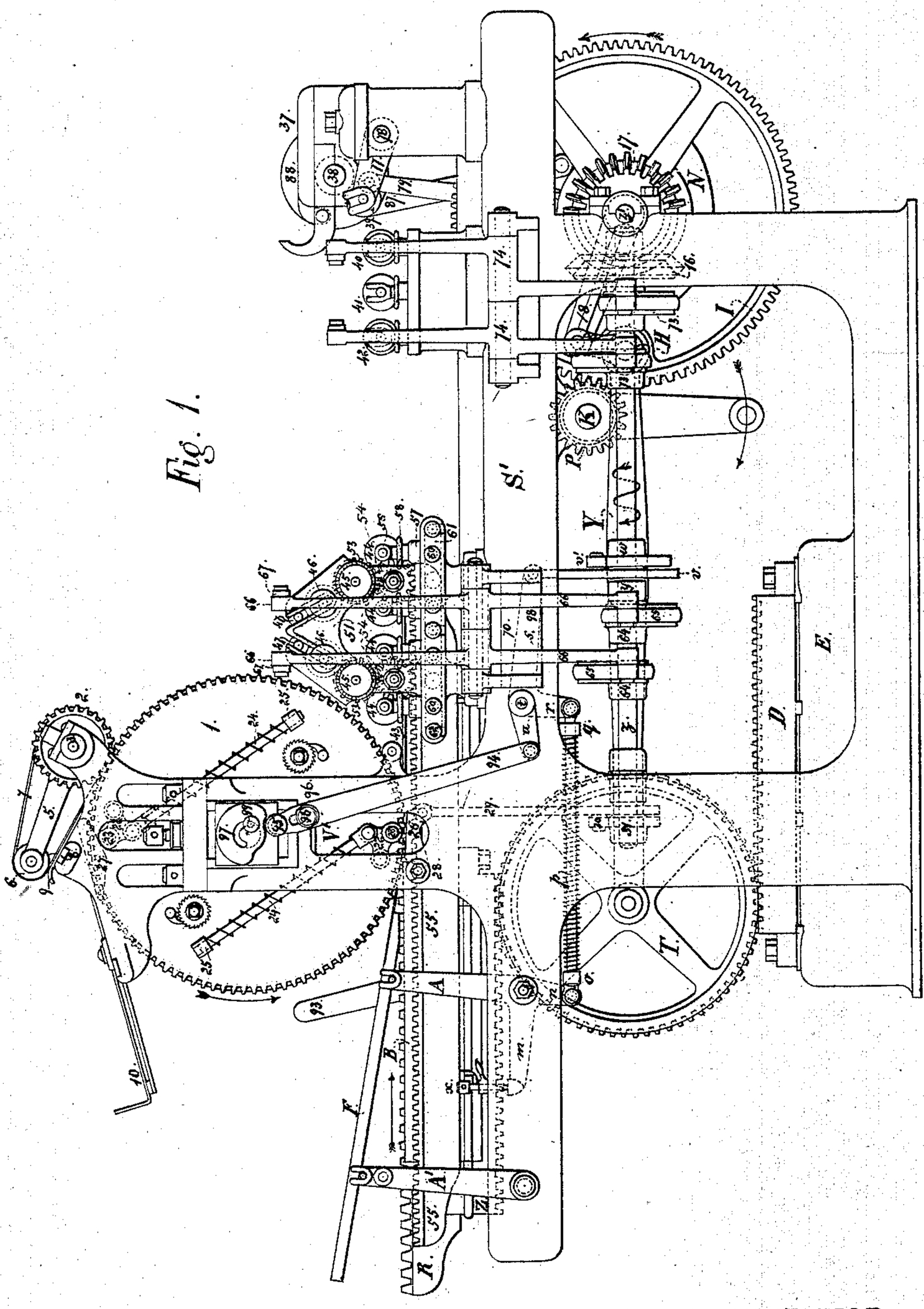
5 Sheets--Sheet 1.

H. BARTH.

Stop-Cylinder Printing-Presses.

No. 139,229. Patented May 27, 1873.

Fig. 1.



WITNESSES.

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5 Sheets--Sheet 2.

H. BARTH.

Stop-Cylinder Printing-Presses.

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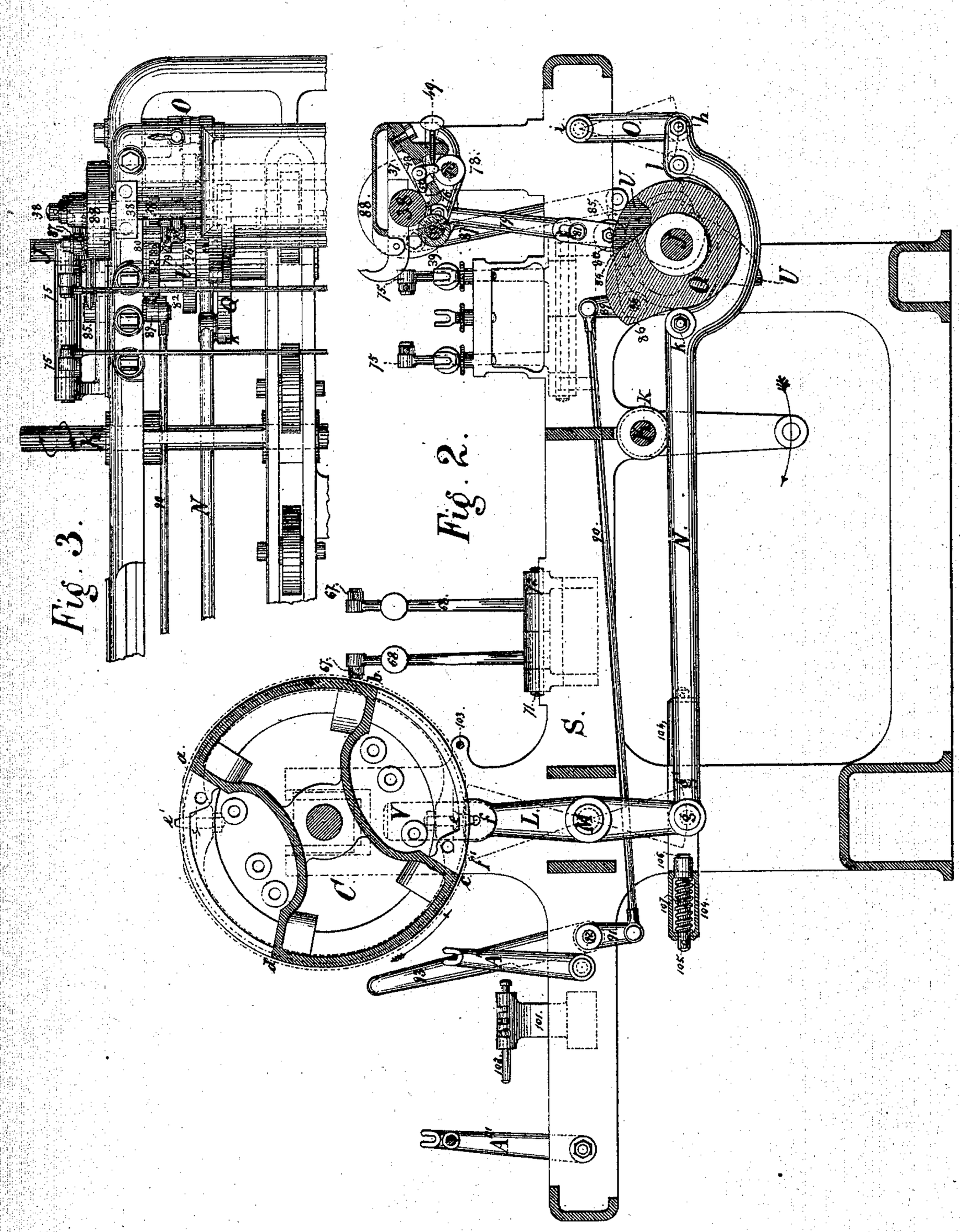

