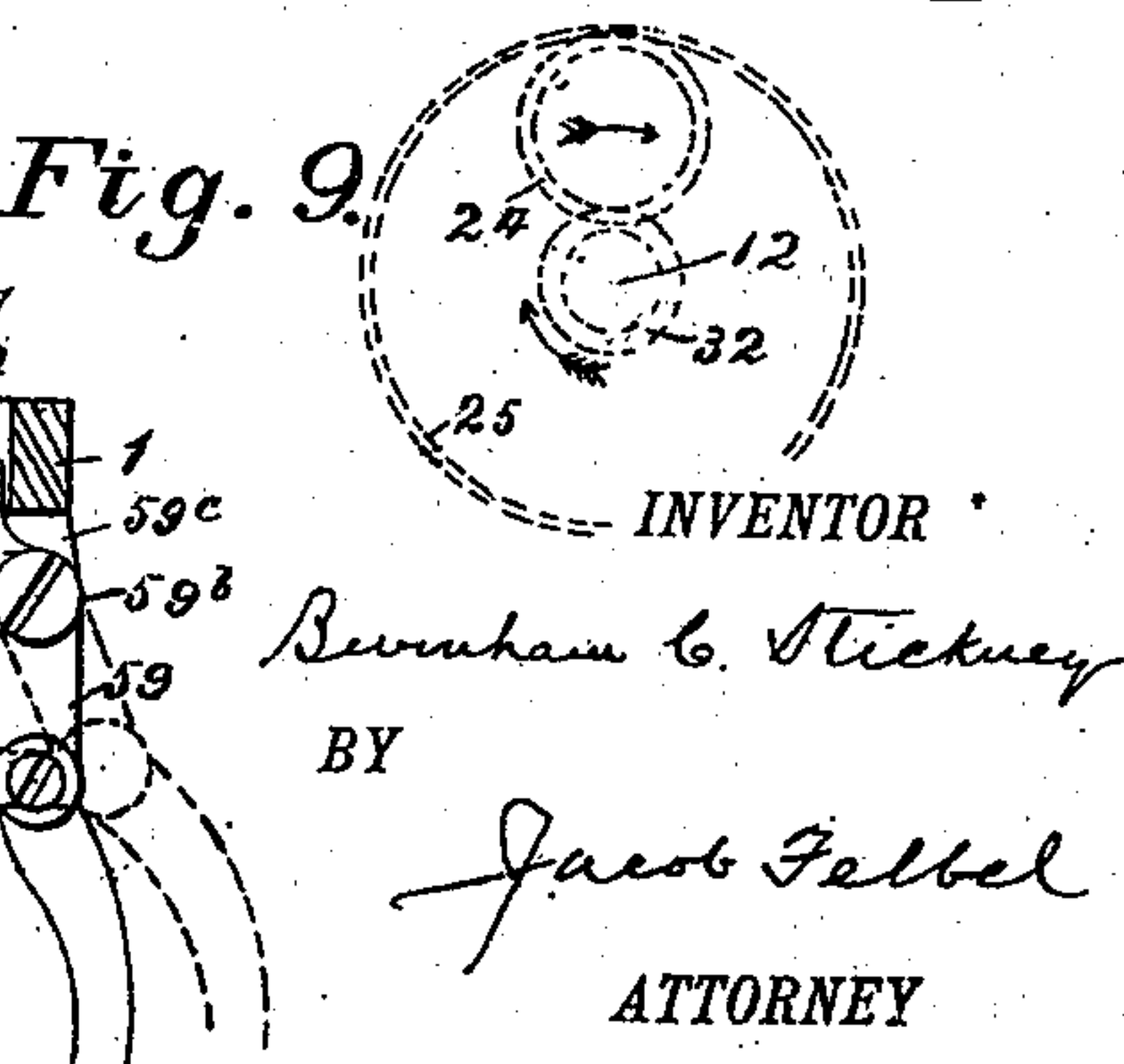
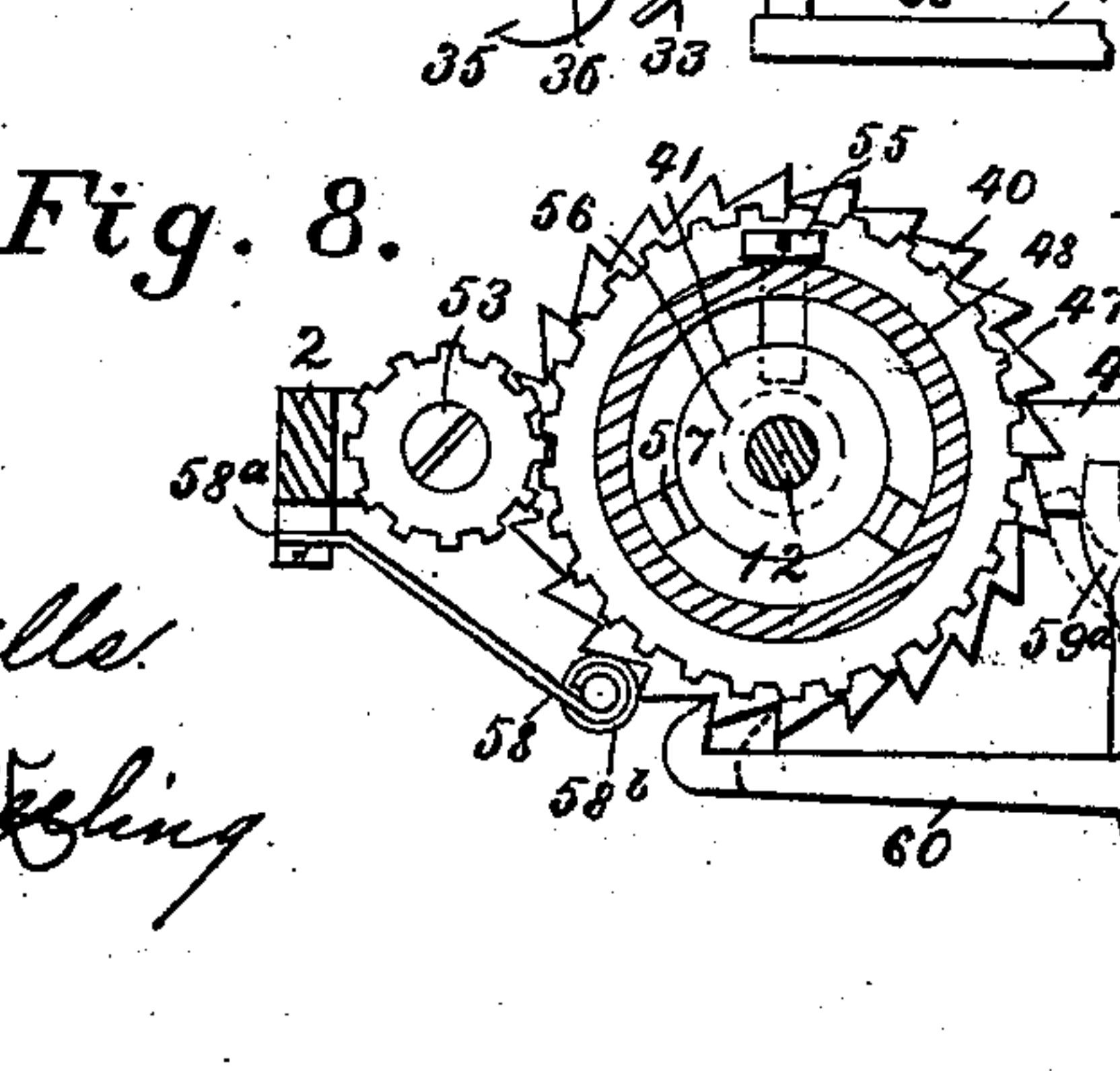
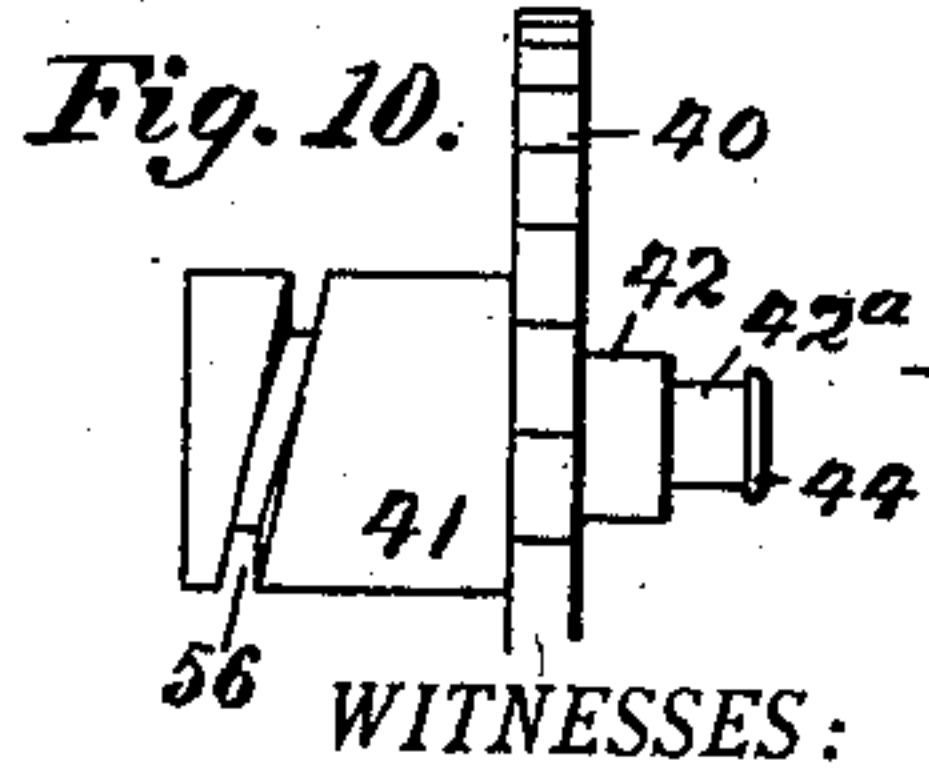
