

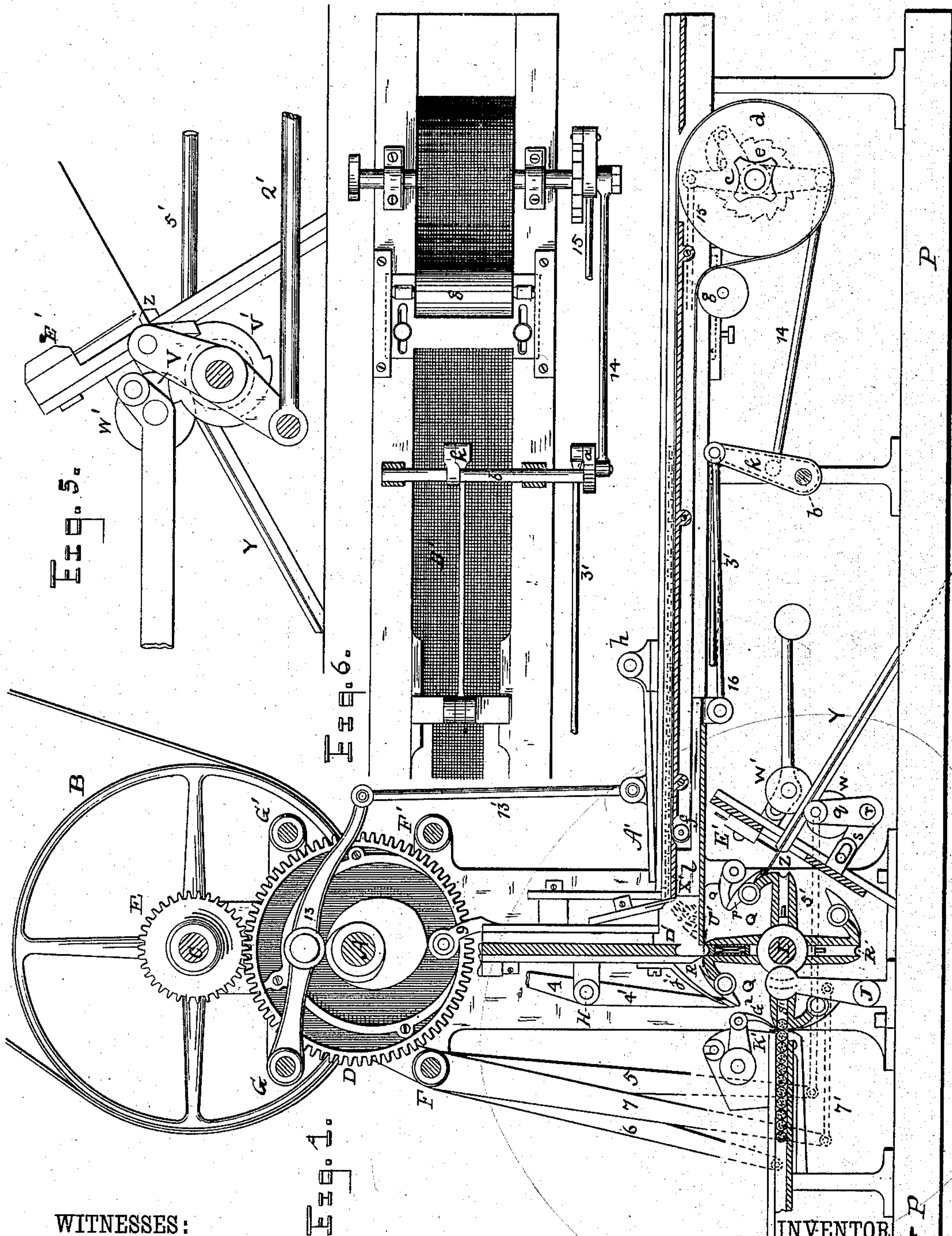
(No Model.)

5 Sheets—Sheet 1.

A. EWING.
CIGARETTE MACHINE.

No. 322,362.

Patented July 14, 1885.



WITNESSES:

D. D. Mott
Henry T. Osward

BY

Alex Ewing
Howard G. Leavitt
ATTORNEY

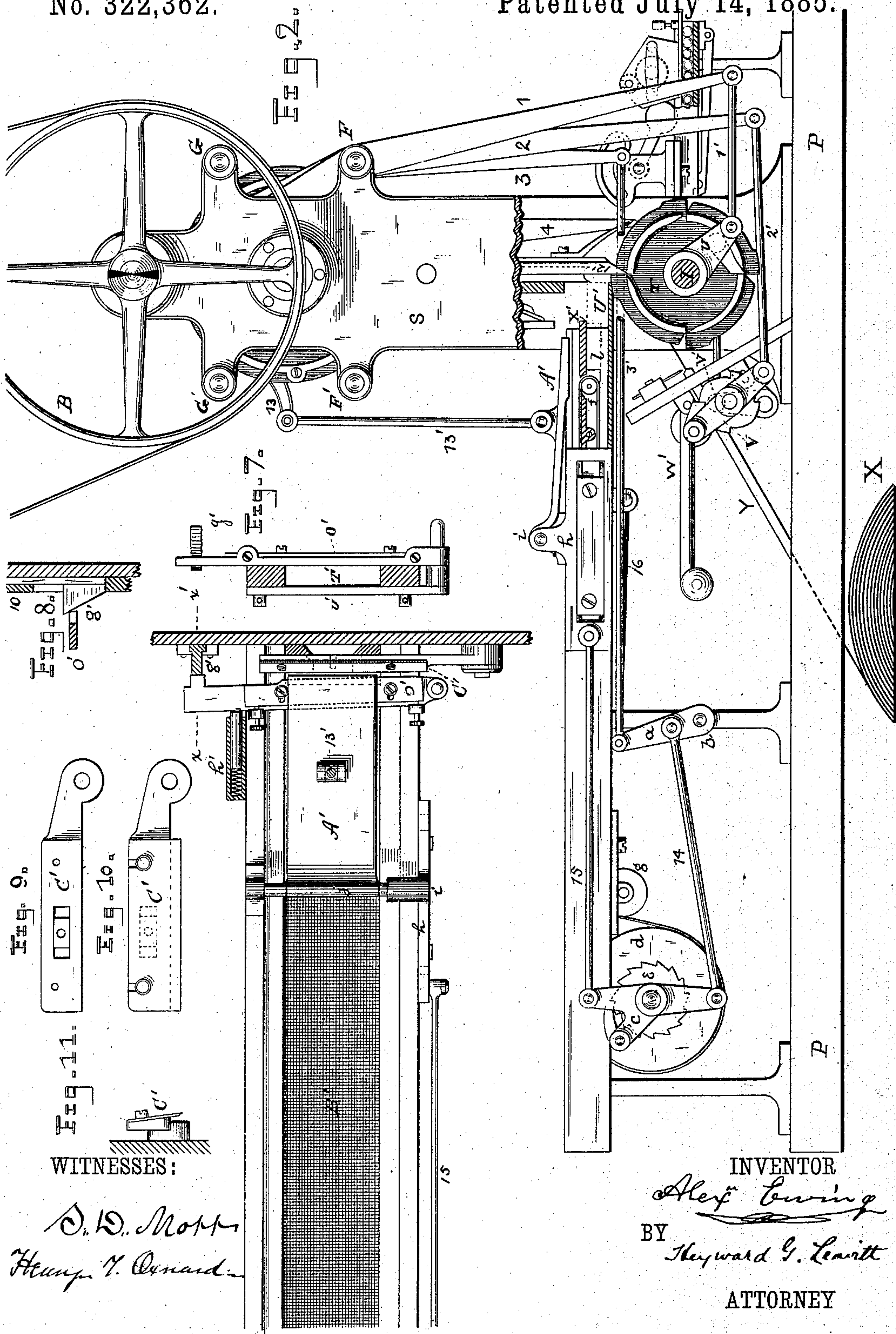
(No Model.)

5 Sheets—Sheet 2.

A. EWING.
CIGARETTE MACHINE.

No. 322,362.

Patented July 14, 1885.



WITNESSES:

D. D. Mott
Henry T. Osmond

INVENTOR

Alex. Ewing
BY
Thorwald G. Leavitt
ATTORNEY

(No Model.)

5 Sheets—Sheet 3.

A. EWING.
CIGARETTE MACHINE.

No. 322,362.

Patented July 14, 1885.

