No. 782,990. PATENTED FEB. 21, 1905.

C. ROZÁR.

APPARATUS FOR PERFORATING REGISTERING STRIPS FOR TYPE SETTING MACHINES.

APPLICATION FILED DEC. 23, 1901

7 SHEETS—SHEET 1.

Fig. 1.

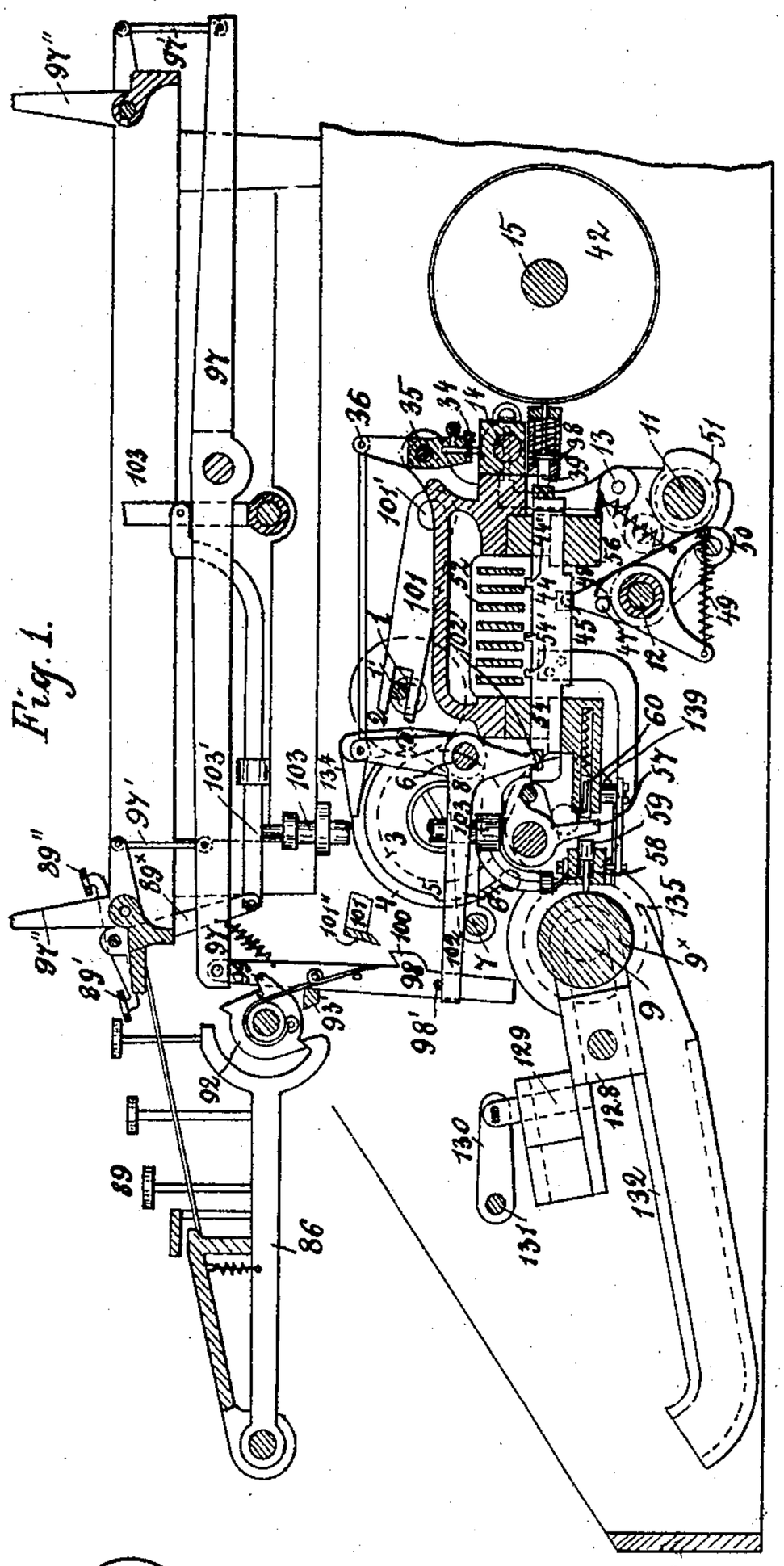

Fig. 12.

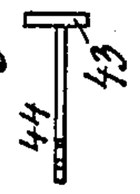

Fig. 11.

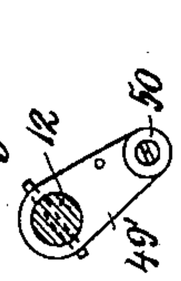

Fig. 8.

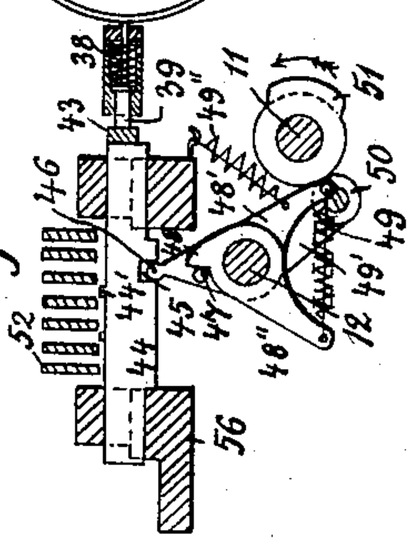

Fig. 10.

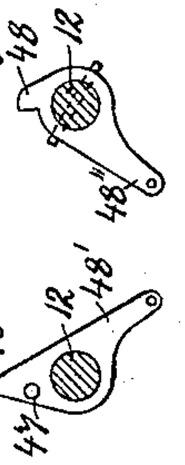

Fig. 9.

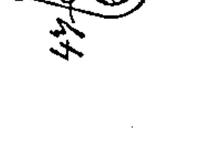

Fig. 4.

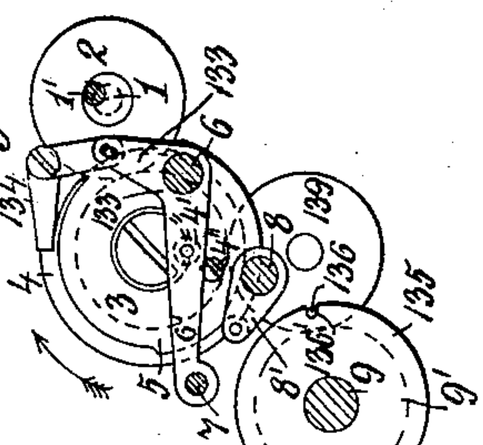

Fig. 5.

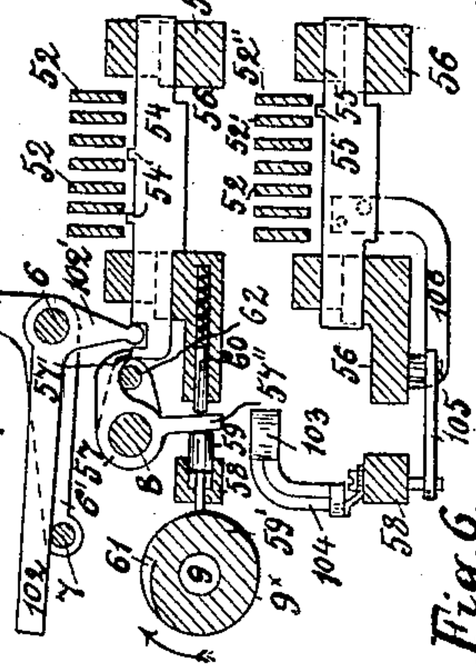

Fig. 7.

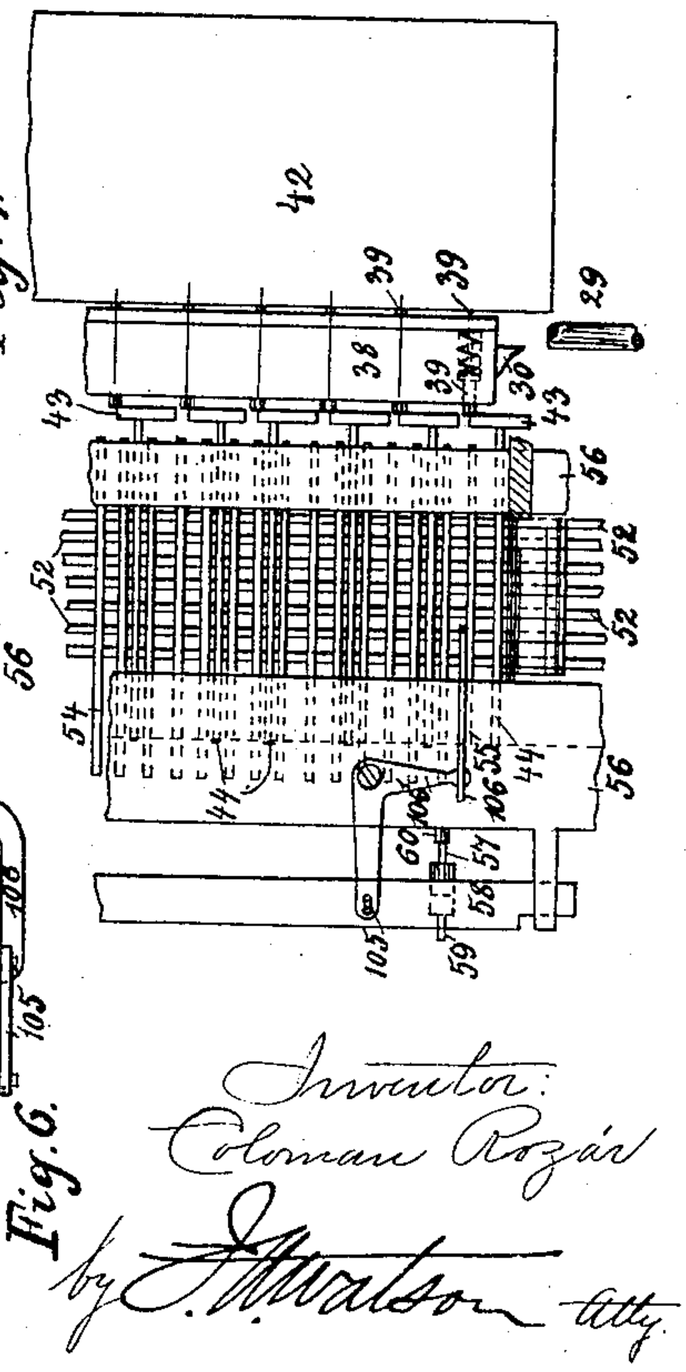

Fig. 6.