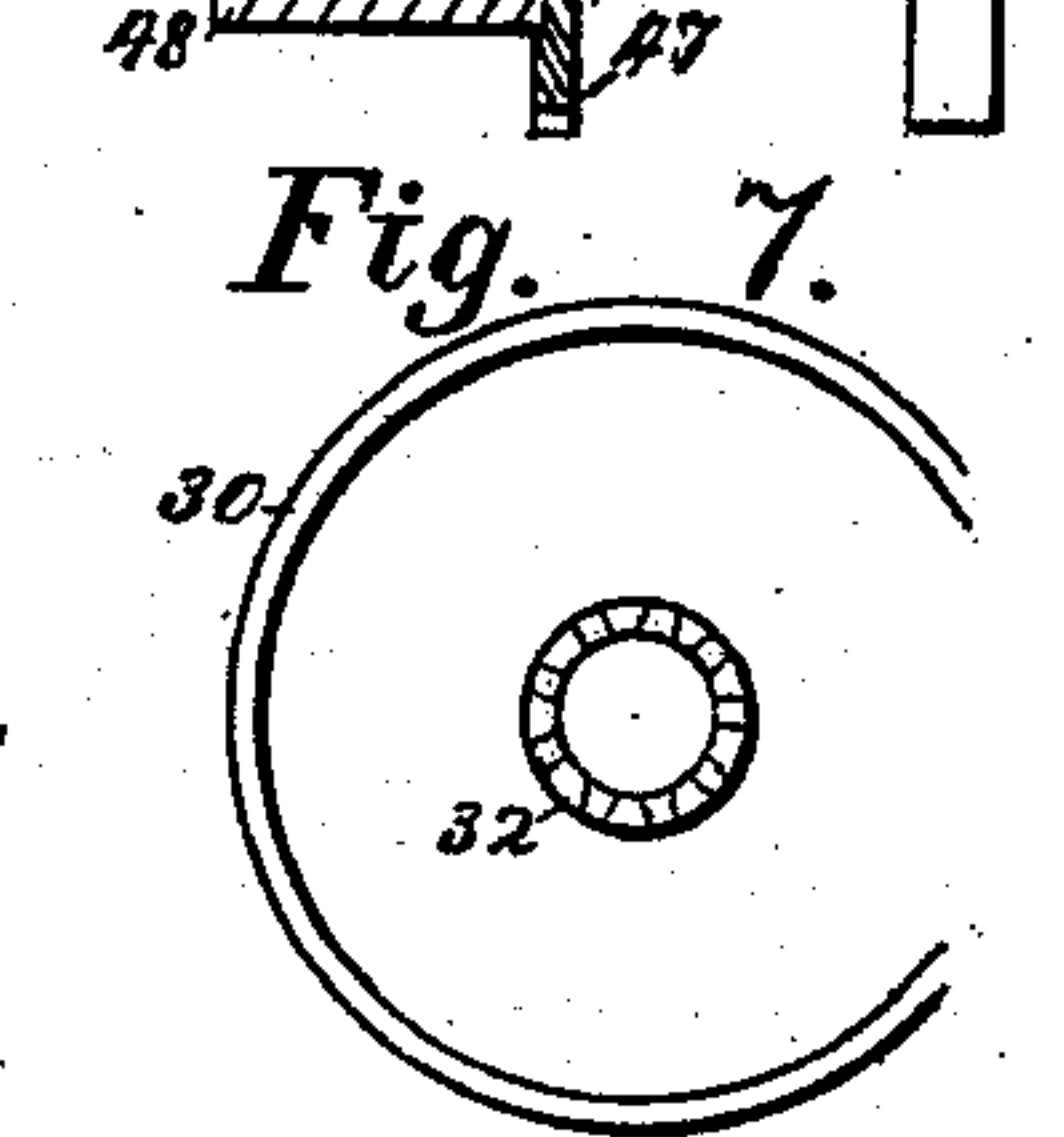
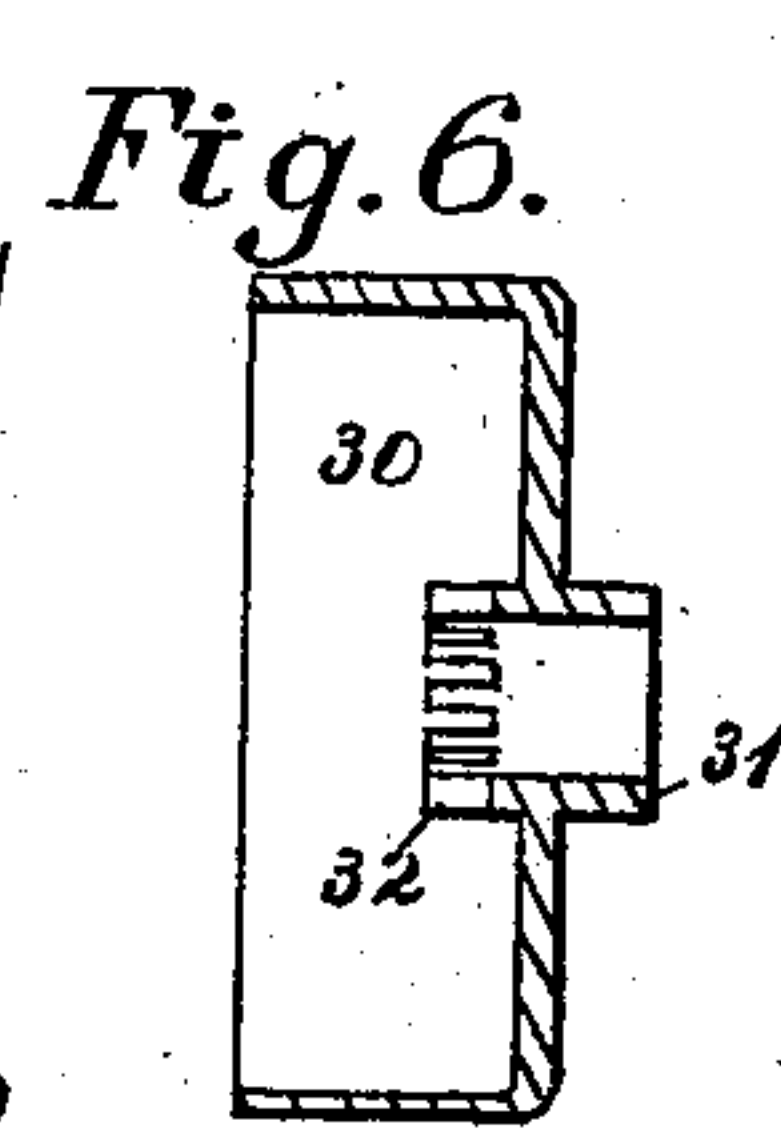
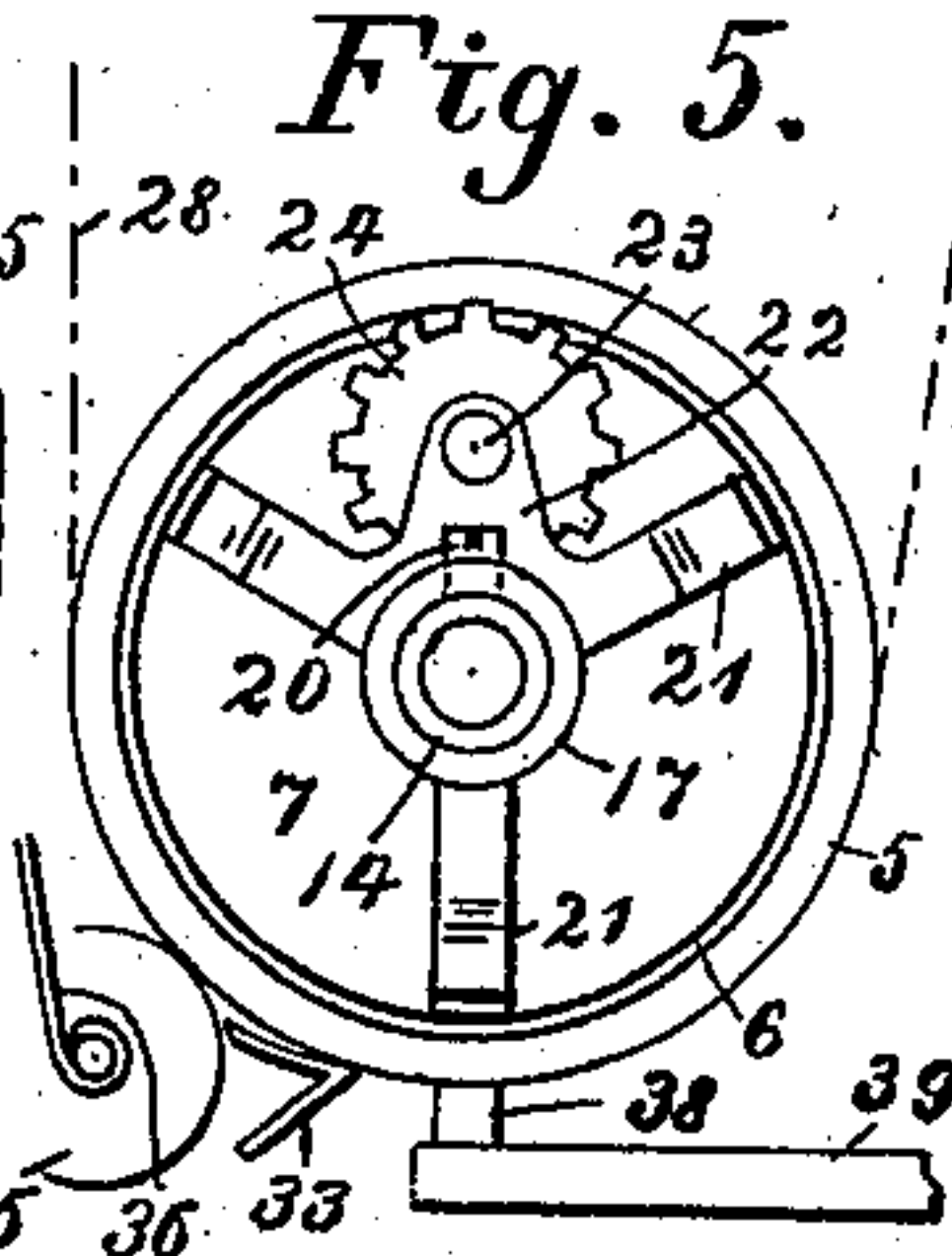
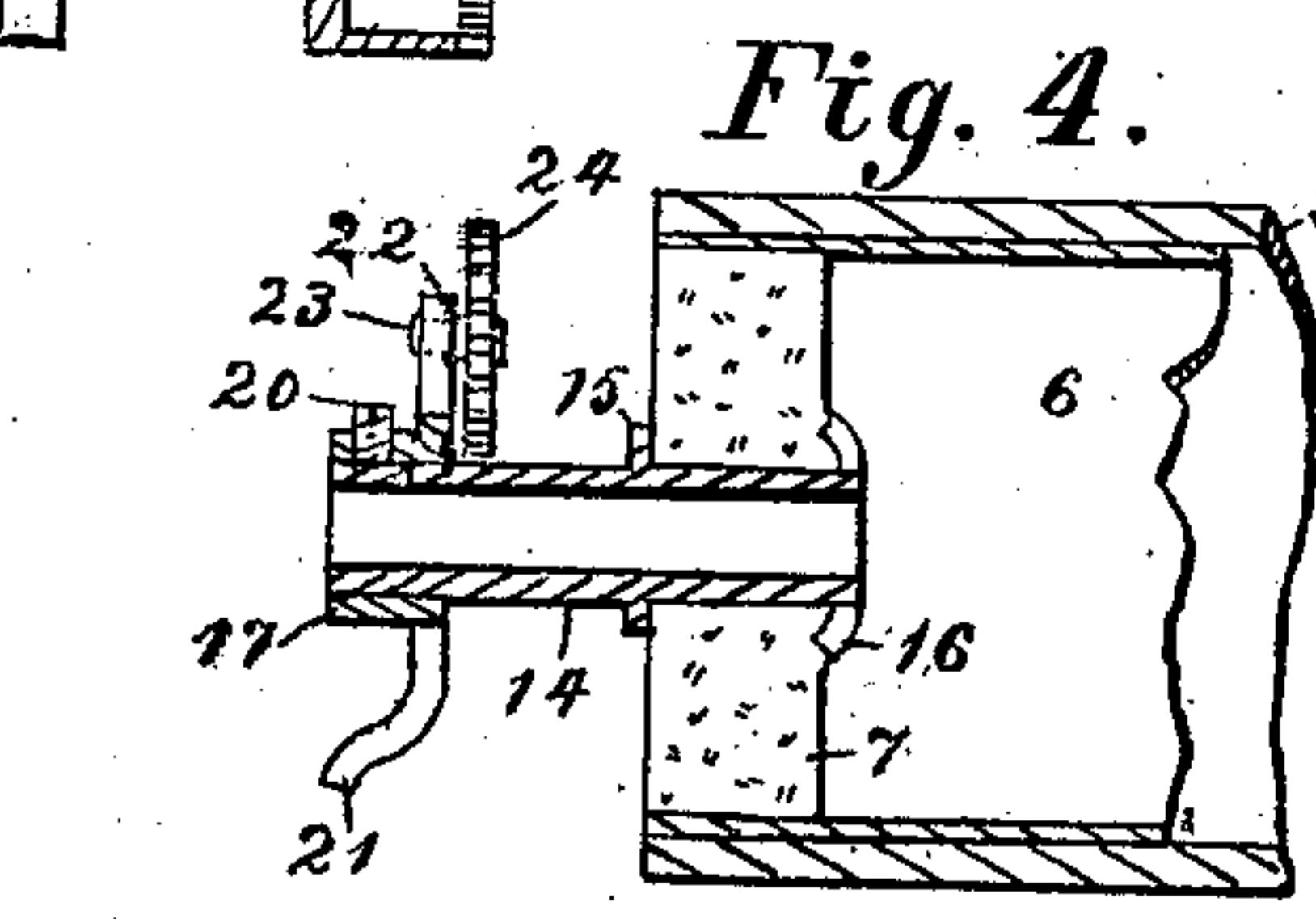