Fig. 3.

Fig. 2.

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Stop-Cylinder Printing-Presses.

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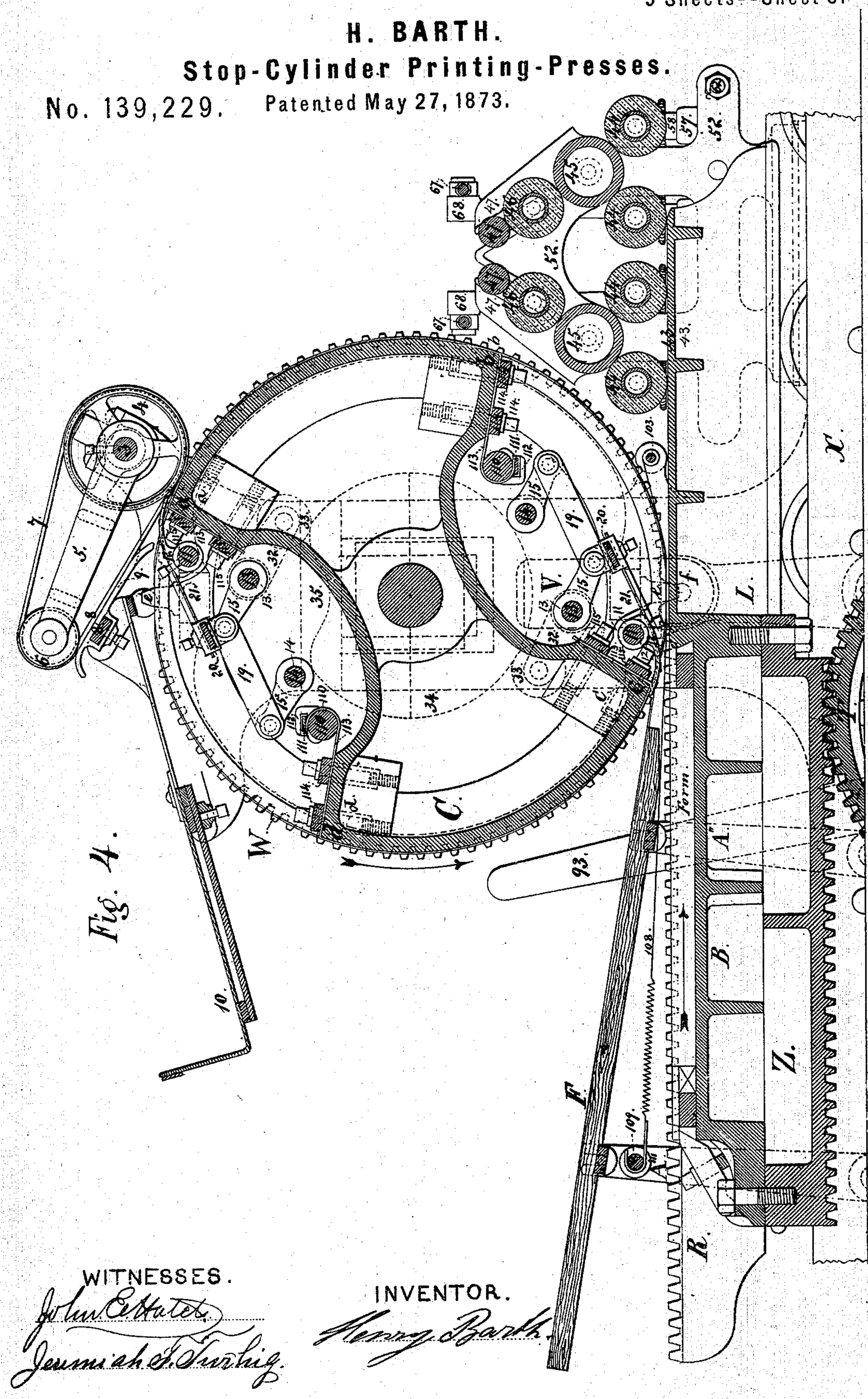

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5 Sheets--Sheet 4.