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7 SHEETS—SHEET 2.

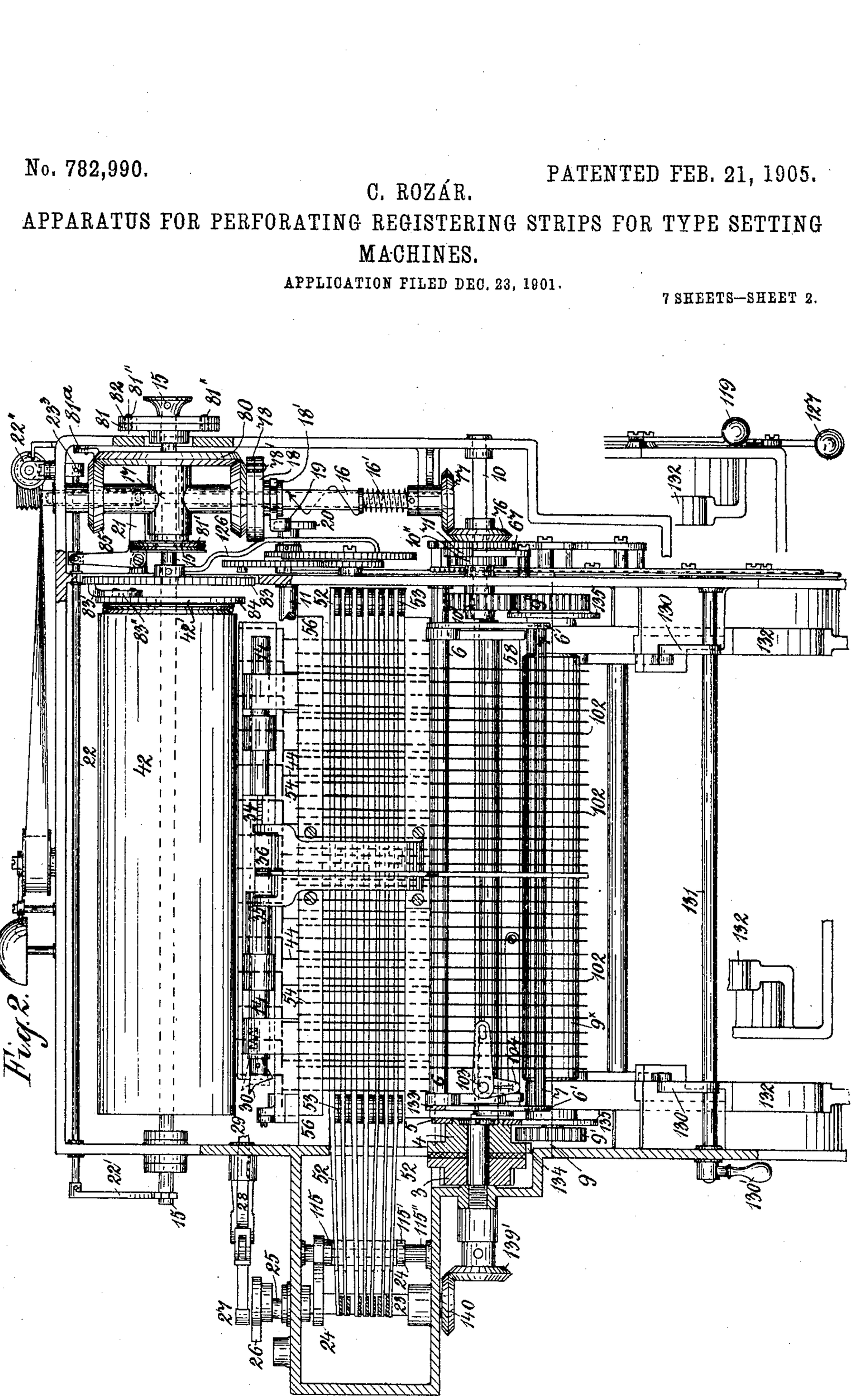

Fig. 2.

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7 SHEETS—SHEET 3.

Fig. 18.

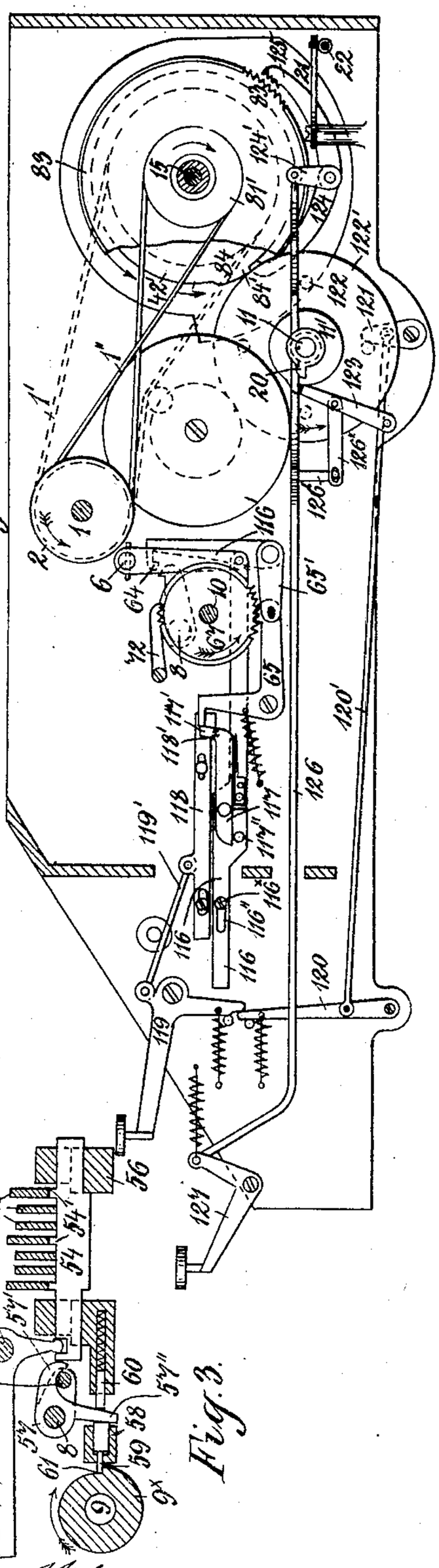


Fig. 3.

Fig. 21.

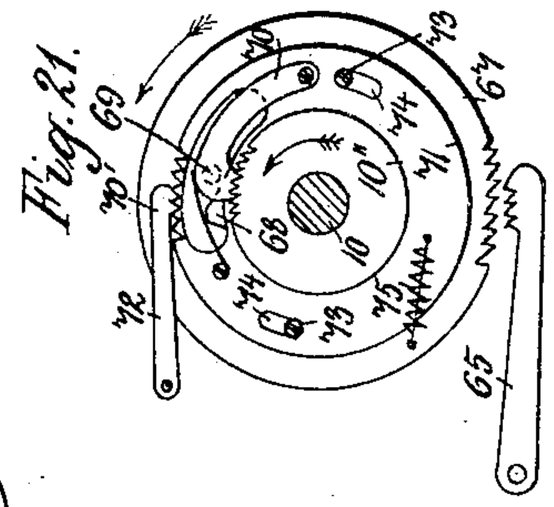


Fig. 20.

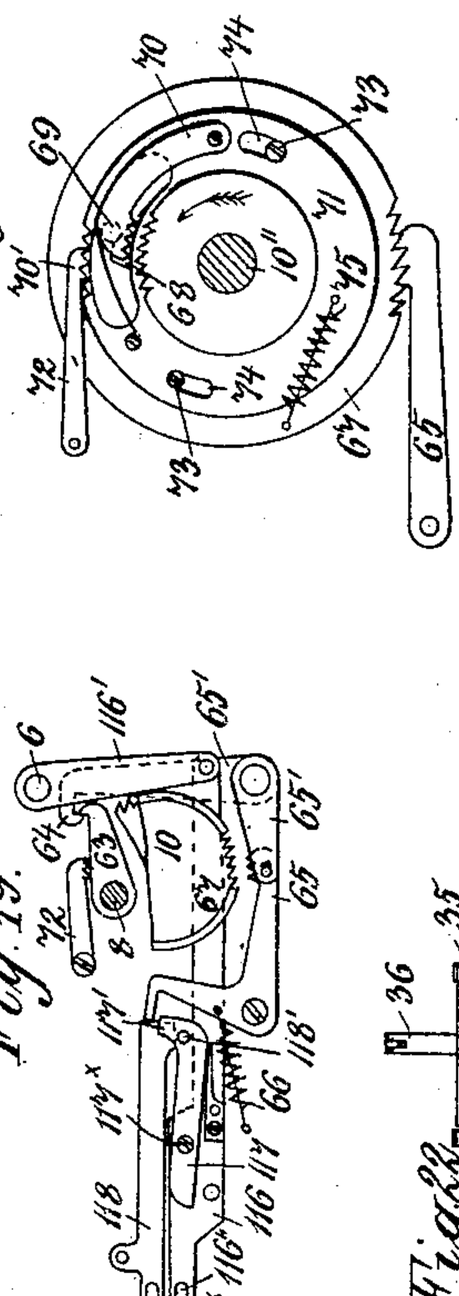


Fig. 19.