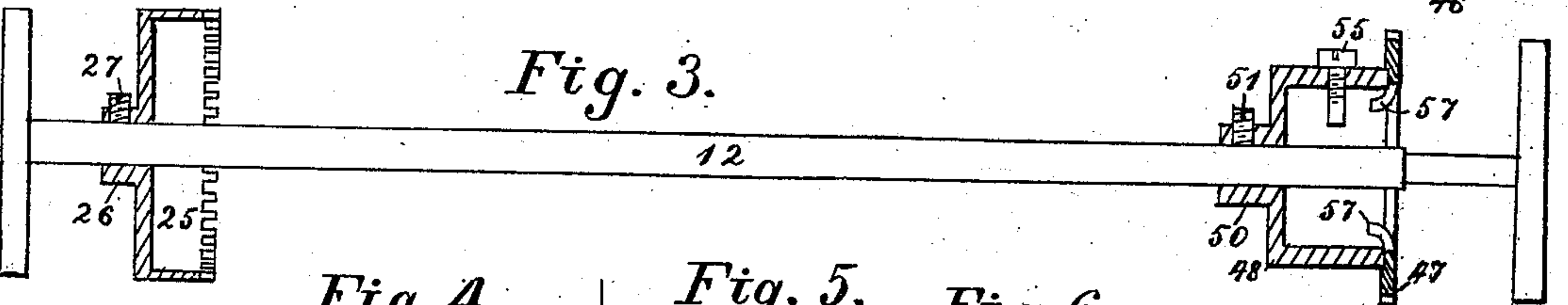
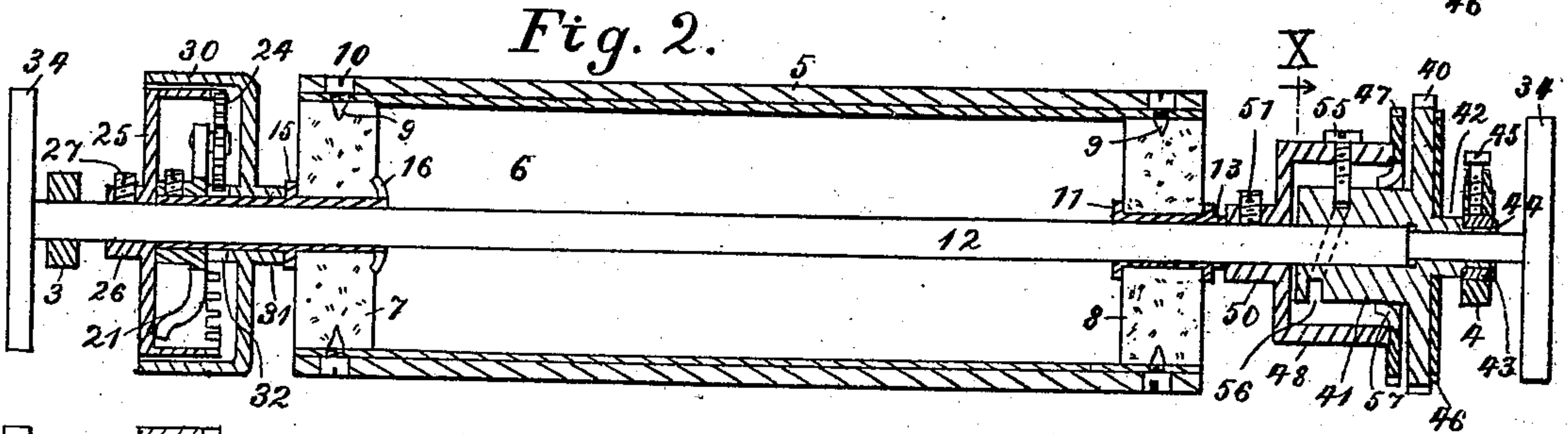
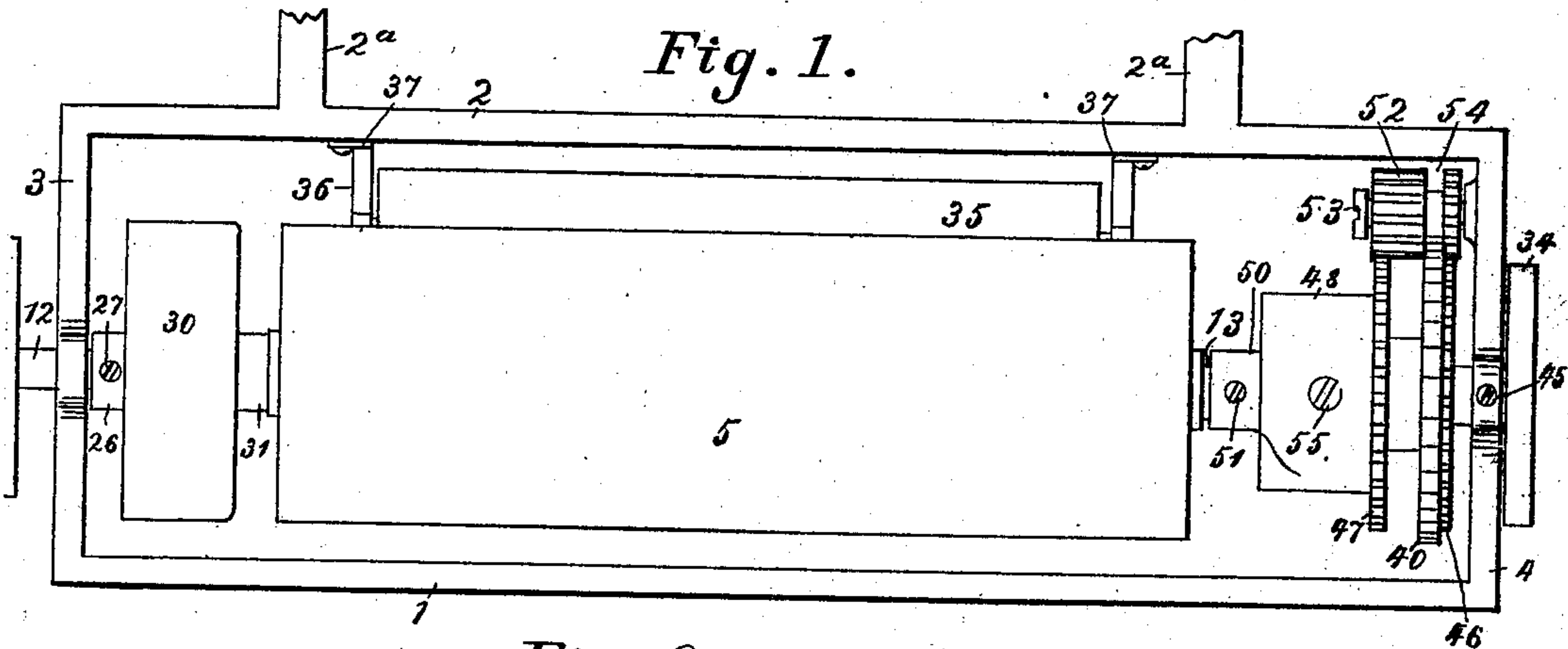