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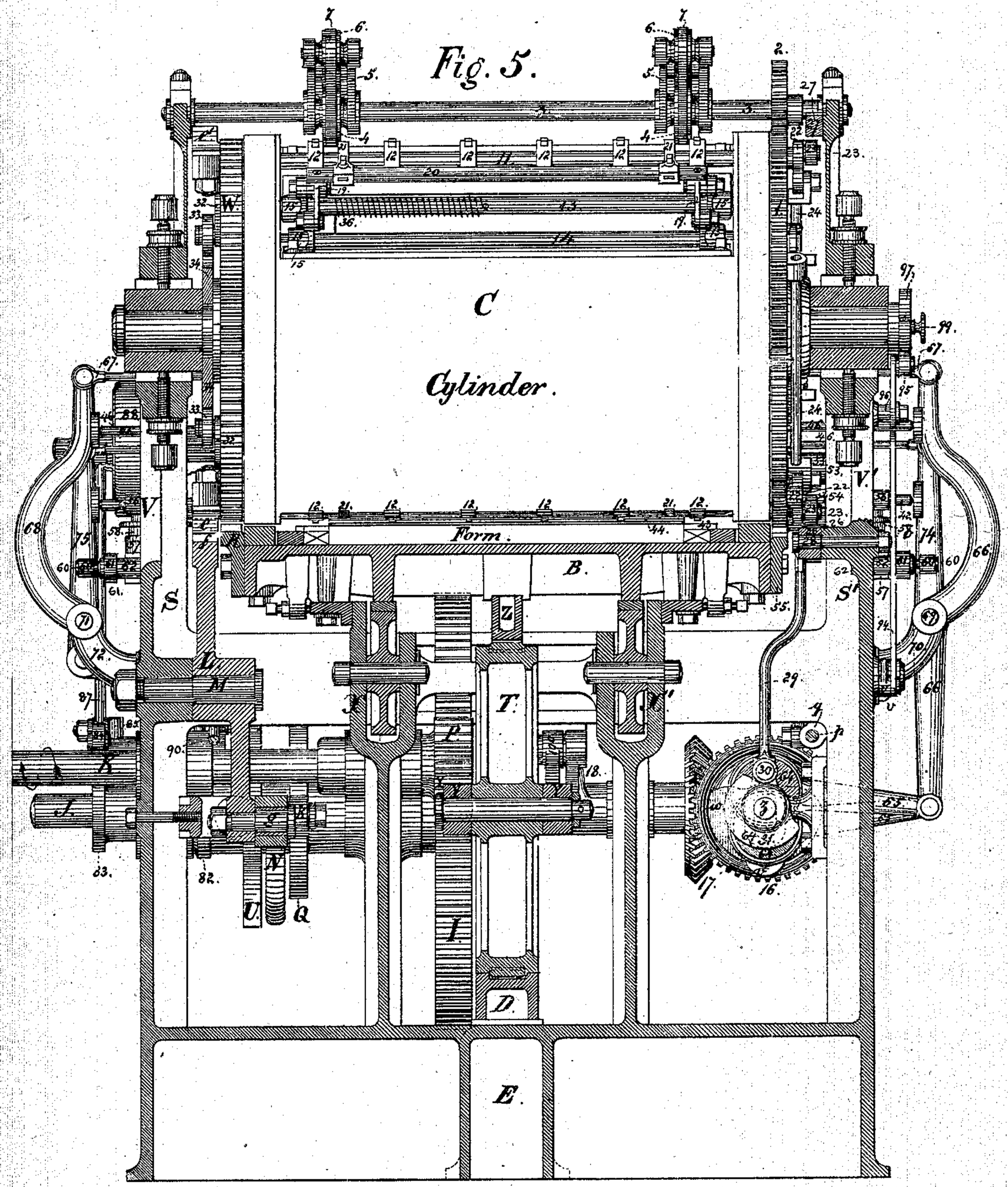
Stop-Cylinder Printing-Presses.

No. 139,229. Patented May 27, 1873.

Fig. 5.



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No. 139,229. Patented May 27, 1873.

Fig. 6.

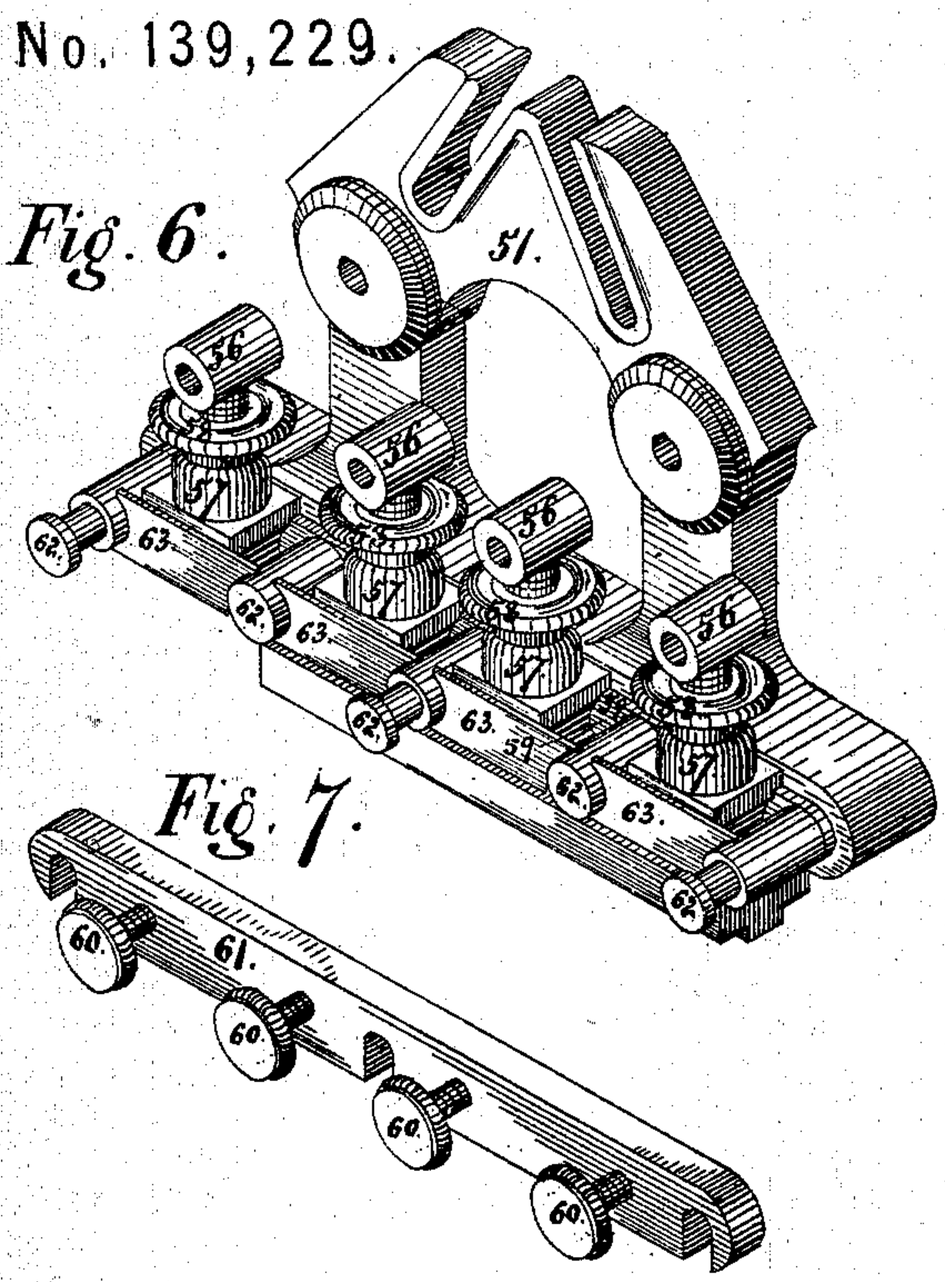

Fig. 7.

Fig. 8.