Fig. 23.

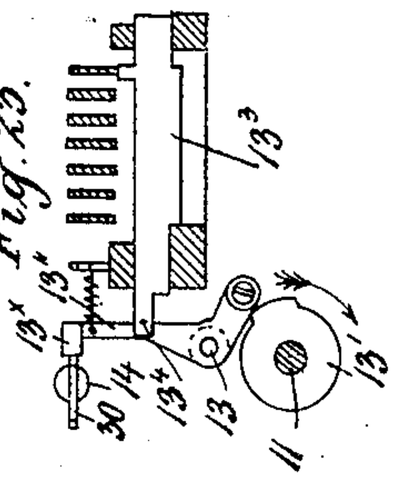
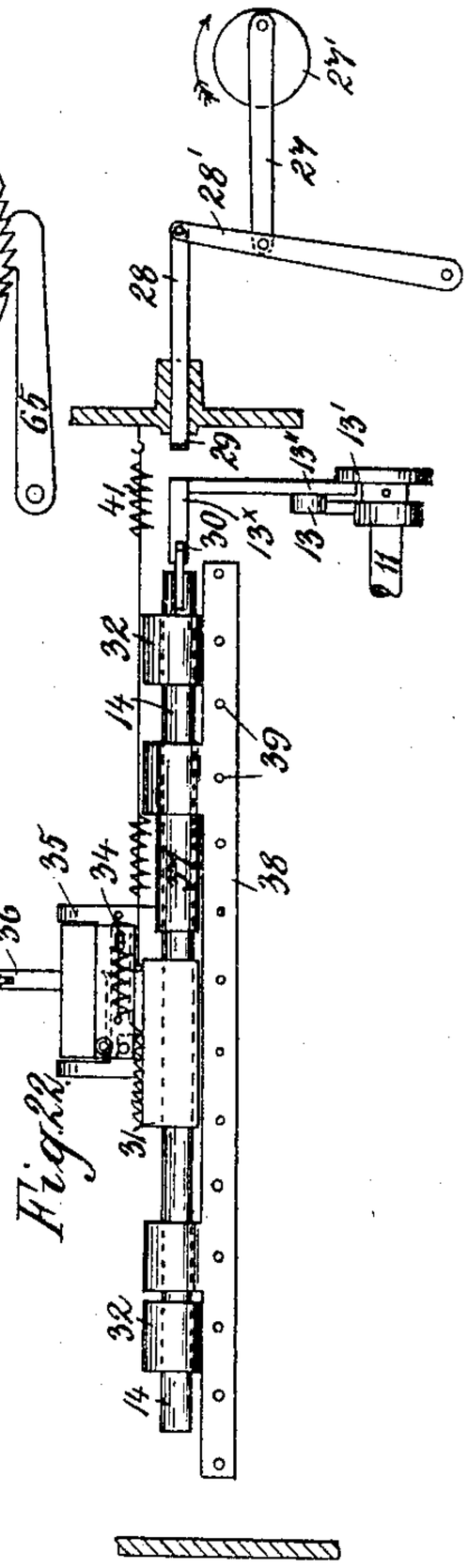


Fig. 22.



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7 SHEETS—SHEET 4.

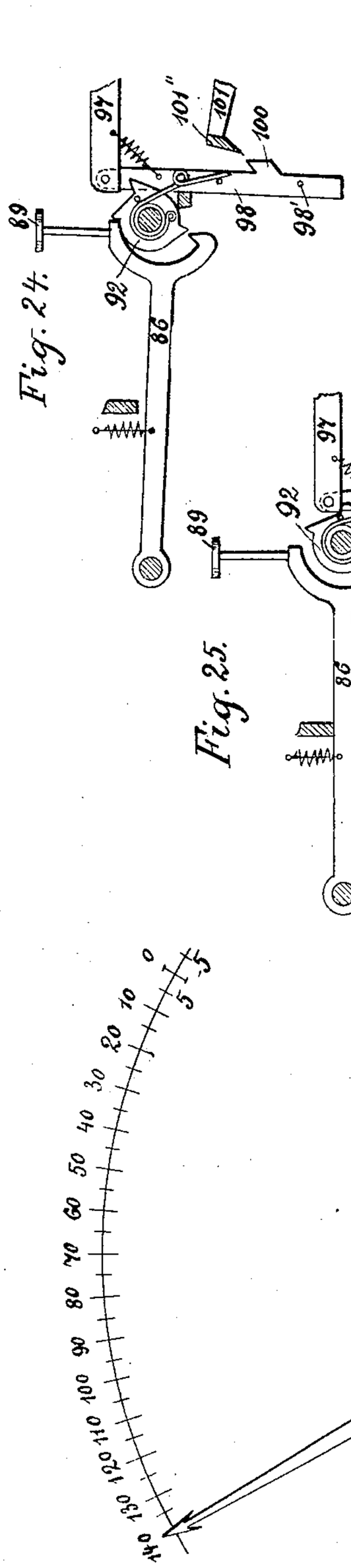

Fig. 24.

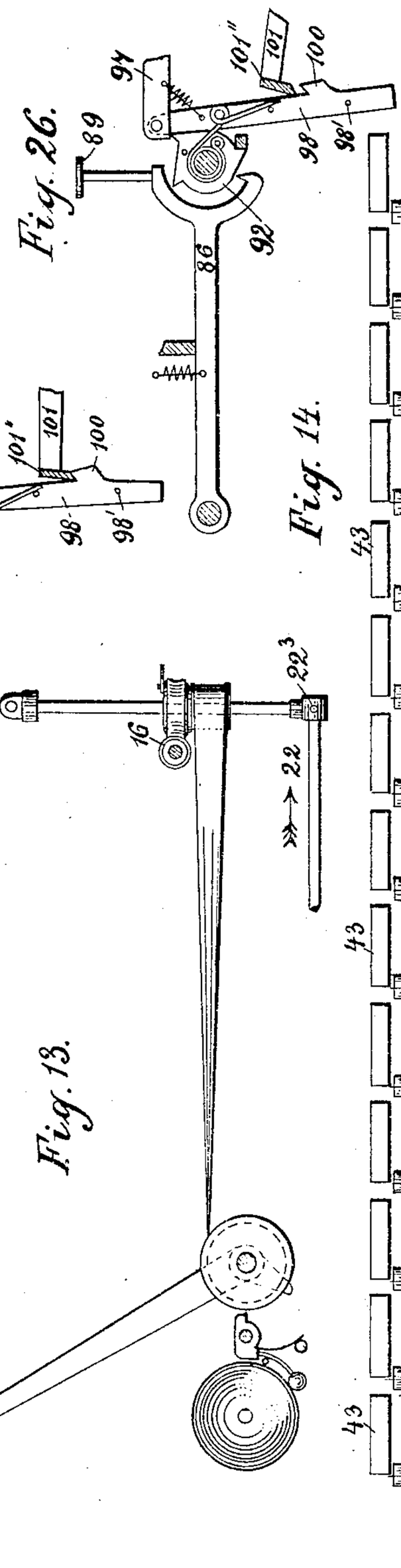

Fig. 25.

Fig. 26.

Fig. 13.

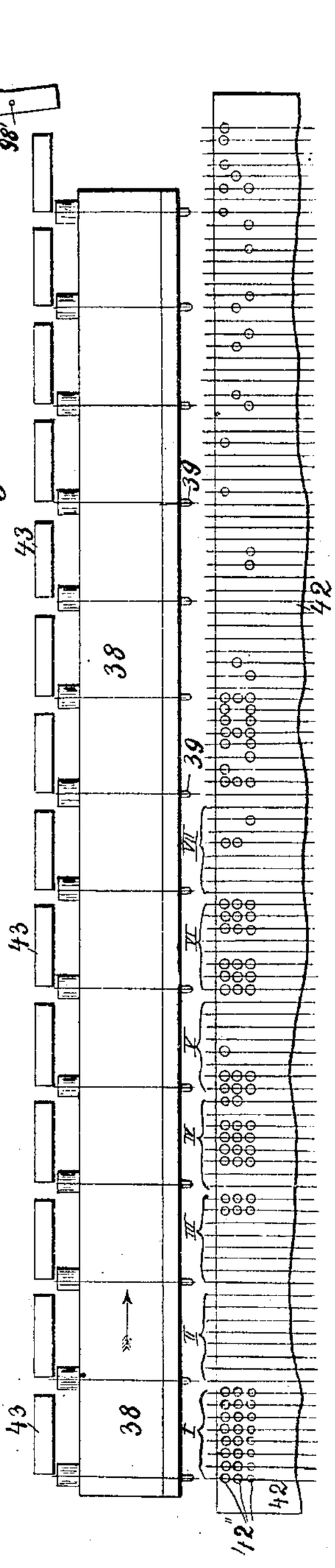

Fig. 14.

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No. 732,990. PATENTED FEB. 21, 1905.

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APPARATUS FOR PERFORATING REGISTERING STRIPS FOR TYPE SETTING MACHINES.

APPLICATION FILED DEC. 23, 1901

7 SHEETS—SHEET 5.

Fig. 15.