No. 698,151.

Patented Apr. 22, 1902.

B. C. STICKNEY.
TYPE WRITING MACHINE.
(Application filed Sept. 28, 1899.)

(No Model.)



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TYPE-WRITING MACHINE.

SPECIFICATION forming part of Letters Patent No. 698,151, dated April 22, 1902.

Application filed September 28, 1899. Serial No. 731,941. (No model.)

To all whom it may concern:

Be it known that I, BURNHAM C. STICKNEY, a citizen of the United States, and a resident of Elizabeth, in the county of Union and State of New Jersey, have invented certain new and useful Improvements in Type-Writing Machines, of which the following is a specification.

My invention relates to cylindrical platens of type-writing machines. One part thereof has for its main object to provide an improved and simplified construction for mechanically or automatically subjecting the entire printing-field of the platen to the hammering action of the types, and thereby preventing indentation or corrugation thereof. Another part has for its main object to provide improved means for adjusting the platen and the paper thereon circumferentially independently of the line-space ratchet-wheel, such adjustment being effected in either direction by mere rotation of a thumb-wheel without the necessity of previous disengagement of the platen from the line-space wheel, and another part of my invention has for its main object to provide improved sound-deadening means.

A further object is to combine in one organism the several features of invention above referred to.

My invention consists in the various features of construction and combinations of devices hereinafter more fully described, and particularly pointed out in the appended claims.

In the accompanying drawings, forming part of this specification and illustrating one way of carrying out my improvements, Figure 1 is a plan of so much of a platen-frame and its appurtenances as is necessary to exhibit my improvements, the platen and the platen-shaft being shown at one extreme of their endwise reciprocation within the platen-frame. Fig. 2 is a central vertical section of the devices shown at Fig. 1, but showing the platen and platen-shaft at the opposite extreme of their endwise reciprocation. Fig. 3 is a front vertical section of a portion of the mechanism shown in the previous views and comprising the platen-shaft and such other parts as are rigidly secured thereto. Fig. 4 is a similar

fragmentary view of the left-hand portion of the platen, showing the parts that are firmly secured thereto. Fig. 5 is an end view of Fig. 4 and also shows diagrammatically side elevations of the pressure-roller, platen-scale, and type-bar, the type being shown in contact with the platen or the paper thereon. Figs. 6 and 7 are respectively sectional and side elevations of a thumb-wheel used for adjusting the platen at will independently of the line-space wheel. Fig. 8 is a vertical cross-section of the right-hand end of the platen-frame and its appurtenances, taken on the plane represented by the line X at Fig. 2, but showing additionally a platen-actuating lever and pawl, a platen-stop, and a spring-pressed detent or check-roller. Fig. 9 is a diagram illustrative of the action of the gearing employed to adjust the platen independently of the line-space wheel. Fig. 10 is an elevation of the line-space wheel and parts integral therewith.

In the various views similar numerals of reference will be used to designate similar parts.

1 and 2 are respectively the front and rear bars, and 3 and 4 the end bars, of an oblong platen-frame, which it is customary to hinge by means of rearwardly-projecting arms 2^a. It is also usual to provide a letter-spacing rack, a front guide-rail, a carriage-propelling spring, &c.; but as these are well known and unessential herein I have omitted them from the several views for the sake of simplifying the case.

The usual cylindrical rubber platen or platen cover or sheath 5 is fitted closely over a metallic shell, tube, or core 6, the ends of which are plugged by bushings 7 8 of soft rubber or other suitable muffling material. The plugs may be secured by means of screws 10, engaging threaded holes in the shell 6, their heads flush with the surface of the platen and their inner ends provided with points 9, which are forced into the plugs. In order to provide a suitable bearing, the right-hand plug 8 has a central perforation and a flanged bushing 11 is inserted therein, and the bushing is mounted so as to turn freely upon a platen-shaft 12. The outer termination of the bushing is provided with a positioning-boss 13. The left-hand plug 7 is likewise perforated and provided with a bushing which

is elongated outwardly at 14, making a sleeve, also adapted to turn upon the shaft 12. In order to prevent the plug 7 and the platen from turning relatively to the sleeve 14, the latter is provided with an outer flange 15 and at its inner end with bent radial fingers 16, which are forced into the rubber and compress it against the flange 15. Rotary movements are imparted to the platen through the sleeve 14, as will presently be explained. The rubber plugs should be of such consistency and thickness as to afford a firm support for the platen-body (comprising the tube 6 and sheath 5) and effectively insulate it from the shaft 12, so that the vibrations set up by the impact of the types upon the platen cannot be communicated through said shaft to the other metallic parts of the carriage.

To the platen-actuating sleeve 14 is secured at its outer end a hub 17 by means of a set-screw 20. Formed integrally with the hub 17 is a brake composed of three bent radial friction-fingers 21. The hub 17 is also provided with a radial arm 22, having a stud 23, upon which is mounted a pinion 24, whose axis is parallel with the platen-axis and whose movement is such that it may be termed a "planet-wheel"—that is, it rotates simultaneously about the axes 23 and 12. The friction-fingers and planet-wheel are confined within a cup-like or crown wheel 25, provided with a hub 26, which is rigidly secured to the platen-shaft 12 by a set-screw 27. The teeth of the internally-arranged planet-wheel 24 mesh with the teeth of the crown-wheel 25, Figs. 2 and 9, which is in turn housed within a reversely cup-shaped shell 30, the rim of which may be knurled or otherwise made suitable for manipulation. The shell or thumb wheel 30 is provided with a hub 31, which projects from both sides of the vertical wall of the shell and fits loosely upon the sleeve 14. The portion of the hub 31 which projects within the cup is provided with edge or crown teeth 32, which mesh with the teeth of the planet-wheel 24. The portion of the hub 31 which projects toward the platen serves as a boss to position the wheel 30 with reference to the flange 15 on the sleeve 14, and since the ends of the teeth 32 contact with hub 17 lateral motion of the thumb-wheel 30 is prevented. As usual, thumb-wheels 34 are fixed one to each end of the shaft 12. The customary platen-scale 33 and pressure-roller 35 are arranged below the platen in rear of the printing-point, as indicated at Fig. 5, the pressure-roller being provided with trunnions, each of which is journaled in an eye formed on the lower end of a spring-arm 36, secured at 37 to the rear bar 2 of the platen-frame, whereby the roller is pressed against the platen or the paper thereon and caused to rotate therewith. A type 38, secured upon the free end of a type-bar 39, is indicated at Fig. 5 as in contact with the platen or the paper 28 thereon.