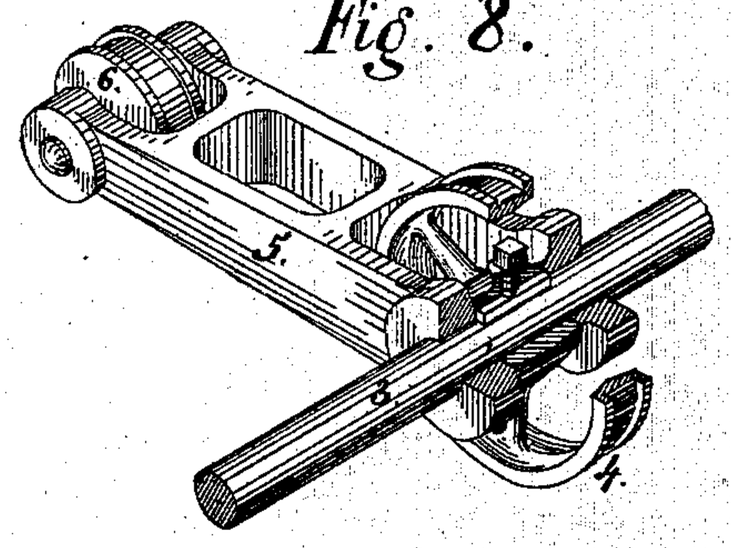

Fig. 9.

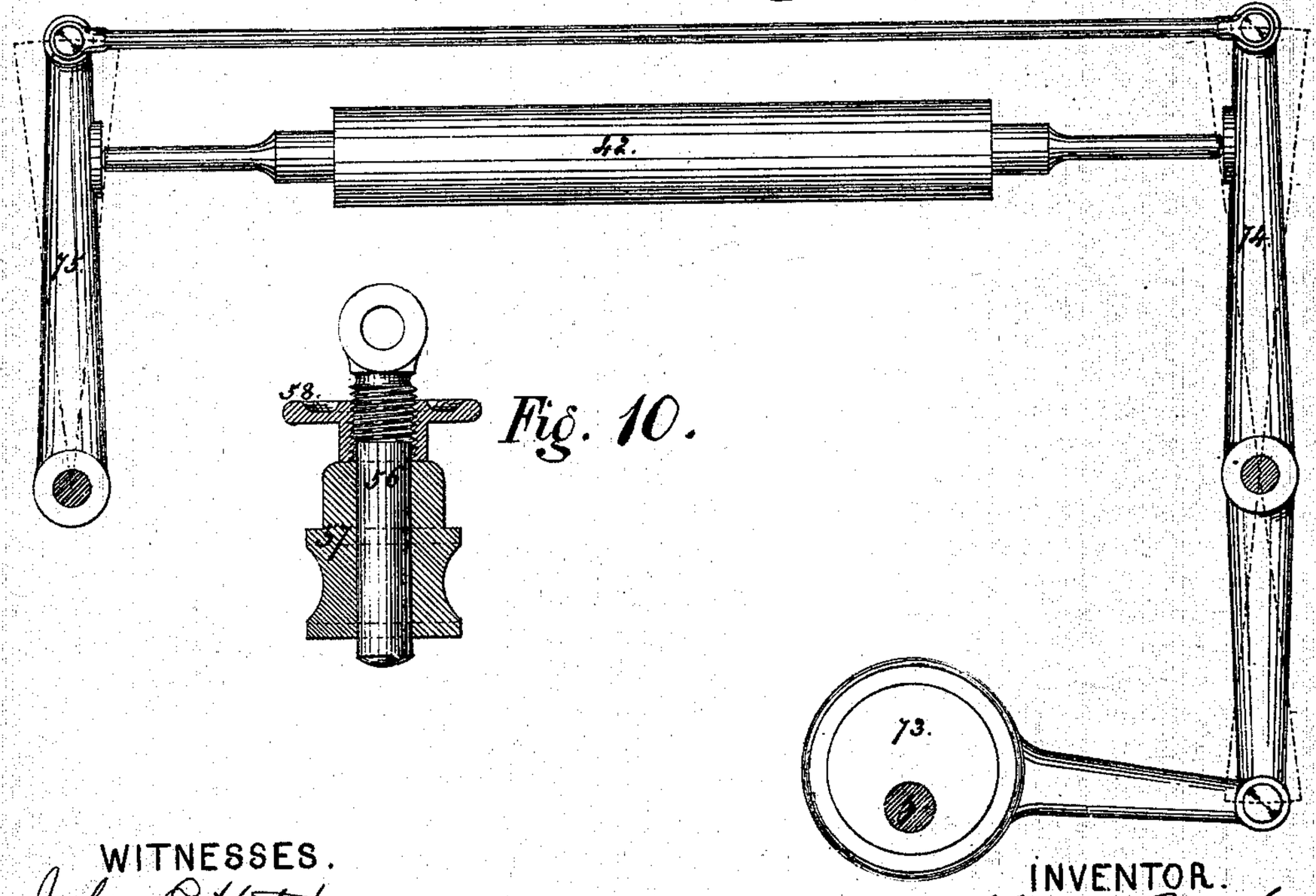

Fig. 10.

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UNITED STATES PATENT OFFICE.

HENRY BARTH, OF CINCINNATI, OHIO.

IMPROVEMENT IN STOP-CYLINDER PRINTING-PRESSES.

Specification forming part of Letters Patent No. **139,229**, dated May 27, 1873; application filed October 16, 1872.

To all whom it may concern:

Be it known that I, HENRY BARTH, of the city of Cincinnati, in the county of Hamilton and State of Ohio, have invented a certain new and useful Improvement in Stop-Cylinder Printing-Presses, of which the following is a specification:

My invention relates to mechanism for stopping and starting the cylinder of a stop-cylinder press, whose circumference is greater than the way described by the bed-plate; for conducting the paper through the machine and discharging it therefrom; for distributing the ink; and for other purposes, as will more perfectly appear in the description hereto annexed.

In the drawing, Figure 1 represents a side elevation of the whole press. Fig. 2 is a longitudinal section, looking toward the side frame S. It is intended to show the stop and starting mechanism, the ink-fountain, the motion of the dip-roller, and the motion of the ink-fountain roller. For the purpose of being clearer, other parts are omitted. Fig. 3 is a top view of one corner of the press. It shows the position of the different cams on the main shaft. Fig. 4 is a part of a longitudinal section through the center line of the press, on a larger scale. It represents the complete cylinder with all its details, the feed-board, the bed, the ink-table, the compilation of rollers, and the paper-discharge arrangement. Fig. 5 is a complete cross-section of the press, taken through the center line of the cylinder, but the cylinder itself is shown in view, (not in section.) Fig. 6 is an isometrical view of a roller-frame after the bar 61 with the set-screws 60 60 60 has been taken off. Fig. 7 shows the bar 61 of the roller-frame 51 in an isometric projection. Fig. 8 is an axomometric, partly sectioned, projection of one of the double forked arms 5 of the shaft 3, with the pulleys 4 and 6. Fig. 9 illustrates the longitudinally-vibrating motion of the distributing-rollers. Fig. 10 is a section of one of the adjustable bearing-holders 57, with the bearing 56, and with nut 58.