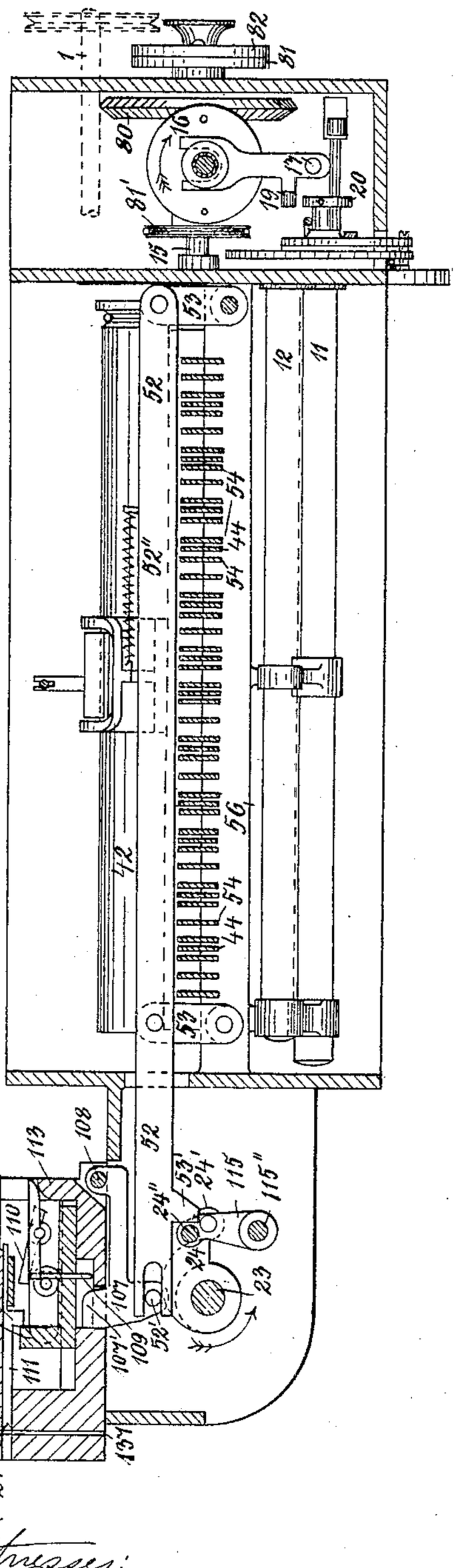

Fig. 16.

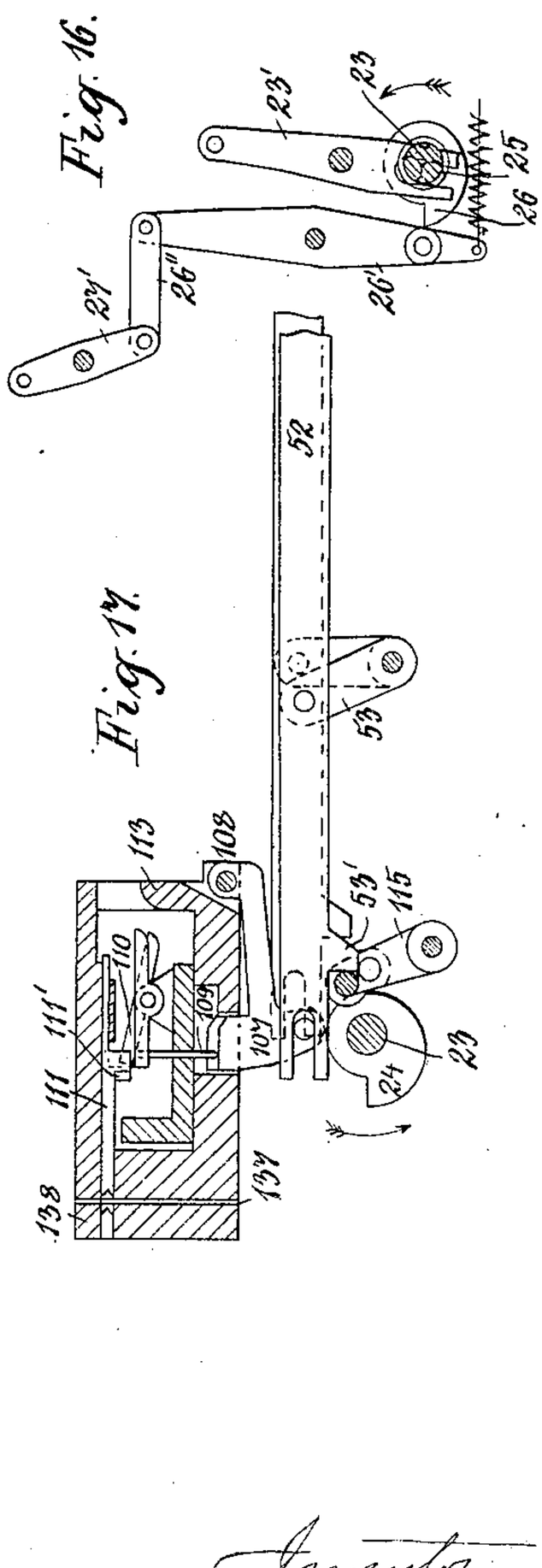

Fig. 17.

Witnesses:
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Lydia I. Jobes.

Inventor:
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No. 782,990. PATENTED FEB. 21, 1905.

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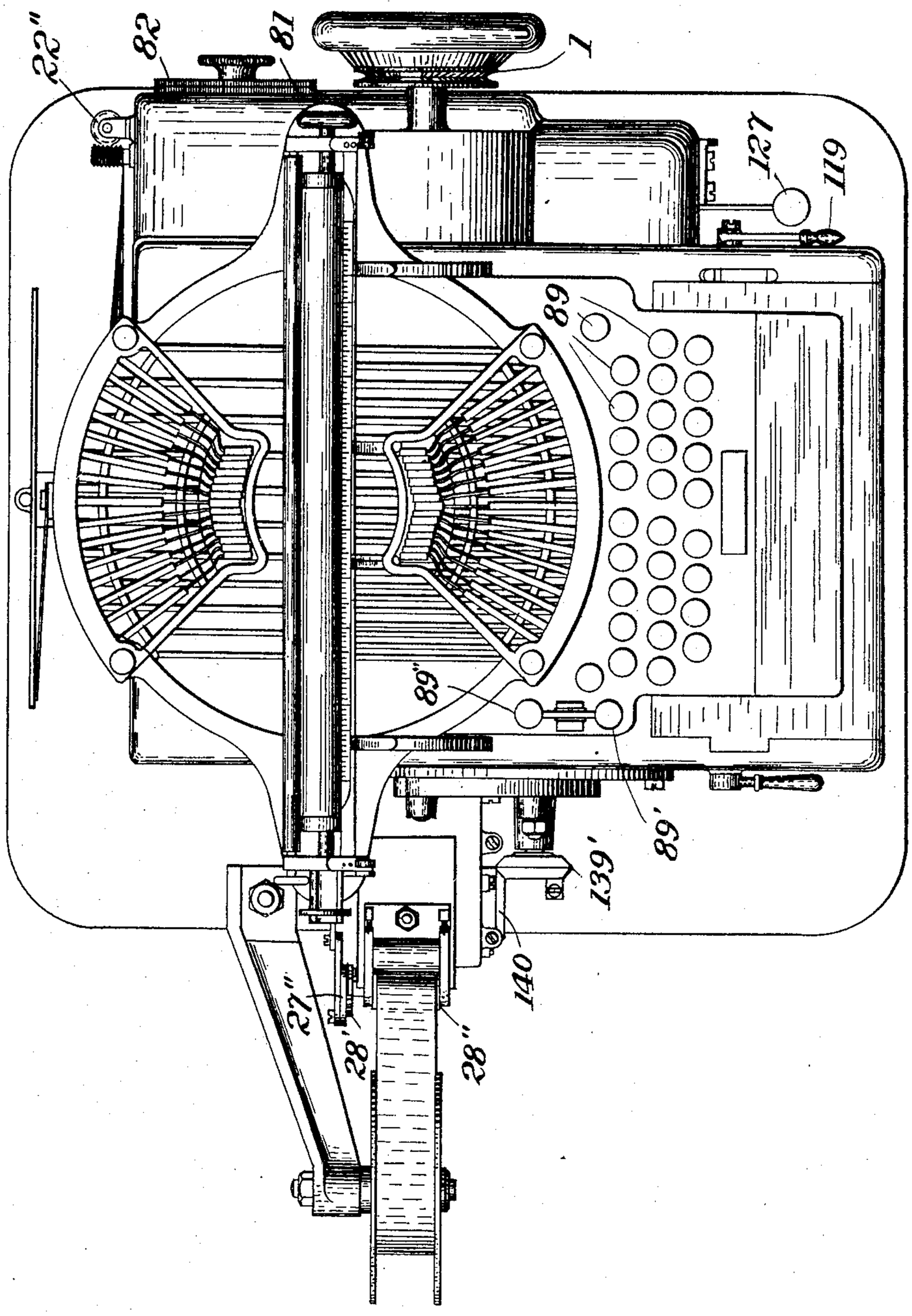
APPARATUS FOR PERFORATING REGISTERING STRIPS FOR TYPE SETTING MACHINES.

APPLICATION FILED DEC. 23, 1901

7 SHEETS—SHEET 6.

Fig. 27.



Witnesses
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H. M. Gillmore, Jr.

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No. 782,990. PATENTED FEB. 21, 1905.

