17. In a tobacco-stemming machine, the combination with the gripping and feeding devices, of a pair of cutters located adjacent to 60 the travel thereof and having substantially vertical axes, a leaf guiding and supporting plate forward of said cutters, means for directing jets of air on the leaf adjacent to and forward of the points of operation of said cutters, and means for adjusting said plate to- 65

ward and from the cutters, substantially as described.

18. In a tobacco-stemming machine, the combination with the gripping and feeding devices, of a pair of cutters located adjacent to 70 the travel thereof and having substantially vertical axes, a leaf guiding and supporting plate forward of said cutters, means for directing jets of air on the leaf adjacent to and forward of the points of operation of said cutters, means for adjusting said plate toward 75 and from the cutters, and means for adjusting said plate vertically, substantially as described.

19. In a tobacco-stemming machine, the 80 combination with the feeding-belts, having parallel gripping and conveying portions, and compressing-rollers, arranged on opposite sides of parallel portions of the belts, said rollers having lateral portions adapted to en- 85 gage the belts and press them together upon the stems, substantially as described.

20. In a tobacco-stemming machine, the combination with the feeding-belts having parallel gripping and conveying portions and 90 compressing-rollers provided with horizontal axes and having peripheral flanges arranged on opposite sides of said parallel portions of the belts, said flanges having lateral portions adapted to engage said belts to press them 95 together upon the stems, substantially as described.

21. In a tobacco-stemming machine, the combination with the feeding-belts, having parallel gripping and conveying portions, and 100 compressing-rollers provided with horizontal axes and arranged on opposite sides of parallel portions of the belts, said rollers having lateral portions adapted to engage the belts and press them together upon the stems, 105 springs for pressing said rollers toward the belts and devices for limiting the movement of said rollers toward the belts whereby the belts are relieved of pressure except when a stem is in engagement therewith, substan- 110 tially as described.

22. In a tobacco-stemming machine, the combination with the feeding-belts, having parallel gripping and conveying portions, of the cutting mechanism, a horizontal support- 115 ing device, provided with a series of transverse shafts, a series of vertically-disposed rollers mounted in pairs upon said shafts and engaging said belts on the upper faces of the same, said rollers having exterior flanges en- 120 gaging the outer lateral faces of said belts, and springs engaging the outer faces of said rollers, substantially as described.

23. In a tobacco-stemming machine, the combination with the feeding mechanism and 125 cutting mechanism, of stem-cleaning mechanism comprising two belts having their faces provided with cleaning projections, said belts being so arranged as to have adjacent parallel portions and means for driving said belts at 130

different speeds, the said parallel portions moving in the same direction, substantially as described.

24. In a tobacco-stemming machine, the combination with feeding mechanism and mechanism for separating the leaf portions from the stems, of stem-cleaning mechanism comprising a pair of belts having adjacent parallel portions, and provided with cleaning projections, the lower belt being longer than the upper belt, means for depositing the stems from the feeding devices upon the said lower belt and means for driving one of said belts at higher speed than the other belt, substantially as described.

25. In a tobacco-stemming machine, the combination with the feeding mechanism and stemming devices, of a stem-cleaning mechanism comprising among its members a belt provided with cleaning projections and having a horizontally-disposed portion, a cooperating device having a movable surface provided with cleaning projections located above the horizontally-disposed portion of said belt, means for driving said belt, and means for operating said cooperating device to cause its surface adjacent to said belt to travel in the same direction as and at a different rate of speed from said belt, substantially as described.

26. In a tobacco-stemming machine, the combination with the feeding mechanism and stemming devices of a stem-cleaning mechanism, comprising among its members, two belts having their faces provided with cleaning projections, said belts having adjacent parallel

portions, and means for driving said belts at different speeds, said parallel portions moving in the same direction, said guides engaging the adjacent portions of said belts and holding them out of contact with each other, substantially as described.

27. In a tobacco-stemming machine the combination with feeding mechanism and stemming devices, of a stem-cleaning mechanism, comprising among its members two belts having their faces provided with cleaning projections, said belts having adjacent parallel portions, and means for driving said belts at different speeds, said parallel portions moving in the same direction, said belts having lateral plain edges not provided with cleaning projections, and guides engaging the said plain edges of the adjacent portions of said belts and holding them out of contact with each other, substantially as described.

28. In a tobacco-stemming machine, the combination with devices for gripping and feeding the stems of leaves, of a pair of rotary cutters having substantially vertical axes, and arranged side by side, said cutters having inwardly-curved cutting edges, substantially as described.

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

LORENZO D. LORENTZ.
JAMES C. BUCHANAN.
ASHER O. TRAVIS.

Witnesses:

L. P. WHITAKER,
F. H. HUBBARD.