The line-space ratchet-wheel is designated as 40 and is provided on the side adjoining

the platen with a hub 41. On the side away from the platen it is provided with a tubular extension or boss 42, the end whereof is reduced at 42^a, Fig. 10, to receive a collar or bushing 43, the extremity of the boss 42 being spun or bent over at 44 to permanently confine the bushing 43, but not being fitted so tightly as to prevent the free rotation of the line-space wheel. The right-hand bar 4 of the platen-frame is perforated to receive the bushing 43 and is also provided with a set-screw 45 to prevent any movement of the bushing. The shouldered or unreduced portion of the boss 42 bears against the bushing 43 and prevents movement of the line-space wheel laterally in one direction, and the spun portion or cap 44 contacts with the outer edge of the bushing and prevents lateral movement of the wheel in the opposite direction. The hub of the line-space wheel is bored to receive the platen-shaft 12. The right-hand portions of the bore and shaft are preferably of reduced diameter, so as to permit the use of a small bore in the bushing 43, thereby minimizing the friction at this bearing, which receives practically the full pressure of the usual line-space check-spring. The platen-shaft is constructed to turn within the line space-wheel hub and affords a partial bearing for the latter. Secured upon the outer side of the line-space wheel is a spur-wheel 46, whose diameter may be nearly as great as that of the line-space wheel, but not so great that there would be danger of the usual line-space pawl engaging therewith.

As more clearly shown at Fig. 3, a short tubular device, shell, or drum 48, closed at one end, is rigidly secured upon the platen-shaft 12 between the line-space wheel and the platen by means of a hub 50 at the closed end of the drum and a set-screw 51, passing through the hub and engaging the shaft. The open side of the drum is adjacent to the line-space wheel. Fast to the drum at its open extremity is a second spur-wheel 47 of preferably the same diameter as the spur-wheel 46, these spur-wheels being similar in all respects except as to the number of teeth, there being preferably one more tooth in one of the wheels than in the other and the teeth of each wheel, considered by itself, being evenly spaced. Arranged directly in rear of and in mesh with both of these spur-wheels is a barrel pinion or wheel 52, mounted upon a shoulder-screw 53, suitably secured in the end bar 4 of the platen-frame. The diameter of the line-space wheel 40 being greater than that of the spur-wheels, a clearance-groove 54 is cut in the periphery of the pinion 52 opposite the line-space wheel. Because of the described connection of the unequally-toothed wheels 46 and 47 they cannot rotate at equal speed, and as the wheel 46 is rigidly secured to the line-space wheel the wheel 47 must rotate either faster or slower than the line-space wheel—that is, it must creep relatively there-

to. The movement of wheel 47 is imparted to the platen through drum 48, shaft 12, wheel 25, brake 21, sleeve 14, and plug 7. Hence the platen must creep relatively to the line-space wheel.

An endless peripheral groove 56 is cut diagonally in the large hub 41 of the line-space wheel. A stud-screw 55, seated in the periphery of the drum 48 and projecting inwardly, engages the groove, and owing to such engagement the rotation or creeping of the wheel 47 and the drum 48 relatively to the line-space wheel 40 is accompanied by a short endwise or axial reciprocatory movement of the drum, the shaft 12, and its appurtenances, including the platen. The extent of the endwise movement of the platen, effected automatically by the cam 56, is preferably about one-tenth of an inch. To prevent any shake or play of the shaft and platen relatively to the line-space wheel, curved spring-fingers 57 are provided upon the spur-wheel 47 for frictionally engaging the periphery of the hub 41. The boss 13 at one end of the platen touches the hub 50, and at the other end of the platen the outer extremity of the sleeve 14 touches the inner face of the crown-wheel 25, which is also rigidly secured to the shaft, so that accidental endwise movement of the platen is prevented. The left-hand bar 3 of the platen-frame is bored, as usual, to receive the platen-shaft, and the latter slides endwise in this bearing, as well as in the bore of the laterally-fixed line-space wheel 40.

Any suitable line-space lever 59 may be provided, pivoted at 59^b to a depending hub 59^c on the platen-frame and having a suitable pawl 60 to engage and rotate the line-space wheel and having also an integral stop 59^a to arrest the line-space wheel, as indicated in dotted lines in Fig. 8, so as to prevent overthrow thereof. A detent or check-spring 58, secured to the platen-frame at 58^a, is provided with an antifriction-wheel 58^b, which engages the platen-ratchet and rides over the teeth thereof in the usual manner.

The parts just described are omitted from the other views for the sake of clearness, and it is understood that they may be of any usual or suitable construction.

At the line-spacing operation the line-space wheel 40 is rotated step by step through aliquot parts of a revolution. The spur-wheel 46, secured to the line-space wheel, also moves through aliquot parts of a revolution; but the platen spur-wheel 47, having one tooth more or one tooth less than the wheel 46, necessarily moves through aliquant parts of a revolution. Assuming that there are sixty-one teeth in wheel 46 and sixty teeth in wheel 47, the platen turns through three hundred and sixty-six degrees while the line-space wheel makes one complete revolution of three hundred and sixty degrees, and during sixty revolutions of the latter the platen revolves sixty-one times. Assuming the circumference of

the platen to be six inches and that the line-space wheel has thirty teeth, at every thirty-first line the writing falls upon the platen at a point one-tenth of an inch in advance of the impressions made thereon at its preceding revolution. Hence at each complete revolution of the line-space wheel any given point upon the platen moves through 6.1 inches, or, in other words, thirty lines of writing occupy 6.1 inches. The line-space distance or interval is therefore $.2\frac{1}{3}$ of an inch, which is an aliquant part of six inches or the entire circumference of the platen. At each line-space movement the platen revolves through one-thirtieth of the said three hundred and sixty-six degrees or 12.2 degrees, which is an aliquant part of a complete platen revolution or three hundred and sixty degrees. Hence, as set forth in my pending application, No. 606,609, filed September 22, 1896, the blows of the types do not fall upon exactly the same portion of the platen at successive revolutions thereof, and therefore impressions made by the types instead of being deepened, as heretofore, by successive impressions at successive revolutions of the platen are partly or wholly obliterated as the new impressions overlap the old, and the printing-surface of the platen is preserved intact, so that impressions of the types upon the paper are as clear and even after a long use of the machine as when the machine is new. Indeed, I have found in practice that after a prolonged test of the platen no perceptible indentations or depressions appear upon the surface thereof, and it looks as smooth and even as when first put into use. If the teeth on 47 exceed in number those on 46, the platen revolves more slowly than the line-space wheel. In the ordinary operation of the machine the platen and line-space wheel and their connections revolve together at nearly equal speed. By reason of the described axial or endwise movement of the drum 48 relatively to the hub 41, which causes a gradual endwise reciprocatory movement of the platen relatively to the platen-frame, the entire printing-field of the platen, considered endwise as well as circumferentially, is subjected uniformly to the impact of the types. The main purpose of having the platen move endwise is to avoid cutting grooves or making circular indentations around the platen by the use of sharp or pointed types, such as the period and comma; but if this effect upon the platen be not considered material or if it be desired not to avoid it the endwise movement of the platen may be eliminated without impairing or detracting in the least from the other feature that I have mentioned relating to the means for causing the platen either to gain or lose relatively to the ratchet-wheel, so as to cause successive lines of type impressions to come closer together than they otherwise would where the platen and the line-space wheel turn always through equal distances.

At the operation by means of the finger-

wheel 30 of the above-described paper-adjusting mechanism the crown-wheel 25, the shaft 12, and the line-space wheel connected thereto remain stationary. The thumb-wheel 30 is grasped by the operator and rotated in the direction in which it is desired to move the paper. The teeth 32 of the thumb-wheel cause the planet-wheel 24 to turn upon the axis 23, and by reason of its engagement with the motionless crown-wheel 25 the planet-wheel is caused to run around within said crown-wheel or about the axis 12, whereby the arm 22 and its appurtenances, including the platen, are also rotated about said axis 12, effecting the desired movement of the paper independently of the line-space wheel, which is held stationary by the check 58. The movement will be understood by reference to Fig. 9, in which the arrows show the rotary movement of the pinion 32 and the orbital movement of the planet-wheel 24 about the axis 12. The line of writing is thus brought even with the platen-scale 33, whereupon the platen may be grasped and turned one or two notches of the line-space wheel until the line of writing is directly over the printing-center, or the thumb-wheels 34 may be manipulated for this purpose. It is the practice in some writing-machines to first disconnect the platen from the line-space wheel and then rotate the platen independently to effect the adjustment of the paper thereon; but by the herein-described construction no disconnection is made and nothing needs to be touched except the thumb-wheel 30, and that needs merely to be rotated, so that the movement of the paper is effected instantly. Moreover, owing to the great difference between the speed of rotation of the thumb-wheel 30 and that of the platen a nice adjustment may be easily made. The rotation of the line-space ratchet-wheel permits only certain portions or certain lines on the paper, corresponding to the line-space notches on the ratchet-wheel, to be brought into alinement with the platen-scale and to the printing-point; but by turning the wheel 30 any desired portion of the paper or any line thereon may be brought into such alinement instantly. The brake 21 should press with such force upon the vertical wall of the crown-wheel 25 that at the rapid operation of the line-space lever it will be impossible for the platen to overthrow or turn independently of the crown-wheel 25 and the line-space wheel. Hence the frictional opposition to the movement of the platen caused by the brake 21 should be considerably in excess of the weak opposition usually afforded by the check 58 to the rotation of the line-space wheel. On the other hand, it is desirable that the movement of thumb-wheel 30 when overcoming the strong opposition of brake 21 shall not be communicated to the line-space wheel. In other words, the thumb-wheel 30 should be more easily rotated than the platen itself. To this end the central pinion 32 is of smaller diameter than the planetary wheel 24, and the latter is smaller

than the crown-wheel 25, the proportions being such that it requires about four revolutions of the wheel 30 to effect one revolution of the platen. The tendency of the wheel 30 to turn the platen-shaft 12 is therefore only about one-fourth as great as its tendency to turn the platen upon the platen-shaft. Hence if the frictional opposition caused by the brake 21 is, say, only three times as great as the opposition offered by the check 58 to the rotation of shaft 12 the platen will turn upon the shaft, while the line-space wheel is held motionless by the check. The proportion of the wheels 24, 25, and 32 may, however, be varied. If desired, the brake 21 may be so strengthened that the platen cannot be rotated independently by thumb-wheel 30 unless the shaft 12 is held stationary by means of a thumb-wheel 34.