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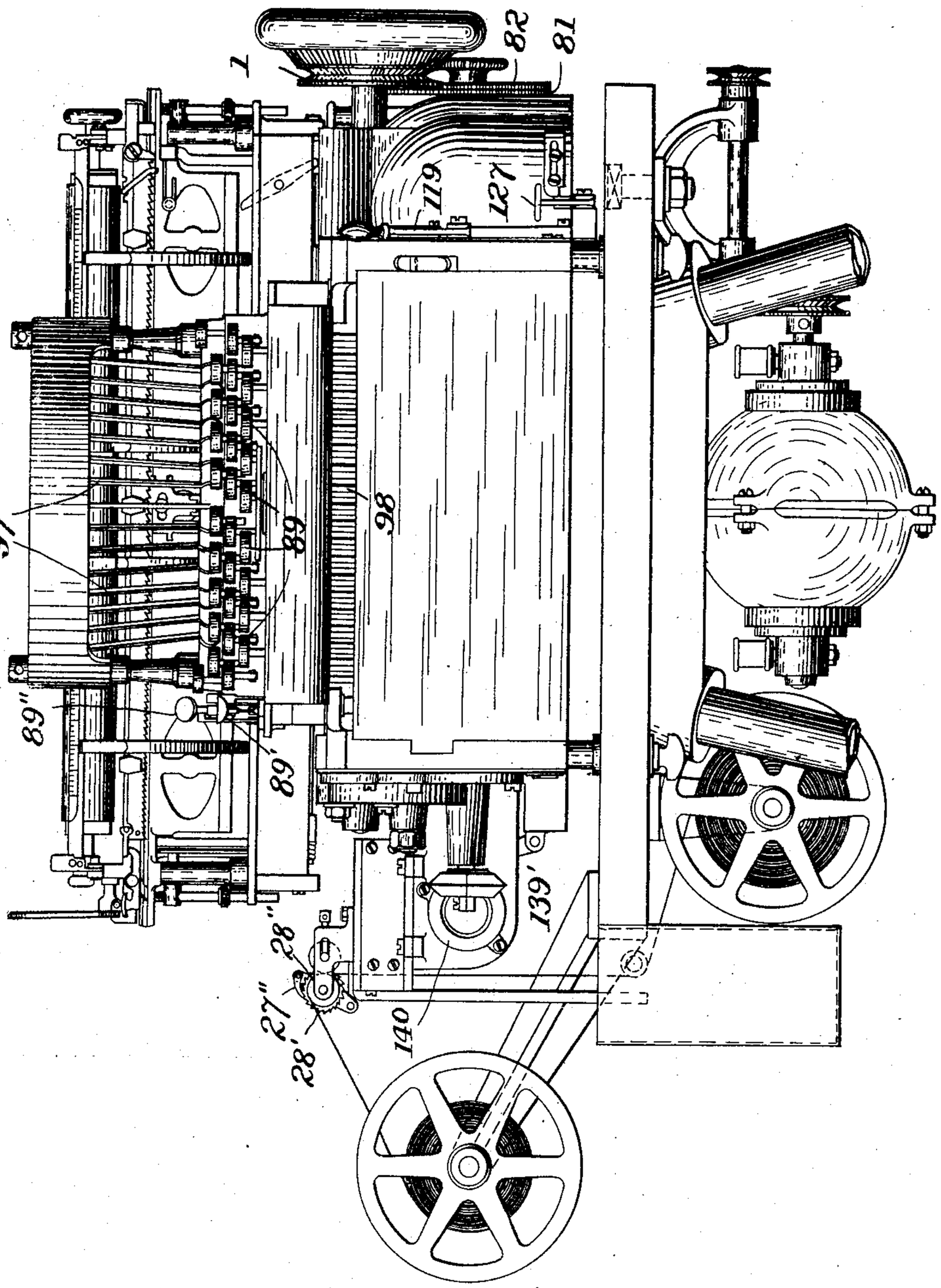
APPARATUS FOR PERFORATING REGISTERING STRIPS FOR TYPE SETTING MACHINES.

APPLICATION FILED DEC. 23, 1901

7 SHEETS—SHEET 7.

Fig. 28.



Witnesses
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Wm. Gilmore, Jr.

Inventor
Colman Rozar
by James A. Watson
atty.

No. 782,990. Patented February 21, 1905.

UNITED STATES PATENT OFFICE.

COLOMAN ROZÁR, OF NUREMBERG, GERMANY.

APPARATUS FOR PERFORATING REGISTERING-STRIPS FOR TYPE-SETTING MACHINES.

SPECIFICATION forming part of Letters Patent No. 782,990, dated February 21, 1905.

Application filed December 23, 1901. Serial No. 86,944.

To all whom it may concern:

Be it known that I, COLOMAN ROZÁR, a subject of the Emperor of Austria-Hungary, residing at Nuremberg, Germany, have invented a certain new and useful Apparatus for Perforating Registering-Strips for Type-Setting Machines, of which the following is a specification.

This invention relates to an improved apparatus for perforating registering-strips for type-setting machines, which strips serve the purpose of conveying the type or the matrices without the aid of an attendant in their proper order for composing lines and at the same time to interpolate spacing-sticks to give all the lines a definite uniform length—*i. e.*, to justify the lines.

The invention consists of an arrangement in connection with apparatus operated by key-levers whereby at the operation of the keys all the various mechanisms of the apparatus (for perforating, registering, and returning to zero) are automatically effected without the special attention of the operator and whereby, further, the depression of a special key at the end of the line, which is announced by bell-signal, operates the justifying of said line.

The apparatus may be also combined, if desired, with a type-writing machine, as shown in Figure 1.

In the accompanying drawings, Fig. 1 is a vertical section taken through the middle of the machine from front to back. Fig. 2 is a plan view of the mechanism below the plane of the keyboard. Figs. 3, 4, 5, and 6 each show portions of mechanism illustrated in Fig. 1, being vertical sectional views similar to said figure. Fig. 7 illustrates more in detail a portion of Fig. 2. Fig. 8 also illustrates a portion of Fig. 1. Figs. 9 to 12, inclusive, are details. Fig. 13 illustrates the indicator in elevation. Fig. 14 is a diagram of the justifying-cylinder and the feeler-pins. Fig. 15 is a vertical section through the machine from right to left. Fig. 16 is a detail. Fig. 17 shows a portion of Fig. 15, the parts being in different positions. Fig. 18 is a vertical section from front to back near the right end of the machine. Figs. 19 to 23, inclusive, are details of the mechanism for setting the justifying-cylinder and for restoring the parts to their normal position after the justification is effected. Figs. 24, 25, and 26 are details of the keyboard and escapement mechanism. Fig. 27 is a plan view of the machine. Fig. 28 is an elevation.

In order to enable the apparatus to be operated for perforating the register-strip, it is first necessary to operate the key mechanism, which may be of any convenient construction to suit this purpose.

In the form of construction adopted for use in connection with this invention the various mechanisms are not operated simultaneously with the operation of the key, as hitherto, but are operated after the release of the key by the finger—*i. e.*, after the return of the depressed key. This key mechanism consists chiefly in that by the coaction of locking-disks 92 and escape-levers 86 oscillating arms 98 receive motion after the corresponding and previously-depressed key has been released. This mechanism, however, forms no part of this invention, as it forms the subject of a separate application for patent.

In order that by the operation of a key the perforation may duly be effected, it is here arranged that the actions for producing the same are only started by the depression of the key and are then carried out mechanically, while after the production of a perforation the apparatus is automatically arrested. For this purpose a continuously-rotating shaft 1 (Figs. 1 to 15) is caused, by means of an eccentric-pin 1′, to impart a constant oscillation to a lever-frame 101, mounted on a shaft 101′ in such a manner that the knife-shaped cross-bar 101″ (Fig. 1) swings in the vicinity of the shoulders 100 of the arms 98, pivoted to the lever 97 and operated by the key mechanism. Each of the keys 89 when being depressed imparts an oscillation to an escape-lever 86, mounted on a shaft 87, whereby the ratchet-disk 92 operates the arms or bars 98 in known manner. By the depression of the key the corresponding arms 98 are drawn or swung into the path of the rail 101″. This latter thereupon at its next downstroke takes the

arm 98 with it by means of the shoulder 100, (Fig. 1,) while at the same time the disk 92 is turned back to its initial position and the arm 98 removed from the path of the rail 101″. Each arm 98 at its downstroke takes with it, by means of a stud 98′, a corresponding angle-lever 102 102′, the arm 102′ being caused to engage in a slide 54, (Fig. 1.) The levers 102 102′ are rotatably mounted upon a shaft 6, which by means of two arms 6′ carries a bar 7, extending beneath all the levers 102, (Fig. 5.) The arm 6′ engages, by means of a prolongation 133, (Fig. 4,) with a pin of a latch 134, which rests against a step in a disk 4, and thus prevents the latter from rotating. This disk 4 when released by the latch 134 is driven, through friction, by a toothed wheel 3, (Figs. 2, 4,) the latter being in gear with the continuously-rotating wheel 2 on the shaft 1. The disk 4 is also formed like a toothed wheel and is in engagement with a toothed wheel 139, (Fig. 4,) and while the latter engages in a toothed wheel 9′ on a shaft 9. If, therefore, any one of the keys is depressed, the latch 134 is disengaged and the disks 4 139 9′ are rotated by the friction of the wheel 3. Shortly before the disk 4 has completed a revolution (Fig. 4) a pin 4″ thereof acts against a roller 4′ of the lever 6′ in such a manner that the latch 134 returns into the path of the step of the disk 4 and finally stops the latter. The disks 4 139 9′ perform, therefore, at each operation of a key a rotation and then come automatically to rest, while the shaft 1 and disks 2 3 rotate continuously.