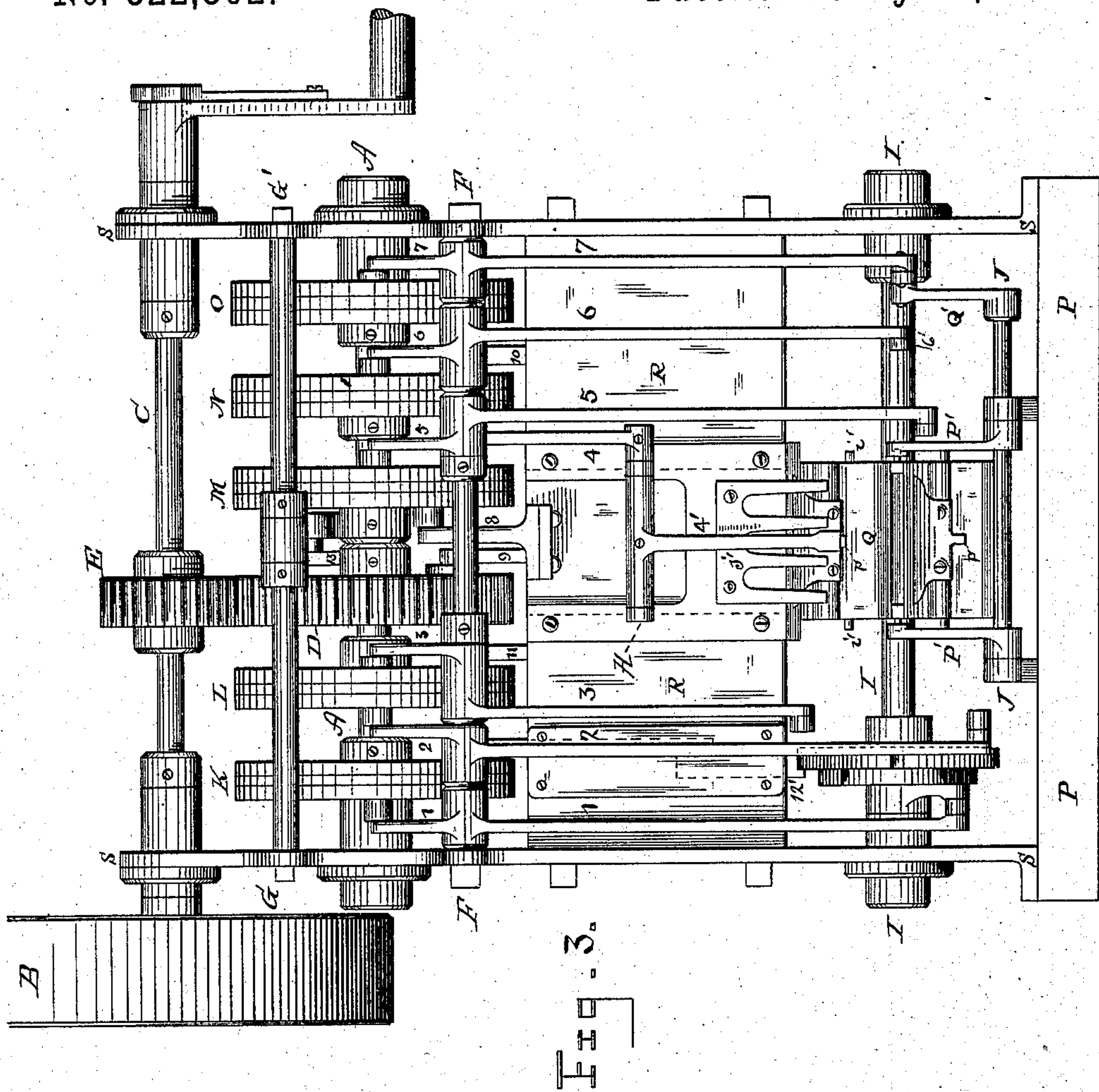
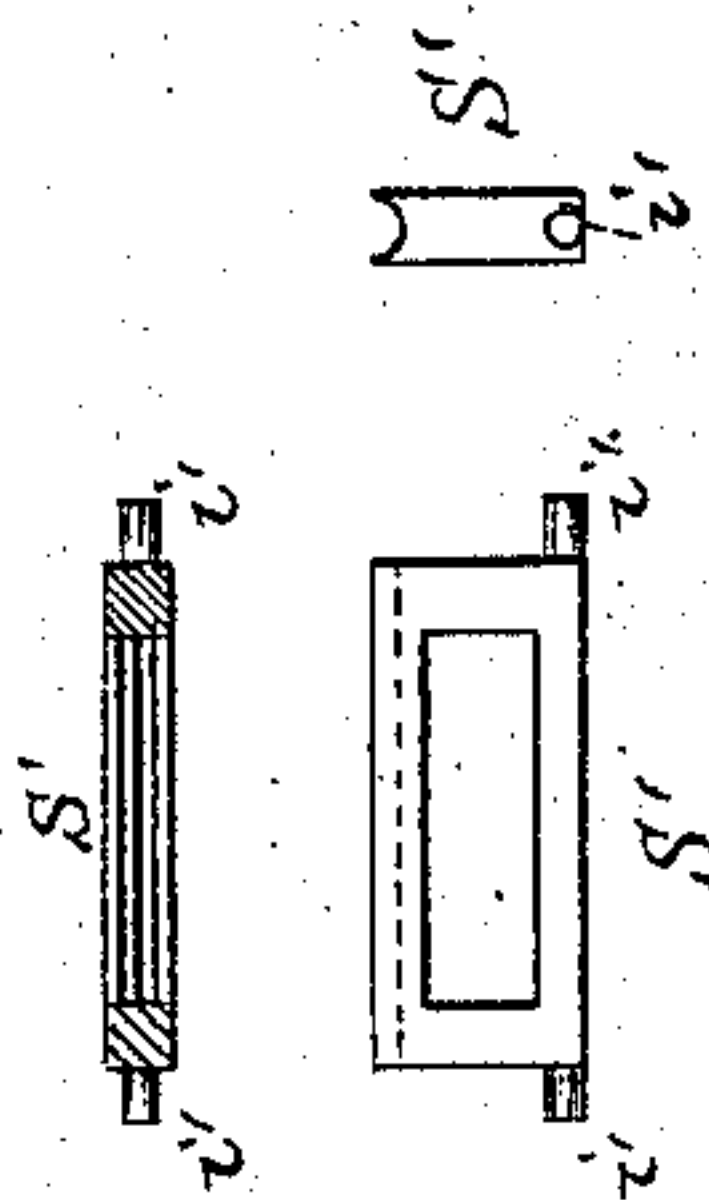


Fig. 3.

Fig. 24.



WITNESSES:

O. D. Mott
Henry C. O'Connell

INVENTOR

Alex. Ewing
BY

Heyward G. Leavitt
ATTORNEY

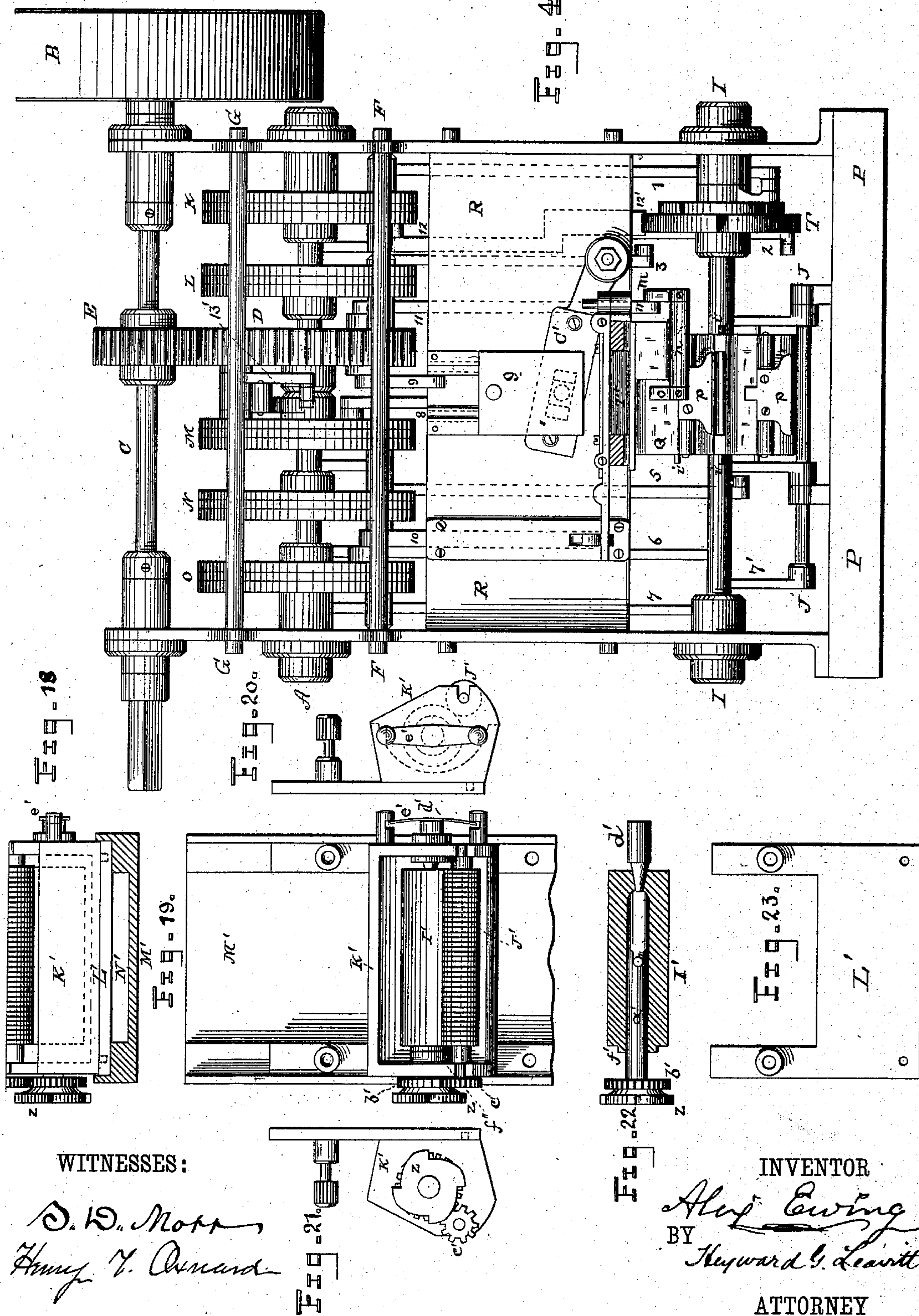
(No Model.)

5 Sheets—Sheet 4.

A. EWING.
CIGARETTE MACHINE.

No. 322,362.

Patented July 14, 1885.



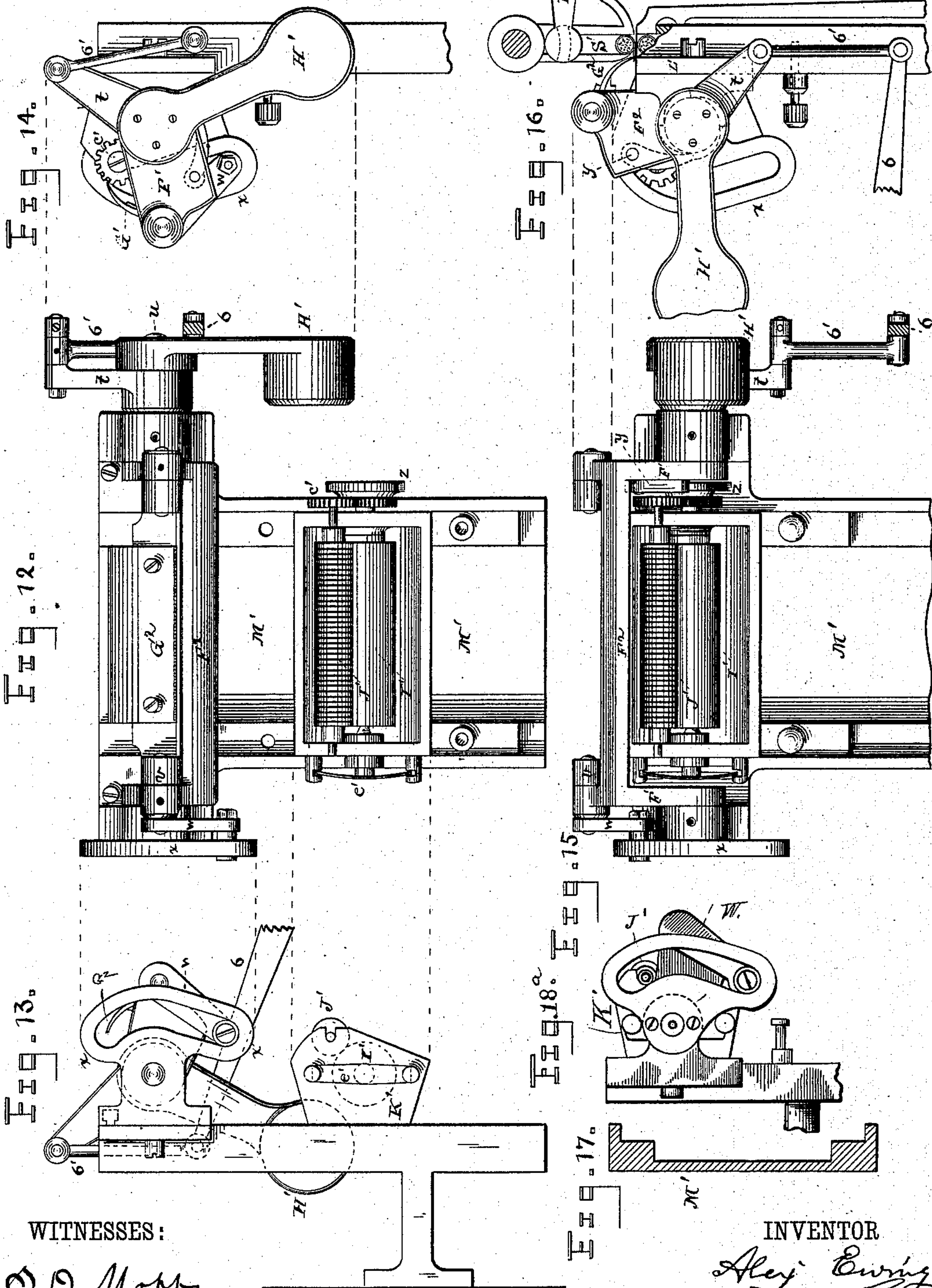
(No Model.)