The fingers 21 may be termed a "master-brake," since their control of the platen is so far superior to that of the line-space check-spring that the platen itself may be grasped to rotate it and all its appurtenances, inclusive of the line-space wheel.

It is not essential in carrying out my invention in all its forms that the brake 21 be the sole medium of communicating movement from the line-space wheel to the platen, as one of the main functions of the brake is to prevent backlash of the platen and obviate irregularity in the line of writing, which would otherwise occur through play in the joints and gear-teeth.

It will be noted that both the automatic platen-creeping and the manual paper-adjusting mechanisms are positively connected to the platen by a sound-muffling construction, that the platen-creeping devices are connected to the paper-adjusting devices by means of a shaft passing through the platen, the latter being located between the two sets of devices and adapted to turn on the shaft.

My invention, considered either as a whole or in its several portions, may be carried out in numerous ways. Hence it is not my intention to limit the same to the precise details of construction illustrated. For instance, it is not essential that the wheels 40 and 46 be made separately or provided with different kinds of teeth so long as by means of a pinion or equivalent connection therewith the wheel 47 is caused to rotate at a different speed from wheel 40. It is not essential that wheel 40 be arranged between wheels 47 and 46 or that wheel 40 operate the platen by means of a shaft. So long as thumb-wheel 30 causes the platen to rotate relatively to the line-space wheel it is not essential that it be arranged concentrically with the platen or confined between the end bars of the platen-frame, or that toothed wheels be used, or that the exact chain of gearing set forth be employed, or that the planet-wheel axis be parallel to the axes of the other wheels, and many other changes may be made within the scope of my invention.

Certain features of my improvements may be used without others, and hence I do not wish to be limited to a machine embodying them all.

5 When using the term "platen creeping" I refer to the rotation of the platen during the line-spacing operation at a different speed, and hence through a different arc from that traversed by the line-space wheel.

10 What I claim as new, and desire to secure by Letters Patent, is—

1. In a type-writing machine, the combination of a line-space wheel, a check therefor, a cylindrical platen rotatable independently of
15 the line-space wheel, a brake constructed to prevent backlash between the platen and the line-space wheel, a main paper-feed roller bearing against the platen, and a thumb-wheel, as 30, provided with means for turning both the platen and the said main feed-roller independently of the line-space wheel, without releasing said brake against the opposi-
20 tion thereof, the rotation of the platen being in the same direction as the rotation of said thumb-wheel.
25

2. In a type-writing machine, the combination of a line-space ratchet-wheel, a spring-check constructed to ride over the teeth thereof, a cylindrical platen rotatable inde-
30 pendently of the line-space wheel, a master-brake arranged between the line-space wheel and the platen, whereby either the line-space wheel may be actuated by the platen or the platen may be actuated by the line-space
35 wheel, and a thumb-wheel, as 30, provided with means for turning the platen relatively to the line-space wheel, without releasing said master-brake and against the opposition thereof, and without turning the line-space
40 wheel.

3. In a type-writing machine, the combination of a line-space wheel, a check therefor, a cylindrical platen rotatable independently of the line-space wheel, a brake constructed to
45 prevent backlash between the platen and the line-space wheel, and a thumb-wheel, as 30, arranged concentrically with the platen and provided with means for turning the platen relatively to the line-space wheel without re-
50 leasing said brake and against the opposition thereof, said thumb-wheel 30 being constructed to turn during such operation in the same direction as the platen, but at greater speed.

4. In a type-writing machine, the combination of a platen-frame, a shaft mounted there-
55 in, a cylindrical platen and a line-space wheel mounted upon said shaft, a thumb-wheel, as 34, fixed upon the shaft, said platen being rotatable independently of the line-space
60 wheel, a brake constructed to prevent backlash between the platen and the line-space wheel, and a thumb-wheel, as 30, also mounted upon the shaft and rotatable relatively to the platen and provided with means for turn-
65 ing the platen relatively to the line-space wheel without releasing said brake and against the opposition thereof, the rotation of

the platen being in the same direction as the rotation of said thumb-wheel.

5. In a type-writing machine, the combina- 70
tion of a line-space wheel, a cylindrical platen, a shaft therefor, an axially-arranged platen-sleeve mounted to rotate upon the shaft, means for connecting the line-space wheel to the shaft, a planet-wheel arranged upon said
75 sleeve, a wheel fixed upon said shaft and meshing with said planet-wheel, and a manually-operated wheel engaging said planet-wheel.

6. In a type-writing machine, the combina- 80
tion of a line-space wheel, a cylindrical platen, a shaft therefor, an axially-arranged platen-sleeve mounted to rotate upon the shaft, means for connecting the line-space wheel to the shaft, a planet-wheel arranged upon said
85 sleeve, a wheel secured upon said shaft and meshing with said planet-wheel, a manually-operated wheel engaging said planet-wheel, and a brake for opposing the rotation of said sleeve upon said shaft.
90

7. In a type-writing machine, the combina-
tion of a line-space wheel, a check therefor, a cylindrical platen, an intermediately-ar-
95 ranged differential gearing for turning the platen with reference to the line-space wheel, a brake constructed to prevent backlash between the platen and the line-space wheel, and a thumb-wheel, as 30, operatively connected to said differential gearing.

8. In a type-writing machine, the combina- 100
tion of a line-space wheel, a check therefor, a cylindrical platen, a train of three wheels operatively connected to the line-space wheel and the platen and constructed to vary the
105 relative circumferential positions of the line-space wheel and the platen, a brake constructed to prevent backlash between the platen and the line-space wheel, and a thumb-wheel, as 30, for operating said train without
110 releasing said brake and against the opposi- tion thereof.

9. In a type-writing machine, the combina-
tion of a line-space wheel, a cylindrical platen, a train of three wheels for rotating the platen
115 without moving the line-space wheel, and a thumb-wheel, as 30, for operating said train.

10. In a type-writing machine, the combina-
tion of a line-space wheel, a check-spring therefor, a cylindrical platen, a train of three
120 wheels arranged intermediate the line-space wheel and the platen, one wheel of said train of three wheels being a planet-wheel and meshing with both of the other wheels in said train, and a thumb-wheel, as 30, for operating
125 said train, the construction and arrangement being such that during the operation of thumb-wheel 30, the line-space wheel remains stationary.

11. In a type-writing machine, the combina-
tion of a cylindrical platen connected with 130
a wheel, as 24, a line-space wheel connected with a wheel, as 25, which engages said platen-wheel; and a manually-operated wheel, as 32, which also engages said platen-wheel.

12. In a type-writing machine, the combination of a platen, a gear-wheel as 24 connected thereto, a line-space wheel, a gear-wheel as 25 connected to said line-space wheel and in mesh with said wheel 24, and a manually-actuated wheel as 32 also in mesh with said wheel 24.

13. In a type-writing machine, the combination of a cylindrical platen, a line-space wheel, a check therefor, a planet-wheel, as 24, means for connecting said planet-wheel to the platen, a wheel, as 25, connecting said planet-wheel to the line-space wheel, a brake constructed to prevent backlash between the platen and the line-space wheel, and a thumb-wheel, as 30, constructed to cause a movement of the planet-wheel relatively to the line-space wheel without releasing said brake and against the opposition thereof, so as to vary the relative circumferential positions of the platen and line-space wheel.

14. In a type-writing machine, the combination of a cylindrical platen connected with a planet-wheel, as 24, a line-space wheel connected with a wheel, as 25, of larger diameter than the planet-wheel and in engagement therewith, and a manually-operated centrally-arranged wheel, as 32, engaging the planet-wheel and constructed to rotate the latter and cause it to swing around the platen-axis in consequence of its said engagement with the wheel 25.

15. In a type-writing machine, as a means for adjusting the paper, the combination of a cylindrical platen, a concentric line-space wheel, and a train of three gear-wheels having axes parallel with the platen-axis and constructed to rotate the platen relatively to the line-space wheel.

16. In a type-writing machine, as a means for adjusting the paper, the combination of a cylindrical platen, a concentric line-space wheel, a train of three gear-wheels having axes parallel with the platen-axis and constructed to turn the platen relatively to the line-space wheel, and a thumb-wheel secured to one of said gear-wheels.

17. In a type-writing machine, as a means for adjusting the paper, the combination of a cylindrical platen, a concentric line-space wheel, a train of gear-wheels having axes parallel with the platen-axis and constructed to turn the platen relatively to the line-space wheel, and a thumb-wheel secured to one of said gear-wheels, the rotation of the platen being in the same direction as the rotation of said thumb-wheel.

18. In a type-writing machine, as a means for adjusting the paper, while the line-space wheel is stationary, the combination of a cylindrical platen connected with a toothed wheel, a line-space wheel connected with a toothed wheel, a third toothed wheel constructed to cause a movement of the platen toothed wheel relatively to the line-space toothed wheel, and a thumb-wheel for actuating the said third toothed wheel, the rota-

tion of the platen being in the same direction as the rotation of said thumb-wheel.

19. In a type-writing machine, the combination of a line-space wheel connected with a toothed wheel, a cylindrical platen connected with a planet-wheel in mesh with said toothed wheel, a centrally-arranged pinion arranged in mesh with said planet-wheel, and a thumb-wheel for operating the said centrally-arranged pinion.

20. In a type-writing machine, the combination of a line-space wheel connected with a crown gear-wheel, a cylindrical platen connected with a planet-wheel arranged within said crown-wheel and in mesh with the teeth thereof, a centrally-arranged pinion in mesh with the teeth of the planet-wheel, and a thumb-wheel for operating the pinion.