The previously-mentioned disk 139 is fast upon a rotary shaft which at its other end (Fig. 2) carries the beveled wheel 139′ in gear with another beveled wheel, 140, on a shaft 23, which by means of a cam 24 (Figs. 2, 15) acts upon the roller 24′ of a lever 115. This lever, with another lever, 115′, is mounted upon a rocking shaft. These levers 115 115′ are connected together by a bar 24″, upon which rests a system of parallel bars 52, with their shoulders 53′ held against bar 24″ by means of springs 52″. The bars 52 are articulated to levers 53 (Figs. 2, 15) and are thus guided in a parallel manner. They have slots at their left ends, which engage with pins 52′ upon pawls 107, which swing upon studs 108 of a casing 113 and project with their noses 107 from beneath into the bottom of said casing. In the said casing is reciprocated a slide 112 by means of a lever 23′, (Fig. 16,) having a slot which engages with an eccentric stud 25 of the shaft 23. Upon this shaft 23 is also provided a cam 26, which imparts a rocking motion to a lever 26′ and also, by means of a link 26″, to a pawl-lever 27′. This latter engages with its pawl 27″ in a ratchet-wheel 28 upon a roller, 28″, (Figs. 15, 16.) The roller 28″ rotates a roller 29′. The paper strip to be perforated is introduced in a guide 137 of the casing 113, so as to come between the rollers 28″ 29′. It is then drawn forward stepwise by these latter and is during the various periods of rest perforated crosswise by the perforating-punches 111, according to the required perforating combination.

The perforating-punches 111 are guided in the top of the casing 113 and are provided with noses 111′. The slide 112 carries a number of vertically-movable pins 109, acted upon by pawls 110, mounted loose upon a common shaft of the slide 112. The pins 109 are within the path of the pawls 107, while the pawls 110 are in the path of the perforating-punches 111′. If thus a rail 52 is in its raised position, (shown in Fig. 15,) it will be clear that at the subsequent forward motion of the slide 112 the pin 109 corresponding to the same rail 52 will also be lifted by the lifted nose 107′ of the pawl 107, so that thereby the corresponding pawl 110 is placed in the path of its corresponding nose 111′, whereby the punch 111 is caused to advance and produce a perforation. At its return the slide 112 withdraws the punch 111 again. If, on the contrary, a rail 52 and its corresponding pawl 107 is in the lower position, as shown in Fig. 17, at the forward movement of the slide 112, the corresponding pin 109 will not be lifted, and the corresponding pawl 110 will consequently not act on the nose 111′ of the corresponding perforator. Therefore a rail 52 when in its lower position does not produce a perforation.

The displacement of the rail 52 into its upper or its lower position is effected by the previously-mentioned slide 54, (Figs. 1, 5,) of which there are an equal number to the required keys 89 and angle-levers 102 102′, each such angle-lever engaging with its arm 102′ in its corresponding slide 54. The slides 54 are provided on their upper edges with projections 54′, arranged in different combinations and in such positions that when a key is not depressed the projections 54′ will be out of register with the rails 52 and will permit of the depression of all of said rails. If, however, a key is depressed, which can only be done at a time when the rails 52 are in the raised position, the projections 54′ of the corresponding slide 54 are brought beneath the corresponding rails 52, (Fig. 3,) and retain the same in their raised position. This causes the paper strip to be perforated according to a combination depending on the number and position of the projections 54′ of the slide 54, corresponding to the depressed key.

The perforating combination of the perforated paper strip serves, as is well known, to deliver types or matrices in definite succession. At the same time it is necessary to supply spacers of such a thickness that the lines, composed with the aid of the perforated paper strip, shall have a definite uniform length.

For this purpose and according to this invention the thicknesses of the several character types are mechanically added together with space-types of medium thickness. In this manner the device upon which are provided the mechanically-acting marks (holes, or pins) for the justification of all the lines which deviate from the normal length of line, receives at the finish of the composed line a definite position. When the said device is in this position, those marks (holes or pins) which represent the justification of the line will be in operative position. If then the paper strip is perforated in accordance with the said marks, it will be obvious that by the use of this perforated strip in setting type spacers of the required thickness will be delivered to justify the line.

For effecting the registering of the proper thicknesses and regulating the device for justifying the following arrangement is provided: Upon a shaft 8 are mounted rotary angle-levers 57, which, with an arm 57′, repose upon the left end of the slides 54 (Fig. 5) and with another arm, 57″, engage between pins 59 60. The pins 60 are controlled by springs and press the pins 59, guided in the rail 58, through the intervention of the arms 57″, constantly against the peripheral surface of a cylinder $9^{\times}$ on the shaft 9 after the lever-arm 57′ has lost its rest on the slide 54, (Fig. 3,) which is the case when the key corresponding to such slide is being operated. Beneath all the lever-arms 57′ extends a bar 62, firmly connected by levers with the rocking shaft 8. The latter carries, furthermore, a lever (8′, Fig. 4,) which, with a roller, rests against the edge of a cam-disk 5, rigidly connected with the toothed wheel 4. As before stated, the shaft 9 performs with the cylinder $9^{\times}$ at every depression of a key a revolution in the direction indicated by the arrow in Fig. 5, starting from the position of rest of the cylinder $9^{\times}$, as represented in Fig. 5. The cylinder $9^{\times}$ is formed with notches 61, disposed in the path of the points of the pins 59. The distance of the edges of the notches from the line 59′, in which the pins 59 touch the cylinder $9^{\times}$ when at rest, varies for the several pins 59 and is proportional to the thickness of the perforated strips through the intervention of the slide 54 corresponding with the said pin 59.

The cylinder $9^{\times}$ is exchangeable, because the thickness of the types for various alphabets and kinds of types varies. The cylinder $9^{\times}$ is retained (in Figs. 1 and 2) by means of blocks 128 and bolts 129 in guideways 132, the said bolts being hinged to the lever 130 on the rod 131. In order to obtain the correct thicknesses in each case, it is necessary to dispose the notches 61 in the position of rest of the cylinder $9^{\times}$ in a definite relative position with the line of contact 59′ of the pins 59, (Fig. 5,) which may be effected, by means of a disk 135, with notch 136, fitted to one end of the cylinder, (Fig. 4.) The cylinder can thus come into gear with the wheel 139 only when the notch 136 is in engagement with a pin 136′ of the toothed wheel 130—*i. e.*, when the cylinder $9^{\times}$ is in the correct relative position with regard to the other parts of the machine.

The operation of a key causes the previously-mentioned member to be coupled with the cylinder $9^{\times}$ and to be moved by this latter. While, however, the cylinder $9^{\times}$ each time performs a complete revolution, the said member is uncoupled from the cylinder and arrested as soon as the step of the notch 61 corresponding to the key has passed the corresponding pin 59 and allowed this latter to engage in the notch. In this manner, therefore, the said member is operated stepwise for an amount which is proportional to the thickness of the perforated slip, while, further, the said member at the end of a line takes up a position corresponding to the sum of thickness of the perforateds trip—*i. e.*, the length of line to be set in accordance with the length of the perforated strip.

The device for justifying consists advantageously of a cylinder provided upon its peripheral surface with rows of holes arranged parallel with its axis of rotation. Each of these rows of holes corresponds to a definite extra length of line or excess which is overcome by justifying, so that for every case within practical limits there is provided a row of holes for effecting the justifying. This row of holes is placed in position each time at the end of a line so as to be opposite a row of pins, which latter thereupon produce a definite perforation combination in the paper strip by means of the mechanism hereinafter described for summing up the thicknesses of the separate perforated signs.

The cylinder $9^{\times}$ (Fig. 2) at its right-hand end is by means of a toothed wheel 9″ in gear with a toothed wheel 10′, which latter is fast upon a shaft 10. Loose upon this shaft are mounted two ratchet-disks 71 67, (see detail Figs. 20, 21,) of which the disk 71 with slots 74 engages pins 73 of the disk 67, while both disks are kept normally in the same relative position by a helical spring 75, attached to both, as shown in Fig. 21. The disk 71 is fitted with a pawl 70, engaging in the teeth of the wheel 10″. The pawl 70 projects, with a stud 69, through a slot in the disk 71. A cam projection 68, provided on the disk 67, serves to lift the pawl 70, by means of the pin 69, each time out of the teeth of the wheel 10″. With the wheel 71 engages constantly a pawl 72 with teeth, while a pawl 65 comes into temporary engagement with the teeth of the wheel 67. When the parts are in the relative position shown in Fig. 20, whereby the disks 67 71 are

uncoupled from the disks 10″, rotating in the direction of the arrow, and the pawl 65 is then suddenly lifted out of engagement with the teeth of 67, the spring will draw the disk 67 with it for a certain distance till the said disk by means of the pins 73 is arrested in the slots 74, (Fig. 21.) This causes the cam 68 to advance from under the pin 69 of the pawl 70, and thus brings the pawl 70 into engagement with the teeth of the rotary disk 10″. From this moment the disks 71 and 67, owing to the coupling with disk 10″, are moved by the latter, as the pawl 72 does not oppose the rotation, while the pawl 65, as previously stated, is disengaged from the disk 67. If now the pawl 65 is suddenly freed to engage with the disk 67, it will cause the parts to immediately take the position shown in Fig. 20, whereby the pawl 70 is disengaged from the disk 10″ by reason of the pin 69 riding on the cam 68, so that thereby the disks 71 67 come simultaneously to rest and leave the disk 10″ to complete its revolution. The skidding or running by the disks 67 71 is prevented through the constant engagement of the pawl 73 in 70′.