5 Sheets—Sheet 5.

A. EWING.
CIGARETTE MACHINE.

No. 322,362.

Patented July 14, 1885.



WITNESSES:

O. D. Mott
Henry T. Arnold

INVENTOR

Alex. Ewing
BY *Howard G. Leavitt*
ATTORNEY

UNITED STATES PATENT OFFICE.

ALEXANDER EWING, OF NEW YORK, N. Y.

CIGARETTE-MACHINE.

SPECIFICATION forming part of Letters Patent No. 322,362, dated July 14, 1885.

Application filed October 16, 1884. (No model.)

To all whom it may concern:

Be it known that I, ALEXANDER EWING, of the city, county, and State of New York, have invented a new and useful Improvement in Machines for Manufacturing Cigarettes, of which the following is a full, true, and exact description thereof, reference being had to the accompanying drawings, in which—

Figure 1 is a vertical section of the machine, in which the course of the tobacco can be traced through each step in the operation from the time it enters the machine until it is finally discharged in the form of a completed cigarette. Fig. 2 is an elevation of the left side of the machine, with the lower part of the frame removed. Fig. 3 is a front view of the machine, the paster and its stand being removed in order to show the front of the forming-wheel. Fig. 4 is a rear view of the machine, with the tobacco-feeder and paper-feeder removed to show the back of the forming-wheel. Fig. 5 is a side view of the paper feeder and knife, as seen on a smaller scale in Fig. 2. Fig. 6 is a detailed plan view of the under side of the tobacco-feeder. Fig. 7 is a plan view of the feed-belt, feed-plate, and the horizontal and vertical knives for cutting the tobacco. Fig. 8 is a section on the line $x x'$ of Fig. 7, showing the wedge for reciprocating the horizontal knife. Figs. 9, 10, and 11 are detailed views of the vertical knife. Fig. 12 is a plan view of the paster and pasting-trough, the latter being withdrawn from its proper position beneath the paster. Fig. 13 is an elevation of one side of Fig. 12. Fig. 14 is an elevation of the opposite side of Fig. 12, with, however, the pasting-trough moved back into place, and shows the position of the paster while taking its paste from the pasting-roller. Fig. 15 is also a plan view of the paster and pasting-trough, showing, however, a different position of the paster. Fig. 16 is a side elevation of Fig. 15, showing the paster in the act of applying to the paper wrapper of a cigarette the paste which it took a moment before from the pasting-roller. Fig. 17 is an end view of the horizontal plate on which the pasting-trough rests. Fig. 18 is a rear view of the pasting-trough, showing the opening between the two horizontal plates below, into which the cigarettes are discharged from the forming-wheel. Fig. 18^a shows an end elevation of the past-

ing device, the end being broken off. Figs. 19, 20, 21, and 22 are details of the pasting-trough. Fig. 23 is a plan view of the sliding horizontal plate to which the pasting-trough is attached. Fig. 24 shows different views of the forming-blocks on which the cigarettes are molded in the four openings in the forming-wheel.

Similar letters of reference indicate corresponding parts.

Before describing the operation of manufacturing cigarettes I will give a description of the machine and its various parts, and of the particular mechanism by which each part is operated.

The frame of this machine consists of a bed-plate, P, two upright sides, S S, firmly attached to it, a center plate, R, and four cross-rods, F, G, F', and G'. The sides are securely fastened together and held in position by means of the center plate and the cross-rods. These sides likewise receive and furnish bearings for the three shafts A, C, and I, (see Figs. 3 and 4,) from which all the different parts of the machine derive their motion. The power is first applied, either by hand or other means, to the shaft C. The driving-pinion E on this shaft gives motion to the cog-wheel D, which is fast on the main shaft A. Motion is thus imparted to the five double-cam wheels K, L, M, N, and O, which are fast on the same shaft as the cog-wheel D, which is also a double-cam wheel. On the lower shaft, I, the forming-wheel Q and the pawl-wheel T are fastened.

From the outside of the cam-wheel K the lever l obtains its motion, the lower end of which, (see Fig. 2,) by means of the connecting-rod l' , takes hold of a pin fixed in the end of the vibrating pawl-arm U, which works loosely on the shaft I. This pawl-arm, as it is advanced, engages with the pawl-wheel T, which is fixed on the shaft I, causing it, and consequently the forming-wheel Q, to make a quarter of a revolution for a whole revolution of the main shaft A.

From the inside of the double-cam wheel K the vertical anchor 12' is made to act by means of the connection 12. This anchor consists of a vertical sliding piece which works on the front face of the center plate, R, and is made wedge shape at its lower end, to cor-

respond to four notches that are in the outside circumference or periphery of the pawl-wheel T, which it enters the moment the pawl-wheel, as it rotates, is brought into position.

5 From the outside of cam-wheel L the lever 2, which operates the paper-feeder, obtains motion, and by means of connecting-rod 2' (see Figs. 2 and 5) communicates motion to the pawl-arm V, which in turn engages and carries with it the pawl-wheel V', causing the
10 feed-roller W to make a partial revolution for each complete revolution of the main shaft A.

W' is a weighted roller, operated by friction, which rests upon and is revolved by the
15 feed-roller W. The wrapping-paper is fed from a large roll, X, beneath the machine, through an opening in the bed-plate P and in the guide-plate Y. It passes between the two rollers W and W', which at each revolution carry forward through the mouth-piece Z
20 a sufficient quantity of paper for the wrapper of a single cigarette.