21. In a type-writing machine, the combination with a cylindrical platen, of a concentric actuator 14, a planet-wheel 24 secured thereto, a crown-wheel 25 inclosing said planet-wheel and in mesh therewith and suitably connected to a line-space wheel, and a drum 30 inclosing the crown-wheel and provided with a central pinion 32 in mesh with the planet-wheel 24.

22. The combination of two centrally-arranged toothed wheels of substantially equal diameters, one wheel having more teeth than the other and the teeth in each wheel being evenly spaced, and a pinion constructed to be rotated by one of the wheels and also arranged in mesh with the other wheel, so that upon the rotation of either of said concentric wheels the other thereof is caused to rotate at a different angular speed.

23. The combination of two concentrically-arranged wheels, a relatively fixed pinion in engagement with both wheels and constructed to be rotated by one thereof, and to cause the other thereof to rotate at a different angular speed, and means called into action at the relative rotation of said concentrically-arranged wheels for causing them to have a relative lateral movement.

24. In a type-writing machine, the combination of a platen-frame, a line-space wheel, a platen mounted concentrically with said line-space wheel, and a rotary device mounted upon the platen-frame and connected to the line-space wheel and to the platen, and constructed to produce automatically a variation in the relative circumferential positions of the platen and the line-space wheel.

25. In a type-writing machine, the combination of a platen-frame, a cylindrical platen, a line-space wheel mounted concentrically with said platen, and a train of wheels constructed to vary the relative circumferential positions of the line-space wheel and the platen, all of said platen, line-space wheel and train of wheels having parallel axes.

26. In a type-writing machine, the combination of a platen-frame, a cylindrical platen, a line-space wheel mounted concentrically with said platen, and a train of three wheels,

one of said three wheels being mounted upon the platen-frame, constructed to vary the relative circumferential positions of the line-space wheel and the platen.

27. In a type-writing machine, the combination of a platen-frame, a platen, a line-space wheel, and a wheel operated by and arranged eccentrically of the line-space wheel and operatively connected to the platen, and constructed to cause the platen to turn through aliquant parts of a revolution at corresponding movements of the line-space wheel through aliquot parts of a revolution.

28. In a type-writing machine, the combination of a platen-frame, a cylindrical platen, a line-space wheel, a wheel operatively connected to the platen, all of said wheels and the platen being concentrically arranged, and a pinion as 52, mounted upon a relatively fixed axis and connecting the wheels so as to cause the platen-wheel and the platen to rotate at different speed from the line-space wheel.

29. In a type-writing machine, the combination of a platen-frame, a cylindrical platen, a line-space wheel, a toothed wheel secured thereto, a companion toothed wheel concentric therewith, and means for connecting the said toothed wheels in a manner to cause the platen to rotate at a speed unequal to that of the line-space wheel.

30. In a type-writing machine, the combination of a platen-frame, a cylindrical platen, a line-space wheel, a toothed wheel operatively secured to the platen, a companion toothed wheel secured to the line-space wheel, all of said wheels being concentric with the platen and the said toothed wheels being of substantially equal diameter and provided with unequal numbers of teeth, and a pinion mounted upon a relatively fixed axis and arranged in mesh with both said companion wheels, whereby the platen is caused to rotate at a speed unequal to that of the line-space wheel.

31. In a type-writing machine, the combination of a line-space wheel, a platen, a wheel, as 47, operatively connected to the platen, a pinion constructed to connect said wheel to the line-space wheel so to cause the platen to rotate at a different speed from that of the line-space wheel, and means for frictionally opposing the relative rotation of the platen and the line-space wheel.

32. In a type-writing machine, the combination of a platen-frame, a platen, a line-space wheel, a wheel operated by and arranged eccentrically of the line-space wheel and operatively connected to the platen, and constructed to cause the platen to turn through aliquant parts of a revolution at corresponding movements of the line-space wheel through aliquot parts of a revolution, and a frictional device arranged between the line-space wheel and the platen and constructed to oppose the movement of the platen-wheel and platen relatively to the line-space wheel.

33. In a type-writing machine, the combi-

nation of a platen-frame, a cylindrical platen, a line-space wheel, a toothed wheel secured thereto, a companion toothed wheel concentric therewith, means for connecting the said toothed wheels in a manner to cause the platen to rotate at a speed unequal to that of the line-space wheel, and automatically-operating means for reciprocating the platen endwise relatively to the platen-frame.

34. In a type-writing machine, the combination of a platen-frame, a cylindrical platen, a line-space wheel, a toothed wheel connected to the platen, a companion toothed wheel connected to the line-space wheel, all of said wheels being concentric with the platen and the said toothed wheels being of substantially equal diameter and provided with unequal numbers of teeth, a pinion arranged in mesh with both said companion wheels, so that the platen is caused to rotate at a speed unequal to that of the line-space wheel, and automatically-operating means for reciprocating the platen endwise relatively to the platen-frame.

35. In a type-writing machine, the combination of a platen-frame, a line-space wheel mounted therein, means for preventing lateral movement of the line-space wheel relatively to the platen-frame, a cam connected to the line-space wheel, a platen arranged concentrically with the line-space wheel and constructed to rotate relatively thereto, and means connected to the platen for engaging the cam so as to effect simultaneously an endwise reciprocation of the platen relatively to the line-space wheel.

36. In a type-writing machine, the combination of a platen-frame, a line-space wheel mounted therein and having a hub provided with a cam, means for preventing lateral movement of the line-space wheel relatively to the platen-frame, a platen arranged concentrically with the line-space wheel and constructed to rotate relatively thereto, a drum operatively connected to the platen and enclosing said cam-hub, and means arranged upon the drum for engaging the cam, so that during the relative rotation of the platen and line-space wheel the platen is reciprocated endwise within the platen-frame.

37. In a type-writing machine, the combination of a platen-frame, a line-space wheel mounted therein and having a cam, as 56, means for preventing lateral movement of the line-space wheel relatively to the platen-frame, a platen mounted in the platen-frame concentrically with the line-space wheel, a drum, as 48, operatively connected to the platen and concentric therewith and enclosing said cam, a wheel, as 47, secured to the open end of the drum and adjacent to the line-space wheel, a pinion, as 52, connecting the wheel 47 with the line-space wheel so as to cause variation in their angular speeds, and means arranged upon the drum for engaging the cam so as to reciprocate the platen endwise during the relative rotary movements of the platen and the line-space wheel.

38. In a type-writing machine, the combination of a platen-frame, a line-space wheel mounted therein and having a hub provided with a cam, means for preventing lateral movement of the line-space wheel relatively to the platen-frame, a shaft mounted in the platen-frame concentrically with the line-space wheel, a cylindrical platen mounted upon the shaft, a drum rigidly secured to the shaft and inclosing said hub and provided with means for engaging said cam, and means for automatically effecting a relative rotation of the platen-shaft and the line-space wheel.

39. In a type-writing machine, the combination of a platen-frame, a cylindrical platen, a rotary device mounted concentrically with the platen and provided with a peripheral cam-groove, a rotary tubular device mounted concentrically with and inclosing said cammed device, one of said devices being connected to the platen and the other thereof being fixed against endwise motion relatively to the platen-frame, and means for effecting automatically a relative rotation of the said devices.

40. In a type-writing machine, the combination of a platen-frame, a line-space wheel, a platen, means for imparting a relative rotary movement to the line-space wheel and platen, a cam secured to the line-space wheel, and means secured to the platen for engaging the cam, the construction and arrangement being such that upon relative rotation of the line-space wheel and platen the latter is moved endwise relatively to the platen-frame.

41. In a type-writing machine, the combination of a platen-frame, a rotary device, as 41, provided with a cam, a shell inclosing said cam device and provided with means for engaging the cam, whereby a relative lateral movement is caused by a relative rotary movement between the cam device and the shell, a platen-cover, as 5, suitably connected to one of said rotary devices, means for preventing lateral movement of the other of said rotary devices and means for imparting a relative rotary movement to said rotary devices.

42. In a type-writing machine, the combination with a platen-frame, of a platen-cover, as 5, a shell connected thereto, a line-space wheel, a cam fixed upon said line-space wheel and arranged within said shell, and means operated by said cam and connected to the platen-cover for reciprocating the latter endwise relatively to the platen-frame.

43. In a type-writing machine, the combination of a platen-frame, a line-space wheel mounted therein, means for securing the line-space wheel against lateral movement relatively to the platen-frame, a shaft arranged concentrically with said line-space wheel, a platen mounted upon the shaft, and means for reciprocating the platen and shaft endwise relatively to the platen-frame.

44. In a type-writing machine, the combination of a platen-frame, a line-space wheel

mounted therein, means for securing the line-space wheel against lateral movement relatively to the platen-frame, a shaft arranged concentrically with said line-space wheel, a platen mounted upon the shaft, and automatically-operating means for reciprocating the platen and the shaft endwise relatively to the platen-frame.

45. In a type-writing machine, the combination of a platen-frame, a platen, line-spacing devices, a platen-shaft and means for reciprocating the platen and the shaft endwise relatively to the platen-frame during the operation of the line-spacing devices.

46. In a type-writing machine, the combination of a platen-frame, a platen, a wheel, as 47, operatively connected thereto, a line-space wheel, a pinion mounted upon the platen-frame and operatively connecting the line-space wheel to the wheel 47, and means for automatically reciprocating the platen and wheel 47 endwise relatively to the line-space wheel, the pinion being constructed to remain constantly in mesh with the wheel 47.