The lifting of the pawl 65 from the teeth of the disk 67 occurs at every operation of a key, and thus exactly at the beginning of the rotation of the cylinder 9× and disk 10″, while the pawl 65 falls back into the teeth of the wheel 67 exactly at the moment when the notch 61 of the cylinder 9× passes in front of and engages the pin 59, corresponding to the depressed key. As previously mentioned, at each operation of a key the lever-frame 6′ 7 (Figs. 4, 5) is oscillated. The spindle 6 of this frame, participating in the oscillation, carries a lever 116′, (Figs. 18, 19,) which is pivoted to a bar 116, having a slot 116′ (Fig. 19) and being guided upon a pin 116×, (Fig. 19.) The bar 116 carries a pawl 117, fulcrumed at 117×. If the key is operated so as to impart the required oscillation to the lever 116′, it draws the bar 116 with it, and the pawl 117, (Fig. 18 acts with its end 117′ against the free end of the pawl-lever 65 in such a manner as to disengage its teeth from the wheel 67. A bell-crank lever 65′, connected with the pawl 65, is thereby brought with its nose 64 into engagement with a hook-pawl 63, fast upon the rocking shaft 8, in such a manner that the pawl 65 is kept out of engagement with the wheel 67, while the end 117′ of the pawl 117 by its pin 118′ riding over a projection of a slide 118, (Fig. 19,) hereinafter mentioned, frees the pawl-lever 65. By operating a key the slide 54 corresponding thereto is moved forward from the position Fig. 5 to that shown at Fig. 3. Thereby the arm 57′ of the corresponding bell-crank lever 57 loses its support on the slide 54, so that the corresponding pin 59 is projected forward through the influence of the lever-arm 57″ and spring-controlled pin 60 (Fig. 3) as soon as the edge of the notch 61 passes by the pin 59. At the corresponding oscillation of the lever 57 the lever-arm 57′ depresses the bar 62 and causes the rocking shaft 8 to make an angular motion, and thus move the hook-pawl 63 over the nose 64 of the bell-crank lever 65′. Thereby is freed the lever system 65 65′, and the pawl 65 is by the action of the spring 66 brought into engagement with the wheel 67 in such a manner that from this moment the disks 67 71 are brought to a standstill, while the disk 10″ completes its revolution. From the foregoing description it will be clear that the disk 67 after each depression of a key is moved by an amount proportional to the thickness of the corresponding type or character.

The disk 67 is rigidly connected with a beveled wheel 76, (Fig. 2,) which engages in a beveled wheel 77 on a shaft 16′. Upon this shaft 16′ is mounted a spring-controlled sleeve 16, capable of sliding endwise without rotating thereon and carrying a coupling-disk 18. On the shaft 16′ are also mounted a loose beveled wheel 79 and a fast disk 78, which latter by means of pins 78′ is coupled with the disk 18. A shifting-fork 18′ on a rod 17 (Fig. 15) engages with its forked end in the annular groove of the hub of the disk 18. The beveled wheel 79 is in gear with a beveled wheel 80, which in common with a disk 81 is seated on a common sleeve, (Figs. 2, 15.) This sleeve, moreover, carries a fast grooved pulley 81′ and is itself loose on the shaft 15 of a cylinder 42, which latter is also loose on the shaft 15. The said shaft 15 finally carries a fast disk 82, which by means of pins 81″ is coupled with the disk 81. The beveled wheel 80 (Fig. 2) gears with a beveled wheel 85. On the shaft 15 is fast a ratchet-wheel 83, (Figs. 2, 18,) formed with a projection 83′. A pawl 83″, carried by a disk 42′, rigidly connected with the cylinder 42, permits the passing of the said projection 83′ of the ratchet-wheel 83 when the latter is moved in the direction indicated by the arrow in Fig. 18 by reason of the pawl 83″ yielding, while, on the contrary, the disk 84 with the same rotary direction is prevented by the same pawl 83″ from escaping the projection 83′, so that in this manner the latter forms a fixed stop for the cylinder 42 in case the ratchet-wheel 83 is prevented from rotating. This ratchet-wheel receives, therefore, by reason of the previously-described transmission from the wheel 76 at the end of the perforation of a line a definite position and is retained therein, so that the projection 83′ also is in a definite position, as well as the cylinder 42, when this latter, with its pawl 83″, is in contact with the said projection 83′.

The cylinder 42 forms the hereinbefore-mentioned justifying means and is provided upon its peripheral surface with longitudinal rows of holes 42″, as is diagrammatically shown in Fig. 14. The cylinder 42 extends

along a rail 38, (Figs. 1, 6, 8, 14,) in which are guided spring-controlled pins 39. At the end of the perforation of a line there is therefore a certain definite perforated row of the cylinder 42 opposite the pins 39, which corresponds to the excess or remnant of line required to be justified. This perforated row is felt by the pins 39 and the paper, strip is thus formed with a corresponding system of perforations, so that at the subsequent setting operation by the aid of this paper strip the spacers delivered are of the required thickness While the rotary position of the cylinder 42 merely depends on the excess of line to be justified and is independent of the length of line itself, it is also known that for the same excess of line the thickness of the required spacers depends on the number of spacing-places of the line, so that lines with the same excess of line may require thinner or thicker spacing-sticks or spacers according to whether these lines contain more or less words. This objection is met by causing the rail 38, with the pins 39 at the perforation of each spacing-tube, to be moved stepwise along the cylinder 42 in the direction of the arrow (Fig. 14.) For practical reasons, however, this stepwise motion begins only with the fourth spacing-hole, taking it for granted that lines consisting of less than four words are not required. For similar reasons the stepwise motion is discontinued at, say, the tenth spacing-holes, as it is quite sufficient to distribute the spacers over eight places and in cases of longer lines with further spaces to supply spacing-sticks or spacers of normal thickness. Thus, for example, with a line of seven words the rail 38 would be moved from its initial position (Fig 14) for three steps, so as to bring the pins 39 in front of the fourth hole of each perforated section I II III IV V VI VII. The stepwise motion is imparted to the rail 38 by the mechanism 34 35 36 (Figs. 1, 22) ordinarily used in type-writers. The rail 38 (Fig. 22) is seated upon a sliding bar 14, mounted in guides 32 in the machine-frame. The said bar also carries a toothed rack 31, with which the operating-pawl 54 acts conjointly in a known manner, while a spring 41, attached to 31, produces the displacement of the rail 38.

The feeling for the perforations in the cylinder 42 by the pins 39 and the production of corresponding perforations in the paper strip are effected by the slide 44, (Fig. 8,) which with regard to the displacement of the rail 38 is enlarged by a plate 43 to such an extent as to cover its corresponding pin 39 in every position of the rail 38. The slides 44 are divided among the previously-described slides 54 and act in the same manner as the slides 54. Each slide 44 is, however, provided with only one projection 44′. Each slide 44 is operated by a pair of levers 48′ 48″ (Figs. 8, 9, 10) upon a rocking shaft 12. The levers 48″ are fast upon the rocking-shaft, while the levers 48′ are mounted loose.

The levers 48′ 48″ of one pair are connected together by a helical spring 49, and the lever 48′ is thereby, with a pin 47, pressed against the nose 48 of the lever 48″. The lever 48′ engages with its end 46 in a notch 45 of the corresponding slide 44. Upon the rocking shaft 12 is fast a lever 49′, which, with its roller 50, is pressed by a spring 49″ against a cam-disk 51, provided on a shaft 11. If the shaft 11 performs one revolution and the lever 49′ be caused to swing by reason of the contact of the cam 51 with the roller 50, the pin 47 will lose its support on the nose 48. The slide 44 is therefore pressed against its corresponding pin 39 by means of the lever 48′ under pressure of the spring 49 and is thus caused to advance if the pin 39 is opposite a perforation in the cylinder 42. This causes the projection 44′ of the slide 44 to enter the path of one of the rails 52 and retains this latter in its raised position and enables the paper strip to receive a corresponding perforation. In this manner, therefore, the paper strip will be perforated in accordance with those rows of holes in the cylinder 42 which at the end of a line are opposite the pins 39.

I prefer to utilize a justifying method which renders necessary the arrangement of two succeeding series of perforations upon the paper strip at the end of the separate lines. In accordance herewith of the entire number of feeling-pins 39 (it being fourteen in the present example) one half serves for the production of the one series of perforations and the other half serves for the production of the other series of perforations. For this reason the rocking shaft 12 extends only beneath the first seven slides 44, while for the actuation of the second group of slides 44 and pins 39 a rocking shaft is used which may either be disposed in the prolongation of the shaft 12 or be independent thereof and which may receive its rocking motion through the intervention of a second cam-disk provided on the shaft 11. The lifts of these two cams are so disposed toward each other that first the first series of perforations is produced and after having then advanced the paper strip by one step the second series of perforations is produced.

The operations before described are automatically executed at the end of the line by depressing the special key 127, (Fig. 18.) The key 127 is connected by a draw-bar 126 with a lever 124′, upon whose shaft are fixed two pawls 124 and 125. The pawl 124 rests against a projection 84′ of the disk 84, firmly fixed to the cylinder 42, while the pawl 125 is adapted to oscillate in the plane of the ratchet-disk 83. The cylinder 42 is driven by a strap 1× from

the continuously-rotating shaft 1. As long as the pawl 124 rests against the projection 84′ the strap $1^{\times}$ slips without rotating the cylinder. If, however, the key 127 is depressed, the pawl 125 is brought into engagement with the ratchet-disk 83 and stops the latter, so that the cylinder 42 is also stopped as soon as its pawl 83″ comes against the projection 83′ of the disk 83. Moreover, it is obvious that the disk 83 may be omitted and the cylinder 42 immediately moved stepwise at the various perforations. This would, however, necessitate the great mass of the cylinders being suddenly rotated and suddenly stopped. The resulting shocks would, however, detrimentally affect the entire mechanism. It is therefore more advantageous to transmit the separate stepwise motions onto an almost subsidiary element, such as the disk 83, and then arrest the greater mass of the cylinder by a single motion.