In the drawing like letters or numbers refer to like parts.

In order that the following description may be more easily understood, I describe the motion of the various parts separately.

I.—*The Motion of the Type-Bed and Cylinder.*

F, Fig. 1, is the feed-board; B, the bed of the type; and C, Fig. 4, the impression-cylinder. The feed-board F is provided with trunnions, which rest in bearings placed on the vibrating arms A, A′, A″, and A‴, for the purpose of receiving a motion on and off the impression-cylinder, in a manner hereinafter described. The impression-cylinder is held in bearings which are fitted to the side frames S and S′, Figs. 1 and 5, and is operated at intervals by the spur-wheel W, Fig. 4, which is fastened to the cylinder C, and which is driven by the rack R, fastened to the type-bed B. The type-bed B runs on rollers fitted to the ribs X X′, Fig. 5, and is operated by the rack Z, Fig. 4, which is bolted to the under side of the bed B, and which is driven by the traveling wheel T. The traveling wheel T gears at the same time into the stationary rack D, Fig. 1, which is secured to the ground-frame E. By means of the rod Y, Fig. 1, the axis of the wheel T is connected with the crank-pin H inserted into the web of the toothed wheel I, which latter is keyed to the main shaft J. The spur-wheel I gears into and is driven by the pinion P. The pinion P is keyed to the shaft K, to which the motive power is applied. The driving-shaft K has to be turned in direction of the arrow, and the pinion P fixed to it will drive the wheel I round the center of the shaft J in the direction indicated by another arrow. By means of the crank, which is formed by inserting the wrist-pin H into the web of the spur-wheel I and through the connecting-rod Y, the rotary motion of wheel I will cause an alternative reciprocating motion of the traveling wheel T. At the same time the stationary rack D, into which the traveling wheel T gears, will impart a rotating motion of the wheel T, so that the same rolls forward and backward upon the rack D. The motion of the wheel T, which gears at the same time into the rack Z, which is bolted to the bed B, will cause a reciprocating motion of the bed B when the driven shaft K is turned.

It will be observed that the space through which the type-bed moves is twice as long as the space through which the wheel T travels.

As far as the description now reaches, the motion of the bed B and of the impression-cylinder C of the press does not differ from presses already in use; but now we come to the point wherein it differs, and in which one part of my invention consists.

The drawing shows all the different parts of my press in the positions they have at that moment when the type-bed B commences to move and the impression-cylinder commences to turn in the direction where the printing is done, and which is indicated by arrows. During the first motion of the bed B in this direction the part *c d*, Fig. 4, of the surface of the cylinder C comes in contact with the type, and the printing is done. While the bed B describes one full stroke in the said direction the cylinder describes only one-half a revolution, so that the printing-surface *a b* takes the place of the printing-surface *c d*. At the end, or a little before the end, of the stroke of the bed B, and after the printing-surfaces *a b* and *c d* have changed their positions, the cylinder is stopped by a mechanism hereafter described, and is held at rest when the type-bed B is about to make its return movement. As soon as the bed B commences a new stroke in the direction of the arrow the cylinder C is started and turns with the bed again, but another part of the cylinder—namely, the surface *a b*—comes in contact with the type and gives the impression for printing the next sheet.

The drawing represents a cylinder provided with two printing-surfaces, which stops twice and prints twice during one revolution, and while the bed performs two double strokes; but we can just as well construct the cylinder with three, or four, or more printing-surfaces, so as to print, successively, three, four, or more sheets of the full capacity of the type-bed during one revolution of the cylinder, and while the bed will run three or four times or more forward or backward. The springs 107 107, Fig. 2, on the ends of the connecting-rod N, arrest the shock caused by the tooth *e* in the cylinder striking against the tooth *f* in the lever L.

II.—*The Mechanism for Stopping and Starting the Cylinder.*

For the purpose of stopping and starting the impression-cylinder twice, or oftener, during one revolution, the cylinder is provided with two or more large teeth, according as it is intended to stop two or more times. As the drawing shows a cylinder with two printing-surfaces and two stops, the impression-cylinder C is provided with the two stopping-and-starting teeth *e* and *e'*, Fig. 4. They are not attached directly to the cylinder, but they are firmly secured to the spur-wheel W, Fig. , which is fastened to the cylinder C. One after the other the teeth *e* and *e'* gear into the space or female tooth *f*, Fig. 4, which is cut on the upper end of the upper arm of the double-armed lever L, Figs. 2 and 4, the pin M, Fig. 2, secured to the side frame S, being the fulcrum of the double-armed lever L. To the lower end of the lower arm of the double lever L, the one end of the connecting-rod N, Fig. 2, is attached by means of the wrist-pin *g*. The other end of the connecting-rod N is held by the hanger O through the pin *h*. The hanger O oscillates upon the pin *i* attached to the frame. The positions of the double-armed lever L and of the hanger O are determined in such a way that the straight line, which bisects the *sinus versus* of the angle of vibration of the lower arm of the lever L, and which passes through the axis of the main shaft J, bisects the *sinus versus* of the angle of vibration of the hanger O also. To the connecting rod N the two friction-rollers *k* and *l* are attached. The cam Q acts upon the roller *k'*, and the cam U upon the roller *l*, Fig. 2. The cams are firmly secured to the shaft J, so as to rotate with the same; they have such a shape and their position is so adjusted as, through the medium of the connecting rod N, the double lever L, and the teeth *f e* and *e'*, to start and stop the cylinder C, as follows: At the moment when the bed and cylinder are in the position in which they are drawn, and the bed is going to move in the direction indicated by the arrow, the cylinder is started by the cams and caused to turn in the direction with the bed and with the same speed as the type-bed moves. At this time the rack R on the type-bed does not gear into the spur-wheel W on the cylinder, as the teeth of the wheel W are cut off at that place of the wheel which faces the rack R while the cylinder stands still. By and by, as the space *f* and the tooth *e* go out of gear, the teeth of the wheel W come to gear into the rack R, so that they are entirely in gear when the tooth *e* leaves the space *f*; then the rack R continues to drive the cylinder, and the lever L, with the space *f*, is caused by the cams to move backward to the extreme position *f' g'*, Fig. 2. At the same time the cylinder C has turned so far that the other stop-and-start tooth *e'* will meet the female tooth or space *f*. About the tooth *e'* the teeth of the wheel W are cut away in the same manner as about the tooth *e*, so that wheel W and the rack R will not gear when the tooth *e'* is about its lowest position; but as soon as the tooth *e'* and the space *f* meet, the cams Q and U will alter the direction of the motion of the lever L again, so as to bring the space *f* to gear into the stop-tooth *e'* as the wheel W and the rack R go out of gear. When the double-armed lever L arrives at its mean position, *e g*, the cams will cause the same to stop there and to hold the cylinder stationary. A little time after the cylinder is stopped, the type-bed B has finished its forward stroke, and while it is running back, the cylinder C is caused, by the cams, to remain stationary, and as the teeth are cut