From the inside of the cam-wheel L the lever 3 receives its motion, the lower end of
25 which is connected (see Fig. 2) by means of the connecting-rod 3' to the arm *a* on the rock-shaft *b*. This arm *a* is connected by means of the rod 14 to the lower end of the pawl-arm *c*, which works loosely on the end of the shaft of the drum *d*. This pawl-arm *c* gives
30 motion to the pawl wheel *e*, which is fast on this shaft, thus causing the drum *d* to make a partial revolution for each complete revolution of the main shaft A. This drum as it revolves
35 operates the feed belt B', which passes around it and the small roller *f* and over the adjustable roller *g*. The pawl-arm *c* is also connected at its upper end by the connecting-rod 15 to the sliding frame *h*, which it works to
40 and fro, causing the frame to move forward only while the feed-belt B' is in motion, and with the same speed and in the same direction as the belt. This sliding frame *h* has an overhanger, *i*, (see Fig. 7,) in which is
45 fixed the center pivot or rod, *j*, on which one end of the feed plate A' is hung directly over the feed-belt B'. This feed-plate A', in addition to the horizontal motion which it thus obtains from the frame *h*, is given a slight
50 movement downward and upward around its axis *i* by means of the lever 13 (see Fig. 2) and the connecting-rod 13', which is connected to the feed-plate near its free end, and supports the plate in a horizontal position. The
55 lever 13 is supported at one end by the cross-rod G, (see Fig. 1,) and has near its center a roller, which rests upon the hub of the cam-wheel M. From a cam upon this hub the lever 13 receives its motion.

60 The rock-shaft *b* (previously mentioned) has fastened to it a second arm, *k*, (see Fig. 1,) which, by means of the connecting-rod 16, actuates the collector 1.

65 A cam on the left side of the cog-wheel D gives motion to the vertical sliding piece 11, (see Fig. 4,) which is connected to the arm *m* on the rock-shaft *n*, to which shaft is attached

the arm *o*, which operates the paper-grippers *p* on the back of the forming-wheel Q as each is in turn brought opposite the paper-feeder. From a cam on the opposite side of the cog-wheel D (see Fig. 4) the vertical
70 sliding piece 9 obtains motion, which carries the vertical knife C'. From the cam on the inside of the double-cam wheel M the plunger
75 D' (see Fig. 1) receives its vertical motion by means of the connection 8.

From the outside of the double-cam wheel M lever 5 obtains motion, the lower end of which is connected (see Fig. 1) by the connecting-rod 5' to the arm *q* on the rock-shaft
80 *r*, to which is attached the arm *s*, which operates the lance-knife E' for cutting the paper.

A cam on the inside of the double-cam wheel N actuates the lever 4, (see Fig. 3,) which
85 is fast on the rock-shaft H, to which the lever 4' is also attached. The lower end of this lever 4' opens the grippers *p* on the front of the forming-wheel Q, and releases the paper the moment the plunger D' is about to descend.
90

From the cam on the outside of the double-cam wheel N lever 6 obtains motion, the lower end of which is connected (see Figs. 1 and 12) by means of the connecting-rod 6' to the arm
95 *t*, which actuates the rock-shaft *u*. On the rock-shaft *u* the frame F² is fastened, which revolves to and fro over the pasting-trough. This frame F² carries the curved plate or paster G², which has also an independent motion,
100 which causes the lower edge of the paster, as the frame moves back, to revolve downward and touch the upper pasting-roller, and as the frame moves forward to revolve outward, so as to apply the paste to the inside edge of the
105 paper which is about to envelop the cigarette. This motion is obtained by means of a roller which works in a guide, *x*, and is connected by the arm *w* to the rock-shaft *v*, to which the paster G² is fastened. The frame F² is counterbalanced by a weighted arm, H', which is fast
110 on the outside end of the rock shaft *u*. This arm H' also insures the action of the guide *x*, causing the lip or lower edge of the paster G² to press alternately against the pasting-roller and against the paper. The pasting-trough K'
115 accommodates two rollers, which revolve in contact with each other, the lower and larger of which, I', dips in the paste and supplies it to the smaller roller, J', which in turn supplies
120 the paste to the paster G². The roller I' is fastened to the shaft *a'*, on the end of which the pawl-wheel *z* is fast. When the pasting-trough is in position under the paster, a pawl,
125 *y*, (see Fig. 15,) on a pin in the frame F², engages with the pawl-wheel *z*, and thus gives motion to the roller I'. This motion is communicated, (see Fig. 19,) by means of a cog-wheel, *b'*, on the shaft *a'*, to the smaller cog-wheel, *c'*, on the shaft of the pasting-roller J',
130 causing this roller to revolve. The shaft *a'* extends but part way through the roller I', (see Fig. 22,) which has at its center a cross-pin which fits into a slot on the end of the

shaft a' , and thus secures the roller to the shaft. The roller I' is supported at its other end by a conical plug, d' , (see Fig. 22,) which fits into the roller, passes through the side of the trough K' , and is kept in position by the horizontal spring e' , which bears against its outer end. This spring e' presses the plug against the roller I' , and forces its shoulder f' against a corresponding face, f'' , on the side of the trough K' , (see Fig. 19,) thus preserving a tight metallic joint at f'' , through which no paste can pass to clog up the bearing or the wheels outside. The arrangement of the trough K' enables each part to be readily removed, washed, and cleansed, and returned to its position. The pasting-trough K' is fastened by two dowels to the sliding plate L' , which enables the trough to be moved forward into position beneath the paster and withdrawn at pleasure.