By the depressing of the key 127 at the end of a line the shaft 11 is also freed to make one revolution. The shaft 11 is by means of a disk 11′ and friction coupled with a wheel-train driven by the shaft 1, (Fig. 18,) the ratio of the gear being such as to cause the former to make one revolution to three revolutions of the shaft 1. The coupling-disk 11′ is retained by a pawl 123. At the depression of the key 127 the draw-bar 126 acts by means of the arm 126′ and link 126″ on the pawl 123 and draws it forward under the ratchet-tooth of the disk 11′, thereby causing the shaft 11 to rotate. The shaft 11 carries a disk 122′, (Fig. 18,) furnished with three pins 122. In the path of these pins is a lever 121, connected by a draw-bar 120′ with a lever 120. The lever 120 acts upon an angle-lever 119, connected by a link 119′ with a slide 118, guided in a straight line by means of pins and slots. In consequence hereof the lever 120 produces the oscillation of the lever 119 and causes the nose 117′ of the pawl 117 of the slide 116 to move out of the path of the pawl-lever 65 by pressing down the pin 118′ of the pawl 117 by means of the enlarged end of the slide 118. If now the lever 119 during its depression comes against the slide 116, so as to move the same and turn the rocking shaft 6, the pawl 117 passes the pawl-lever 65 without actuating it—*i. e.*, without lifting it out of the teeth of the disk 67—and therefore also without producing the stepwise motion of the cylinder 42. The oscillation thus transmitted to the rocking shaft 6 produces the disengagement of the pawl 134, (Fig. 4,) and thereby also the operation of the perforating apparatus in the manner hereinbefore described. During the ensuing third revolution of the shaft 11 the lift of a third cam-disk 13′ upon this shaft (Figs. 23, 22) acts on a lever 13″, swinging around 13. The plate 13^{3} is connected by a draw-bar 13^{4} with the lever 13″ and can be so displaced as to produce the first perforation in the paper strip for indicating the required end of the line as soon as the lever 13″ is oscillated. A lateral end $13^{\times}$ of the lever-arm 13″ is thereby applied against the side of a pawl 30, disposed at the right-hand side of the bar 13, (Fig. 22,) and thus places the said pawl in the path of a pusher 28 29, which is moved forward through the intervention of lever-and-link connection 28^{3} 27 by the action of a crank-disk 27^{3} (Fig. 22) on the perforating-shaft 23. This causes the bar 38, with its feeler-pins 39, to be returned into its initial position. The reason that with this third revolution no thicknesses have been counted is the same as previously explained with reference to the prior one-third revolutions. This third revolution of the shaft 11 serves at the same time for returning the disk 83 into its initial or zero position, for when the projection 83′ of the disk 83 at the end of a line is required to take always a definite position relative with the rail 38 it will obviously also be necessary at the beginning of counting the thicknesses in each line that the said projection should always have the same relative position to the rail 38. To this end a cam 20 (Figs. 2, 15, 18) upon the shaft 11 strikes during the last third revolution of the said shaft against an arm 19 of the shifter 18′, and thereby disengages the coupling-disk 18 from the coupling-disk 78. The fork 18′ engages by its guide-rod 17 with an angle-lever 21, (Fig. 2,) which latter is connected with a rod 22. The latter is connected by an arm 22′ with the shaft 15 of the cylinder 42. At the displacement of the fork 18′ by the cam 20 the ratchet 83, or rather its projection 83′, is also withdrawn from the pawl 83″, so that the cylinder 42 is free to the pull of the strap 1′. The cylinder thus obeying the pull of the strap is turned as far as the stop-pawl 124, against which the nose 84 strikes. Upon the shaft 15 is also mounted the coupling-disk 82, which also is uncoupled from the disk 81 by the shifting of the shaft, and thereupon the pull of the strap 1″ acts upon the disk 81′ and causes the wheel 80 to turn as far as the stop 81. The rotation of the wheel 80 is transmitted to the wheels 79 and 85. The pull of the strap is so calculated that the wheels are securely moved against the stop before the cam-disk 20 ceases to act. When the action of the cam-disk 20 upon the nose 19 of the lever 19′ ceases, all the couplings are returned to their zero position by the pressure of the spring 16′. The bar 22 at the same time and by the connection 22^{3} also disengages the pointer mechanism, or rather its driving-worm, (Figs. 2 and 13.) Finally it may be remarked that for the purpose of simplifying the key mechanism in the example represented in the drawings one key may be utilized to operate three marks. This is effected by the double reversing-key 89′ 89″, (Fig. 1,) well known in type-writing machines.

The said key acts, through the medium of lever-and-link connections 89× 103′, upon a shaft 103, linked by an arm 104 to the guide-rail 58 for the pins 59, coacting with the cylinder 9×, (Figs. 6, 7.) With the rail 58 is connected an angle-lever 105, whose arm 106′ is connected by an arm 106 to a slide 55. If none of the reversing-keys 89′ 89″ are operated the projection 55′ of slide 55 takes up the position shown in Fig. 6 and the rails 52′ 52″ produce no perforations. If, however, one of the reversing-keys 89′ or 89″ is operated, the projection 55′ of the slide 55 is caused in the first case to move beneath the rail 52″ and in the latter case to move under the rail 52′, and in accordance therewith perforations are produced by the rails 52′ 52″.

In order to reproduce the perforated text at the same time in ordinary print, it is advantageous to combine the described perforating aparatus with a type-writing machine, as is indicated in Fig. 1. For this purpose the so-called "Williams" type-writing machine has been chosen. The levers 97 are used to actuate, through the intervention of draw-bars 97′, type-levers 97″, while the bar 103′ is connected with a lever 103″, which carries the paper-roll.

I claim—

1. In a machine of the class described, the combination with mechanism for producing a mechanical representation of the characters in a line of print, of mechanism for registering the space in the line required to be filled for justification, mechanism for registering the number of word intervals in the line, and automatic means controlled by said registering mechanisms for producing at the end of the mechanical representation of the characters a mechanical representation of the justification required for the line.

2. In a machine of the class described, the combination with mechanism for producing a mechanical representation of the characters in a line of print, of mechanism for registering the space in the line required to be filled for justification, mechanism for registering the number of word intervals in the line, and means automatically controlled by said registering mechanisms for producing at the end of the mechanical representation of the characters a mechanical representation of the justification required for the line.

3. In a machine of the class described, the combination with mechanism for perforating a strip to produce a mechanical representation of the characters in a line of print, of mechanism for registering the space in the line required to be filled for justification, mechanism for registering the number of word intervals in the line, and means automatically controlled by said registering mechanisms for producing at the end of the line representation a series of perforations constituting a mechanical representation of the justification required for the line.

4. In a machine of the class described, the combination with a keyboard, of the slides 54 operated from the keyboard, the bars 52 arranged transversely to the slides, means for periodically moving the bars into contact with the slides, and means controlled by said bars for producing a mechanical representation of a line of print.

5. In a machine of the class described, the combination with the slides 54, having differently-arranged projections, of the overlying bars 52 arranged transversely to said slides, means for yieldingly and periodically bringing the bars into contact with the slides, and a strip-perforating mechanism controlled by the movement of said bars.

6. In a machine of the class described, the combination with a series of slides 54, of a second series of parallel slides 44, a series of bars 52 overlying the said slides, a keyboard and connections for controlling the slides 54, automatic justifying mechanism for controlling the slides 44, and means controlled by the bars 52 for producing a justified mechanical representation of a line of print.

7. In a machine of the class described, the combination with the justifying-cylinder 42 having different depressions or surfaces corresponding to the justification of different lines, of a series of slides 44, means whereby the adjustment of said bars is controlled by said justifying-cylinder, and mechanism controlled by said slides for producing the mechanical representation of the justification of a line.

8. In a machine of the class described, means for registering the thicknesses of the characters constituting a line of print comprising a rotatable cylinder having depressions in its surface, the circumferential distances from a given line to said depressions being proportionate to the thicknesses of the corresponding types or characters.

9. In a machine of the class described, a variable-space device comprising a cylinder having a plurality of notches or depressions therein arranged at variable distances from a common longitudinal line, a series of spring-pins arranged to coöperate with said cylinder, and means controlled by the movement of said pins into the notches for registering the several widths of characters in the line of print.

10. In a machine of the class described, a justifying-cylinder having in its periphery a series of groups of variable elevated surfaces, a series of feelers arranged in a common support parallel with said cylinder and movable to and from said cylinder, and means for adjusting said feelers longitudinally to said justifying-cylinder.

11. In a machine of the class described, the combination of a justifying piece or cylinder

having elevations or depressions corresponding to the justification of different lines, means for registering the width of the characters of a line and the number of word intervals in the line, and means for bringing said registering device into conjunction with said justifying piece or cylinder to set the latter, after the characters of a line have been indicated.

12. In a machine of the class described, the combination with the justifying-cylinder 42, of the disk 83, means for first adjusting the disk during the indication of the characters for a line upon the keyboard, and means for bringing the disk and cylinder into conjunction to set the latter after the entire line has been indicated on the keyboard.

In testimony that I claim the foregoing as my invention I have signed my name in presence of two subscribing witnesses.

COLOMAN ROZÁR.

Witnesses:
ALOIS GOBANZ,
OSCAR BOCK.