away at the part of the wheel W which faces the rack R, while the cylinder is held stationary the bed B can freely pass under the cylinder. When the bed B has arrived at its extreme backward position, from where I started to follow its motion, and in which position it is drawn, the double-armed lever L is in its starting-position also, but the cylinder C I find one-half turned around, and the teeth *e e'* and the printing-surfaces *a b* and *c d* in changed places. But as the two halves of the cylinder are symmetrical, the position of the cylinder will be analogous to the position in which it is drawn. While the bed is running forward and backward the next time, the cams Q and U will start and operate upon the second half of the cylinder C in the same manner as during the first forward and backward strokes of the bed. My stop-and-start mechanism has the advantage over many others designed before, of having less joints, and the relative positions of the double lever L and the hanger O, as described above, cause it to operate with perfect accuracy. For the purpose of observing conveniently the action of the stop-and-start teeth *f e* and *e'*, I have provided the side frame S with an opening or window, V, Figs. 1 and 4, which assists me in adjusting these important parts very finely and perfectly.

III.—*The Paper Feeding and Delivery Arrangement.*

The arms A A′ A″ and A‴, Figs. 1 and 2, upon which the feed-board F rests, vibrate on pins inserted in the side frames S and S′. The arm A is made with the arms *m* and *n*, Fig. 1, in one piece. Over the end of the arm *m* a projection of the side frame S′ is provided, with an adjusting screw, *x*, Fig. 1, by which the end position of the feed-board F, in regard to the impression-cylinder C, can be regulated. A double armed or elbow lever, *s*, Fig. 1, is fastened inside of the side frame S′ to the shaft or axle *t*. A hole bored through the side frame S′ serves as bearing for the shaft *t*. The shorter arm *r* of the elbow-lever *s* and the arm *n* of the three-armed lever A *m n* are connected by the rod *p* upon which a spring is wound. One end of this spring presses against the guide *q* through which the rod *p* goes, and which is fastened to the side frame S′; the other end of the spring acts upon the head *o* of the rod *p;* consequently the spring will push the feed-board F so far toward the impression-cylinder C as the set-screw *x* over the arm will allow. To the longer arm 98 of the lever-elbow *s* the cam-rod *v* is attached. At its lower end the cam-rod *v* is provided with a long hole, in which it is guided by shaft *z* in one way, while between the collar *y* and the cam *w*, it is guided the other way. The cam *w* is fastened to the cam-shaft *z*, and acts upon the roller *v′*. It has such a shape, and such a position, that it causes, through the roller *v′*, the cam-rod *v*, the elbow-levers *s*, the rod *p*, and through the arms *n* and A, the feed-board F to move, at correct times, off of the impression-cylinder C, holds it in the position furthest from the cylinder, while the paper is put onto it, and moves it up to the cylinder again, by means of spring *p*, a little before the cylinder is started. The cam-shaft *z* receives a rotary motion from the continuation *z′* of the main shaft, J, through the miter wheels 16 and 17, Fig. 1. The continuation *z′*, which lies in line with the main shaft J, is provided with the crank 18, by which it is coupled by means of the connecting piece 100 to wrist-pin H of the wheel I, on the main shaft J, so that the cam-shaft *z* will make the same turns as the main shaft J, and its continuation *z′*. At the end of the cylinder C, opposite the wheel W, the spur-wheel 1, Figs. 1 and 5, is fastened to the cylinder, and gears into the pinion 2, which is secured to the pulley-shaft 3. The shaft 3 is held in bearings in the side frames S and S′, and carries two or more pulleys 4 4, which slide on the shaft 3, and may be tightened at any place required, Figs. 1, 4, and 5. The arms 5 5, which form at each end a fork, are slipped on to the shaft 3 the same time with the pulleys 4 4, so that each of the pulleys 4 4 is situated between the two blades of the fork at one end of one of the arms 5 5, and so that when a pulley 4 is moved on the shaft 3, the arm moves with it, and that when the pulleys 4 4 are tightened to the shaft 3, and turn with it, the shaft can revolve freely in the holes of the arms. In the forks at the other ends of the arms 5 5, the pulleys 6 6 are placed revolving on pins. Over every pair of the pulleys 4 4 and 6 6, one of the endless India-rubber belts 7 7 is stretched. The diameters of the wheels 1, the pinion 2, and the pulleys 4 4 4 are so calculated, that the India-rubber belts 7 7 touch the surface of the impression-cylinder C, and that the speed of the belts 7 7 is just equal to the speed of the circumference of the cylinder C. Above the cylinder C is bar 8, Figs. 1 and 4, extending from side to side, and fastened to the frames S and S′. Upon this bar 8 the polished metal guides 9 9 9 9, Fig. 4, are slipped, and may be tightened by set-screws at places required. Under each of the India-rubber bands 7 7, one of the guides 9 9 is to be set, so that the rubber-bands, when in motion, slide on the guides. In front of the cylinder C, and above the same, a basket 10, composed of small metal strips, is placed to serve as an outlay table. It is so constructed, as to be lengthened and shortened, and it can be easily taken away and replaced. Inside the cylinder C are arranged for each printing-surface one griper-shaft 11, Fig. 4, provided with gripers 12 12 12 for receiving and holding the paper. To the shafts 13 and 14 the levers 15 15 15 15 are fastened, one at each end of each shaft. Two pairs of the levers 15 15, situated at the same end of the cylinder, one of which belongs to shaft 13, and one to

shaft 14, are connected by the rods 19 19. To those ends of the connecting-rods 19 19 which are jointed to the levers 15 15 on the shaft 13 the metal bar 20 is fastened, and provided with thin steel fingers 21 21, so arranged as to slide on the bar 20, and which can be fastened at any point required.