The pasting-trough is shown in Fig. 13 drawn back from under the paster in order that its structure may be shown; but when in position it is pushed forward, as shown in Fig. 18^a, under the paster and locked by the dowel-pins. Thus it will be seen that the paster G^2 , when raised into the position there indicated, comes into contact with the small upper pasting-roller, J' , as it is then over it, and receives paste therefrom along its inner lower edge. This plate L' rests upon the horizontal plate M' , to which it is secured, when in position, by means of two dowel-pins. The opening N' (see Fig. 18) between these two horizontal plates is of sufficient size to receive the cigarette as it is discharged from the forming-wheel.

From the inside of the double-cam wheel O , the vertical sliding piece 10 receives its motion, to the lower end of which the wedge g' is fastened. This wedge, (see Figs. 7 and 8,) as it descends, forces the horizontal knife backward against the spring h' , which, as the wedge ascends, carries the knife forward to meet the edge of the descending vertical knife C' .

From a cam on the outside of the double-cam wheel O the lever 7 obtains motion, which is connected (see Figs. 1, 3, 4, and 16) by means of the connecting-rod 7' to the arms Q' on the rock-shaft J . This rock-shaft actuates the dischargers P' , which take hold of the lugs i' on the forming-blocks S' , sliding them outward and transferring the cigarettes from the forming-wheel to the opening N' between the horizontal plates L' and M' . The forming-wheel Q , which revolves directly beneath the plunger D' , has four openings, R' , in which the forming-blocks S' work. The outer ends of these forming-blocks S' (see Figs. 1 and 24) constitute the lower half of a cylindrical mold, of which the plunger D' forms the upper half.

Having described the different parts of the machine and their various movements, I will now proceed to describe the operation of manufacturing cigarettes.

The tobacco (cut long) is first distributed in

a layer of even thickness over the surface of the feed-belt B' , (see Figs. 1 and 7,) the width of which corresponds exactly to the length of the cigarettes, and over the horizontal plate X' , which covers the horizontal knife O' . The edge of this knife projects slightly beyond the end of the plate X' . The machine being set in motion, the feed-plate A' slides backward and descends upon the tobacco. This plate and the feed-belt B' now move forward together, carrying the tobacco with them and causing a sufficient quantity to advance beyond the end of the plate X' . The horizontal knife O' now advances slightly to meet the vertical knife C' , which at the same instant descends and cuts off the amount of tobacco required for the cigarette, which falls upon the horizontal plate U' in front of the collector 1. The feed-plate A' holds the tobacco firmly against the plate X' until the knife C' has ascended. It then resumes its horizontal position and slides backward, preparatory to coming forward a second time. While this operation has been going on the gripper p at the back of the forming-wheel Q has been opened, and at the same time the feed-roller W has caused the wrapping-paper to advance forward through the mouth-piece Z and under the gripper. This gripper p now descends upon the upper edge of the paper, holding it down against the forming-wheel, and at the same moment the lance-knife E' descends, cutting off a sufficient quantity of paper for the wrapper of the cigarette, and allowing it to fall across the opening in the rear of the forming-wheel. The wheel now makes a quarter of a revolution, and is anchored in position with the paper-covered opening directly below the plunger D' , and coinciding exactly with the opening in the horizontal plate U' . At this moment the collector 1 (previously mentioned) slides forward, carrying the tobacco into this opening and against the vertical plate R , immediately below the plunger D' . The gripper p on the top of the wheel is now raised and the plunger D' descends, carrying the tobacco through the opening in the plate U' , and forcing it and the paper together into the opening in the forming-wheel below. By this operation the tobacco is compelled to take a round form, while at the same time it is partially enveloped in the paper wrapper, a part of which still projects above the top of the forming-wheel. The collector 1 now slides backward and the plunger D' withdraws from the forming-wheel, which is immediately released, and advances another quarter of a revolution, carrying the unfinished cigarette with it to a horizontal position. The wheel is then again anchored in position, with the opening which contains the cigarette directly opposite the opening N' between the two horizontal plates L' and M' . By this operation the paper has been folded by means of the fingers j' over the top of the cigarette, so that only a narrow edge projects upward against the end of the plate L' . The paster

G² now revolves downward, taking paste from the pasting-roller J' above and applying it to the inside edge of the wrapping-paper. At the same moment the forming-block S' slides forward, transferring the cigarette into the opening N', and then withdraws even with the surface of the forming-wheel, in position to receive a second charge of tobacco on again reaching the plunger or filler D'. By this operation (see Figs. 1 and 12 to 16) the paper has been folded completely around the cigarette, which is allowed to remain in its position until the next finished cigarette causes it to advance farther on between the plates. The upper plate, L', is of such a length that the paste has time to dry and adhere before the cigarette reaches its opposite end and is finally discharged.

I claim—

1. In a cigarette-machine, the combination, with the feed-belt, pivoted and reciprocating feed-plate, and the forming-wheel and plunger, of the sliding collector, the vertical plate R, and the horizontal plate U', provided in its front with an opening, substantially as and for the purpose described.

2. In a cigarette-machine, the combination, with a forming-wheel and formers, constructed as described, of the plunger, the pivoted paper-grippers, the lever 4', and the fingers j', by which the paper is folded around the tobacco, substantially as described.

3. In a cigarette-machine, the combination of a main frame mounted on a bed-plate, cross-rods, and a center plate connecting the same, shafts bearing therein, the tobacco-feed belt and pivoted and reciprocating plate, the vertical and horizontal knives, the paper-feed devices, the paper-grippers, the forming-wheel and plunger, the pasting trough and rolls, the pasting-knife, the dischargers for discharging the finished cigarette into a suitable receptacle, and levers and rods connecting the several parts whereby they are operated, substantially as and in the manner described.

4. In a cigarette-machine, the combination of a wheel having hollow radial arms or wings, formers working in said arms formed on their outer faces with a semi-cylindric cavity, and a vertically-moving plunger having its lower end constructed of corresponding contour, pivoted and reciprocating feed-plate, sliding collector, vertical plate R, horizontal plate U', and suitable connecting and operating mechanism, as set forth.