47. In a type-writing machine, the combination of a platen-frame, a platen, a wheel, as 47, operatively connected thereto, a line-space wheel, a pinion mounted upon the platen-frame and operatively connecting the line-space wheel to the wheel 47, and means for automatically reciprocating the platen and wheel 47 endwise relatively to the line-space wheel, the pinion being elongated so as to remain constantly in mesh with the wheel 47.

48. In a type-writing machine, the combination of a platen-frame, a platen, a wheel, as 47, operatively connected thereto, a line-space wheel, a wheel, as 46, rigidly connected thereto, the line-space wheel being arranged between the wheels 46 and 47, a pinion mounted upon the platen-frame and connecting the wheels 46 and 47 so as to cause the relative rotation thereof, and means for automatically reciprocating the platen and wheel 47 relatively to the line-space wheel, said pinion having a peripheral groove opposite the line-space wheel, and being elongated so as to remain constantly in mesh with the wheel 47.

49. In a type-writing machine, the combination of a platen-frame, a bushing, as 43, secured in an end bar 4 thereof, a line-space wheel having a central bore and constructed to turn in said bushing but to be held thereby against lateral motion, a shaft journaled at one end in said bore, a cylindrical platen mounted upon the shaft, and means for reciprocating the shaft and platen endwise relatively to the line-space wheel.

50. In a type-writing machine, the combination of a platen-frame, a cylindrical platen, a line-space wheel arranged at one end of the platen, devices arranged at the other end of the platen for adjusting at will the relative circumferential positions of the line-space wheel and platen, a thumb-wheel for actuating said adjusting devices, and a brake for

preventing backlash between the line-space wheel and the platen.

51. In a type-writing machine, the combination of a platen-frame, a cylindrical platen, a line-space wheel and platen-creeping devices arranged at one end of the platen, adjusting devices arranged at the other end of the platen for altering at will the relative circumferential positions of the line-space wheel and platen, and a thumb-wheel for actuating said adjusting devices.

52. In a type-writing machine, the combination with a platen-frame, a platen, and a line-spacing mechanism, including a line-space wheel having uniformly-spaced teeth and arranged concentrically with the platen, and also including means for turning the platen through an aliquant part of a complete revolution of each portion of the line-spacing mechanism, of means for turning the platen at will without reference to the line-spacing mechanism, so as to effect an independent adjustment of the paper upon the platen.

53. In a type-writing machine, the combination of a platen-frame, a platen, a line-space wheel arranged concentrically with the platen and having evenly-spaced teeth, means for effecting automatically relative rotary movements of the platen and the line-space wheel, and means for turning the platen at will relatively to the line-space wheel, so as to adjust the paper carried thereon.

54. In a type-writing machine, the combination with a cylindrical platen and a line-space wheel of an intermediately-arranged finger-wheel rotatable relatively to the platen, means controlled by said finger-wheel for turning the platen relatively to the line-space wheel, and means for causing an automatic relative rotation of the platen and line-space wheel at the operation of the latter.

55. In a type-writing machine, the combination of a cylindrical platen, a line-space wheel connected thereto by means of adjusting devices, and a finger-wheel, the construction and arrangement being such that at the operation of said line-space wheel the platen rotates automatically relatively to the line-space wheel, and also such that said finger-wheel may be operated to cause an independent rotary movement of the platen in either direction relatively to the line-space wheel.

56. In a type-writing machine, the combination of a cylindrical platen, a line-space wheel, a finger-wheel for rotating the platen and line-space wheel simultaneously, means for causing an automatic relative rotation between the line-space wheel and the platen at such simultaneous rotation, a finger-wheel rotatable relatively to the platen, and means controlled by the last-mentioned finger-wheel for rotating the platen relatively to the line-space wheel.

57. In a type-writing machine, the combination of a platen-frame, a cylindrical platen, a line-space wheel, a finger-wheel arranged at

each end of the platen-frame for turning the platen and line-space wheel simultaneously, means for causing an automatic relative rotation between the line-space wheel and the platen at such simultaneous rotation, a third finger-wheel, and means controlled by said third finger-wheel for turning the platen at will relatively to the line-space wheel so as to effect an adjustment of the paper carried by the platen.

58. In a type-writing machine, the combination of a platen, a line-space wheel, and toothed gearing positively connecting the line-space wheel to the platen, said gearing being constructed and arranged so that at the rotation of the line-space wheel the platen rotates relatively thereto, and also so that the platen may at will be rotated by said gearing independently of the line-space wheel, in order to effect an adjustment of the paper.

59. In a type-writing machine, the combination of a platen-frame, a platen, a line-space wheel, means for automatically reciprocating the platen in letter-space direction relatively to the platen-frame, and means for turning the platen at will relatively to the line-space wheel.

60. In a type-writing machine, the combination of a platen-frame, a platen, a line-space wheel having evenly-spaced teeth, means for effecting automatically relative rotary movements of the platen and the line-space wheel, means for automatically reciprocating the platen endwise relatively to the platen-frame, and means for turning the platen at will relatively to the line-space wheel, so as to adjust the paper carried thereon.

61. In a type-writing machine, the combination with a platen and a line-space wheel, of two trains of differential gearing, each train constructed to cause relative rotation of the platen and the line-space wheel, one train constructed to be manually operated for adjusting the paper carried upon the platen, and the other train being constructed to operate automatically.

62. In a type-writing machine, the combination of a platen-frame, a line-space wheel mounted therein, and a platen connected to the line-space wheel by two trains of gears, one train being constructed to operate automatically at the line-spacing operation and the other train being manually operable for effecting an adjustment of the paper carried by the platen.

63. In a type-writing machine, the combination of a platen-frame, a line-space wheel mounted therein, a relatively rotatable platen, and two brakes, as 57 and 21, arranged in series between the platen and the line-space wheel.

64. In a type-writing machine, the combination of a platen-frame, a line-space wheel mounted therein, and a platen connected to the line-space wheel by two trains of gears ar-

ranged in series, each train being provided with a brake for preventing backlash between the line-space wheel and the platen.

65. In a type-writing machine, the combination of a platen-frame, a line-space wheel mounted therein, and a platen connected to the line-space wheel by two trains of gears, one train being constructed to operate automatically at the line-spacing operation and the other train being manually operable for effecting an adjustment of the paper carried by the platen, each train being provided with a brake for preventing backlash between the line-space wheel and the platen.

66. In a type-writing machine, the combination of a metallic platen-tube, a softer tubular sheath therefor, insulating-plugs arranged in the ends of the metallic tube, retaining-screws seated in the metallic tube and engaging the plugs, and suitable central supports for the plugs.

67. In a type-writing machine, the combination of a metallic platen-tube, a softer tubular sheath therefor, insulating-plugs arranged in the ends of the metallic tubes, retaining-screws seated in the metallic tube and engaging the plugs, metallic bushings arranged centrally in said plugs, and a shaft upon which said bushings are supported.

68. In a type-writing machine, the combination of a metallic platen-tube, a softer tubular sheath therefor, insulating-plugs arranged in the ends of the metallic tubes, retaining-screws seated in the metallic tube and engaging the plugs, metallic flanged bushings arranged centrally in said plugs, and a shaft upon which said bushings are supported.

69. In a type-writing machine, the combination of a cylindrical platen an insulating-plug therefor firmly secured to a central sleeve, said sleeve being arranged upon a shaft, and means for causing the sleeve to rotate either together with the shaft or independently thereof.

70. In a type-writing machine, the combination of a cylindrical platen, an insulating-plug therefor firmly secured to a central sleeve, said sleeve being arranged upon a shaft and frictionally engaged thereto, and means for rotating the sleeve at will in opposition to said friction.

71. In a type-writing machine, the combination of a line-space wheel, a cylindrical platen-body, an insulating-plug at each end thereof, a central sleeve secured in one of said plugs, said sleeve being mounted upon a shaft and said shaft being connected to the

line-space wheel, a planet-wheel arranged upon said sleeve, a wheel secured upon said shaft and meshing with said planet-wheel, and a manually-operated wheel for operating said planet-wheel.

72. In a type-writing machine, the combination of a line-space wheel, a cylindrical platen-body, an insulating-plug at each end thereof, a central sleeve secured in one of said plugs, said sleeve being mounted upon a shaft and said shaft being connected to the line-space wheel, a planet-wheel arranged upon said sleeve, a wheel secured upon said shaft and meshing with said planet-wheel, a manually-operated wheel for turning said planet-wheel, and a brake for opposing the rotation of said sleeve upon said shaft.

73. In a type-writing machine, the combination of a cylindrical platen, a platen-frame, wheel 46, wheel 47 connected to the platen, a rotary device connecting said wheels and operated by wheel 46, and means for reciprocating wheel 47, together with the platen, toward and away from wheel 46.

74. In a type-writing machine, the combination of a cylindrical platen, a platen-frame, wheel 46, wheel 47, an elongated pinion in mesh with wheel 47 and operated by wheel 46, and means for reciprocating wheel 47, together with the platen, toward and away from wheel 46.

75. In a type-writing machine, the combination of a platen, a toothed wheel connected thereto, a line-space wheel, a toothed wheel connected to the line-space wheel, one of said toothed wheels having more teeth than the other, and a pinion meshing with both of said toothed wheels.

76. In a type-writing machine, the combination with a platen, of a line-space wheel connected thereto by a differential gearing, said differential gearing including two connected toothed wheels having different numbers of teeth, one of said toothed wheels being connected to the platen and the other of said toothed wheels being connected to the line-space wheel, and means for causing one of said toothed wheels to creep relatively to the other wheel so as to alter the relative rotative positions of the line-space wheel and platen.

Signed at New York this 27th day of September, A. D. 1899.

BURNHAM C. STICKNEY.

Witnesses:

E. M. WELLS,
F. KEELING.