The griper-shafts 11, and the discharge finger-shafts 13 13 and 14 14, are held in bearings in the webs of the wheels at either end of cylinder C. The griper-shafts 11 11 project over their bearings in wheel 1, Fig. 1, and are provided outside of wheel 1 with double-armed levers 22 22, made in one piece with the shafts. To these levers are attached at one arm the friction-roller 23, and at the other arm the spring-rod 24. A spiral spring, wound over each of the rods 24, presses with one end against the guide 25, through which the spring-rod 24 goes, and with the other end upon the head of the rod 24, and so acts through the lever 22, upon the griper-shaft 11, as to keep the gripers 12 12 closed, thereby holding the paper tight to the edge of the corresponding printing-surface of the cylinder.

For the purpose of opening the gripers to receive the paper to be printed, and to deliver the paper after being printed, the two cams, 26 and 27, are attached to the side frame S′. The cam 26 is movable on the pin 28, but held stationary while the cylinder is in motion, and during part of the time when the same is standing still, thereby forming an inclined plane upon which the friction-roller 23 runs, and so the gripers open. The cam 26 is caused to rise and drop by the revolving cam 31, which is fastened to and revolves with the cam-shaft *z*, and which acts upon the roller 30 attached to the cam-rod 29; the latter is jointed to the cam 26. The cam 27 is fastened stationary to the side frame S′ in such a position and with such a shape that the roller 23 will run on to it, and cause the gripers 12 12 12 to open when the end of the paper arrives under the rubber belts 7 7 7, and that the roller 23 will run off and close the gripers again after the paper is delivered.

The discharge finger-shafts 13 13, Fig. 4, project over their bearings in wheel W, and carry outside of this wheel the levers 32 32, fastened to the shafts at one end and provided with a friction-roller, 33 33, at the other end. The rollers 33 33 travel on the round plate 34, which is fastened to the bearing of the cylinder-shaft in side frame S, concentric with the cylinder C, and which has the cut-out 35. As long as the roller 33 is in contact with the concentric part of the cam-plate 34 the discharge-fingers 21 21 are caused to lay their ends close to the printing-surface of the cylinder, but as soon as the roller 33 comes to the cut-out 35 the spring 36, Fig. 5, which is put on the shaft 13, will act and cause the fingers 21 21 to move and to lift the paper, which was placed with its margin on top of the ends of the fingers 21 21, to the endless India-rubber bands 7 7, and to follow the motion of the paper, moving with the rubber bands 7 7 until the paper reaches the polished metal guides or ways 9 9 9 9; then the roller 33 will leave the cut-out and the fingers 21 21 will be drawn back to the cylinder. The combination of the shaft 14 with shaft 13 causes the tips of the fingers 21 21 to describe such a way that they follow the motion of the India-rubber bands 7 7, or of the edge of the paper which is moving with them. A little irregularity is corrected by the elasticity of the fingers 21 21. Under the cylinder, and attached to the rods 103 and 109, are tapes, or elastic bands 108 108, Fig. 4, to hold the paper to the cylinder smooth and free from wrinkles.

IV.—*The Inking Apparatus.*

The inking consists in the ink-fountain 37, Fig. 1, with the iron roller 38, the composition dip-roller 39, the composition table-distributers 40 41 42, the ink-table 43, Fig. 4, the four composition form-rollers 44 44 44 44, the two ink-cylinders 45 45, made of iron or hard wood, the two composition distributing-rollers 46 46, and the small iron rollers 47 47.

In the drawing the dip-roller 39 is shown in contact with the ink-fountain roller 38. The dip-roller 39 occupies this position as long as the ink-table 43, which is fastened to or made in one piece with the bed B, is not under the dip-roller 39. While the dip-roller 39 is in contact with the roller 38, this is turned so as to receive a thin coat of ink from the reservoir of the ink-fountain, which is formed by the roller 38, and the steel knife 48, Fig. 2, and to which the ink is supplied, and so as to apply a narrow stripe of ink to the dip-roller 39. The thickness of the coat of ink, which the roller 38 takes out of the reservoir, can be regulated by the set-screws 49 49 49, Fig. 2. Each of these set-screws acts upon one arm of one of the double-armed or angle levers 50 50 50, so that the other arms of these angle-levers 50 50 50 press the knife 48 more or less against the roller 38. The amount of turn of the roller 38, and consequently the width of the stripe of ink put onto the dip-roller 39, can be regulated from the feeder's stand. When, as the bed B with the ink-table 43 is running forward and backward, the ink-table 43 passes under the dip-roller 39, the latter will drop and roll upon the ink-table 43 and give the ink to the same. The distributing-rollers 40 and 42, Fig. 1, receive a lateral or vibrating motion in opposite directions, and they spread the ink and divide it over the ink-table 43 while the same is moving forward under them.

The form-rollers 44 44 44 44, Fig. 4, take ink from the ink-table 43 while rolling on the same; then give the ink to the ink-cylinders 45 45 and take it back from them in a more equally-divided state; and then apply the evenly-di-

vided ink to the type or form while it is passing under them. Upon the ink-cylinders 45 45 roll and vibrate the distributing-rollers 46 46, connected with which are the iron-rollers 47 47.

Altogether the system of rollers compiled over the form-rollers distributes and grinds the ink very finely, and serves as a reservoir. By this arrangement all dust, pieces of paper, and other strange bodies, mixed accidentally with the ink, will accumulate on the small iron rollers at the top, and remain there, where they will not injure the printing.

In all cylinder-presses with cylinder distribution heretofore built, either the form-rollers or the ink-cylinders vibrate, while in my press the composition-rollers 46 46 on top of the ink-cylinders 45 45 vibrate. By this arrangement all composition-rollers in the system are more durable.

The ink-cylinders 45 45 are held in stationary bearings in the roller-frames 51 52, which are firmly secured to the side-frames S and S′; but the bearings are so arranged that the cylinders 45 45 can be easily taken out, when required. Upon the shaft of each ink-cylinder a toothed wheel, 53 53, Fig. 1, is fastened, by which the cylinder is operated. These wheels gear into the intermediate wheels 54 54 which are driven by the rack 55 fastened to the bed B.

The form-rollers 44 44 44 44 are held in adjustable bearings 56 56 56 56, so that they can be lowered and moved onto the ink-cylinders 45 45 when they become smaller in size by shrinking or wear; and that they can be quickly and correctly adjusted in regard to their position to the ink-table and form and to the ink-cylinders. The form-rollers 44 44 44 44 are turned by friction by the ink-cylinders 45 45. The bearings 56 56 56 are made with round stems, which fit in holes in the bearing-holders 57 57 57 57. On the stems of the bearings 56 are screw-threads cut and the nuts 58 58 screwed, by which either end of the form-rollers may be raised or lowered. The bearing-holders 57 57 57 57 slide with grooves planed in them on projections 59 59 of the roller-frames 51 52; and they can be tightened by the set-screws 60 60. The nuts of the set-screws 60 60 are tapped into the bars 61 61, which are slipped with their open holes between collars on studs 62 62. The studs 62 62 are riveted into the roller-frames 51 52. Between the bearing-holders 57 57 and the set-screws 60 60 the plates 63 63 63, which slide on the studs 62 62 62, are placed to prevent the points of the set-screws 60 60 60 from being pressed into the roller-holders 57 57.