5. In a cigarette-machine, the combination, with the main shaft carrying double-cam-wheel O, of the lever and connecting-rod 7 7', rock-shaft J, bearing an arm, the dischargers P', mounted on said rock-shaft, and the wheel Q, having forming-blocks provided with outwardly-projecting lugs, substantially as described.

6. In a cigarette-machine, the combination of the vertically-sliding piece 9, carrying a vertical knife, the pivoted and horizontal knife and its restoring-spring, and the vertically-

sliding piece 10 for operating said latter knife, the same having at its lower end a wedge, substantially as described.

7. In a cigarette-machine, the combination of the vertically-sliding piece 10, provided with a wedge, the horizontal pivoted knife, and a spring for returning the knife when forced backward by the descent of said sliding-piece, substantially as described.

8. In a cigarette machine, the combination, with the main shaft bearing double-cam wheel N, of the lever 4', rock-shaft H, the plunger D', and the forming-wheel provided with the gripping devices p, all operating substantially as described.

9. In a cigarette-machine, the combination, with the forming-wheel, feed-belt, and pivoted and reciprocating feed-plate, the collector, the plunger, and the paper-feed devices, of devices on the forming-wheel for gripping the paper until carried up to the plunger, and a rock-shaft and lever for automatically releasing the paper, the pasting trough and rolls, the paster G², and the plates L' and M', forming between them a space for the reception of the finished cigarettes, as described.

10. In a cigarette-machine, the combination, with the main shaft bearing double-cam-wheel M, of the lever 5, connecting-rod 5', the rock-shaft r, bearing the arm q, the arm S, attached to said arm q, the knife E', and the paper-feed rolls, the whole operating to feed the paper and sever therefrom amounts sufficient for the wrapper of a single cigarette, substantially as herein described and shown.

11. In a cigarette-machine, the combination, with the plunger, forming-wheel, and forming devices, the paper and tobacco feed mechanism, all constructed and operating in the manner herein described, of the pasting-trough bearing upper and lower pasting-rolls, the frame F², revolving to and fro over said trough, and the curved paster carried by said frame and operating therewith to receive the paste from said upper roll and apply it to the inside edge of the paper, all substantially as set forth.

12. In a cigarette-machine, the combination of a rotating wheel formed with radial arms, each of which is provided with a former conforming in shape to the longitudinal half of a cigarette, a plunger constructed at its lower end of like contour, means for operating said plunger to successively meet said arms, a collector for supplying material to the space between the plunger and arms, and the feed-belt and pivoted and reciprocating plate, the paper-feeding devices, and grippers, all arranged to operate substantially as herein described.

13. The combination of the main shaft having a cog-wheel provided on its side with a cam, the rock-shaft n, having arm m, arm o, and sliding piece 11, the forming-wheel provided with the pivoted paper-grippers, the sliding piece 9, and the vertical knife, substantially as described.

14. In a cigarette-machine, the combination,

with the main shaft bearing a cam-wheel, and the cross-rod bearing lever 3, of the rock-shaft *b*, bearing an arm, the drum having on its shaft a loose pawl and a fixed ratchet-wheel, the feed-belt and its rollers, the sliding frame and feed-plate, rods connecting the lever and rock-shaft arm, the latter and the pawl on the drum-shaft, and the sliding frame and pawl, and the means, substantially as described, whereby the feed-plate is operated from the main shaft.

15. In a cigarette-machine, the combination, with main shaft bearing the cam-wheel *L*, cross-rod *F*, and the paper-feed rolls, of a lever pivoted on rod *F*, a rod, pawl, wheel, and weight, conjointly operating the feed-rolls, causing them to partially revolve at each whole revolution of the main shaft, and in feeding to the machine a quantity of paper sufficient for the wrapper of a single cigarette, substantially as described.

16. In a cigarette-machine, the combination of a feed-belt and pivoted and reciprocating feed-plate, a movable horizontal knife and a movable vertical knife, a receiving-plate having an opening therein, and a collector for delivering the material when cut to the forming-wheel, substantially as described.

17. In a cigarette-machine, the combination of a supporting-frame, a main driving or operating shaft bearing a cam-wheel, a traveling feed-belt, a sliding frame adapted to move forward with the belt, a feed-plate pivoted to such frame above the feed-belt, a pivoted lever resting on the hub of the cam-wheel, and

a rod connecting said lever with the feed-plate, substantially as and for the purpose described.

18. In a cigarette-machine, the combination of the forming-wheel, reciprocating formers, a plunger, a paper-feeding device, paper-grippers located on the forming-wheel, plates *L'* *M'*, having a space between them and carrying an oscillating paster, *G*², and paste-trough *K'* having paste-rollers, with suitable connecting and operating mechanism.

19. In a cigarette-machine, the combination of the feed-belt, pivoted and reciprocating feed-plate, a cutter, a forming-wheel carrying reciprocating formers, a suitable plunger, the plates *L'* *M'*, having a space, *N'*, between them and carrying an oscillating paster, *G*², and paste-trough *K'*, provided with rollers, with suitable connecting and operating mechanism.

20. In a cigarette-machine, the combination of a forming-wheel, *Q*, carrying reciprocating formers and paper-grippers, a suitable plunger, receiving-plates *L'* *M'*, having space *N'* between them and carrying an oscillating paster, *G*², and a paste-trough having two rollers, *J'* *I'*, and the paper-feeding rollers *W* *W'*, the forming-wheel being arranged between the plates and paper-feed, as described and shown, with suitable connecting and operating mechanism, as set forth.

ALEX. EWING.

Witnesses:

JNO. E. PEAKE,
JAS. W. WRIGHT.