When one end of one roller is to be moved on or off the corresponding set-screw only is to be loosened. When all the form-rollers are to be taken out the set-screws 60 60 of one side have to be loosened and the bar 61 lifted off; then the plates 63 63 and the bearing-holders 57 57 with the bearings can be slipped off endwise, and the rollers 44 44 may be easily and quickly taken out.

The distributing-rollers 46 46 receive their vibrating motions from the eccentrics 64 64 fastened to the cam-shaft *z*, and through the eccentric yokes and rods 65 65, the double-armed levers 66 66, the connecting-rods 67 67, and single arms 68 68. The eccentric yokes and rods 65 65 are made in one piece, and they are jointed to the lower arms of the double-armed levers 66 66, which vibrate on the pin 69 of the bracket 70. The bracket 70 is bolted to the side frame S′. Each of the connecting-rods 67 67 joints the upper end of the upper arm of one of the double levers 66 66 with the upper end of the opposite single arm 68, and causes the same to vibrate on the pin 71 of bracket 72, which is bolted to the side frame S. Between the levers 66 66 and 68 68, and in the slots of the roller-frames 51 52, the vibrating rollers 46 46 are held. This arrangement simplifies the laying in of the rollers very much, because no cross-heads or collars have to be attached to them, as in presses which have levers only on one side to vibrate the rollers. The distributing-rollers 40 and 42 are vibrated from the eccentrics 73 73, which are fastened to the cam-shaft *z*; also, by the double-armed levers 74 74 and the single levers 75 75, through similar means and in the same manner as the rollers 46 46. The bearings in which the rollers 40 41 42 are held are like the bearings of the form-rollers, but open on top and only adjustable in height. The dip-roller 39 is held in bearings in the vibrating arms 76 and 77, Fig. 2, which are fastened to the shaft 78. The shaft 78 is held in bearings in the side frames S and S′. The rod 79 is connected at one end with the arm 76, and is provided with the roller 80 at the other end. Near the end with the roller 80, the rod has a long hole, in which it is guided on the pin 81 which is fixed to the side frame S. The cam 82, which is firmly secured to the main shaft J, acts upon the roller 80, and has such a shape and such a position that it causes the dip-roller 39, at right times, to come in contact with the fountain-roller 38, and to leave this to roll on the ink-table 43. The ink-fountain roller 38 is caused to turn, when in contact with the dip-roller, by the cam 83, which is firmly secured to the main shaft J, at the end, projecting over the bearing in side frame S. The cam 83 acts upon the roller 84, which is attached to the lever 85. The lever 85 is fastened to the shaft 86, outside of the side frame S. The rod 87 connects the lever 85 with the inside ratchet-wheel 88, which is put on the ink-fountain roller 38, and operates the same. The shaft or axle 86 is held in a long bearing in the side frame S, and the lever 89 is fastened to it inside of the side frame S. Through the rod 90, the lever 89 is connected with the lever 91, which is keyed to the shaft 92 inside of the side frame S. The shaft 92 is held in a long bearing in the side

frame S. Outside of the side frame S the handle-lever 93 is fastened to the shaft 92. From the lever 93 the ink-fountain roller 38 may be turned by hand.

V.—*Arrangement for Double Rolling and Single Printing.*

For fine work it is sometimes required to let the bed with the form run twice forward and backward under the ink-roller. For this purpose I have arranged my press with a mechanism which, when in operation, causes the feed-board F, with the paper, to remain in the position off of the cylinder C, while one set of gripers is about to close, so that these gripers cannot catch the paper. The second set of gripers will find the feed-board and the paper in the right position to take hold of the paper when they are going to close. In case double rolling is wanted, I provide only one (either one) of the two printing-surfaces of the cylinder C with a blanket, and make only this surface ready for printing; so that the surface not used is about the blanket thickness lower than the other, and the form can pass freely under it. To prevent the feed-board F from moving toward the cylinder when that set of gripers is going to close which is not to be used, the lever *u*, Fig. 1, is fastened to the shaft *t* outside of the frame S′. To the lever *u* the rod 94 is attached at one end, and the other end is provided with the roller 95, and guided by means of the pin 96, and the cam 97 attached to the projection of the shaft of the cylinder outside the side frame S′. When the feed-board moves off of the cylinder, the lever *u* and the rod 94, with the roller 95, move downward; when the feed-board moves to the cylinder, these parts move upward; but that part of the cam 97 which is larger in diameter touches the roller 95 when in its lowest position, and prevents it from moving upward, and consequently the feed-board from moving to the cylinder. The cam 97 can be fastened by the screw 99 in such positions that the larger part of the same will be in contact with the roller 95, when those gripers are going to close, which are not wanted to catch the paper. The smaller part of the cam 97 never touches the roller 95, and is so situated that the roller 95 can freely rise; hence the feed-board with the paper can move toward the cylinder when that set of gripers is going to close which belongs to the printing-surface in use.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. The hangers O, in combination with the connecting rod N, having on its end the spring 107, and the double-armed lever L ending in the female stop-and-start tooth *f*, substantially as and for the purpose set forth.

2. The cam *u* on the cam-shaft *z*, in combination with the cam-rod *v*, the elbow-lever *s*, the rod *p*, arms *n* and A, and feed-board F, for the purpose set forth.

3. The shaft 14, in combination with the shaft 13, operating substantially as described, to cause the tips of the fingers 21 21 to follow the motion of the India-rubber band, in their descent.

4. The mode of vibrating rollers longitudinally, by laying them between two vibrating arms, the one at one side and the other at the other side of the press.

5. The adjustable bearings 56, in combination with the bearing-holders 57, the bars 61, and the set-screws 60, substantially as and for the purpose set forth.

6. The elastic-bands or tapes 108 108, Fig. 4, under the cylinder, attached to the rods 103 and 109 for the purpose of holding the paper to the cylinder smooth and free from wrinkles.

7. The arrangement by which the blankets and the tympan-sheets are fastened to the cylinder, consisting in the clamping-bars 114 114, Fig. 4, and 115 115, and the blanket-winders 110 110, with the hooks 112 112, or similar devices, for holding reglets around which the blankets or tympans are laid.

8. The mechanism by which the ink-fountain roller 38 can be turned by hand, and by which the amount of turn of this roller may be regulated from the feeder's stand.

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Witnesses:

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