

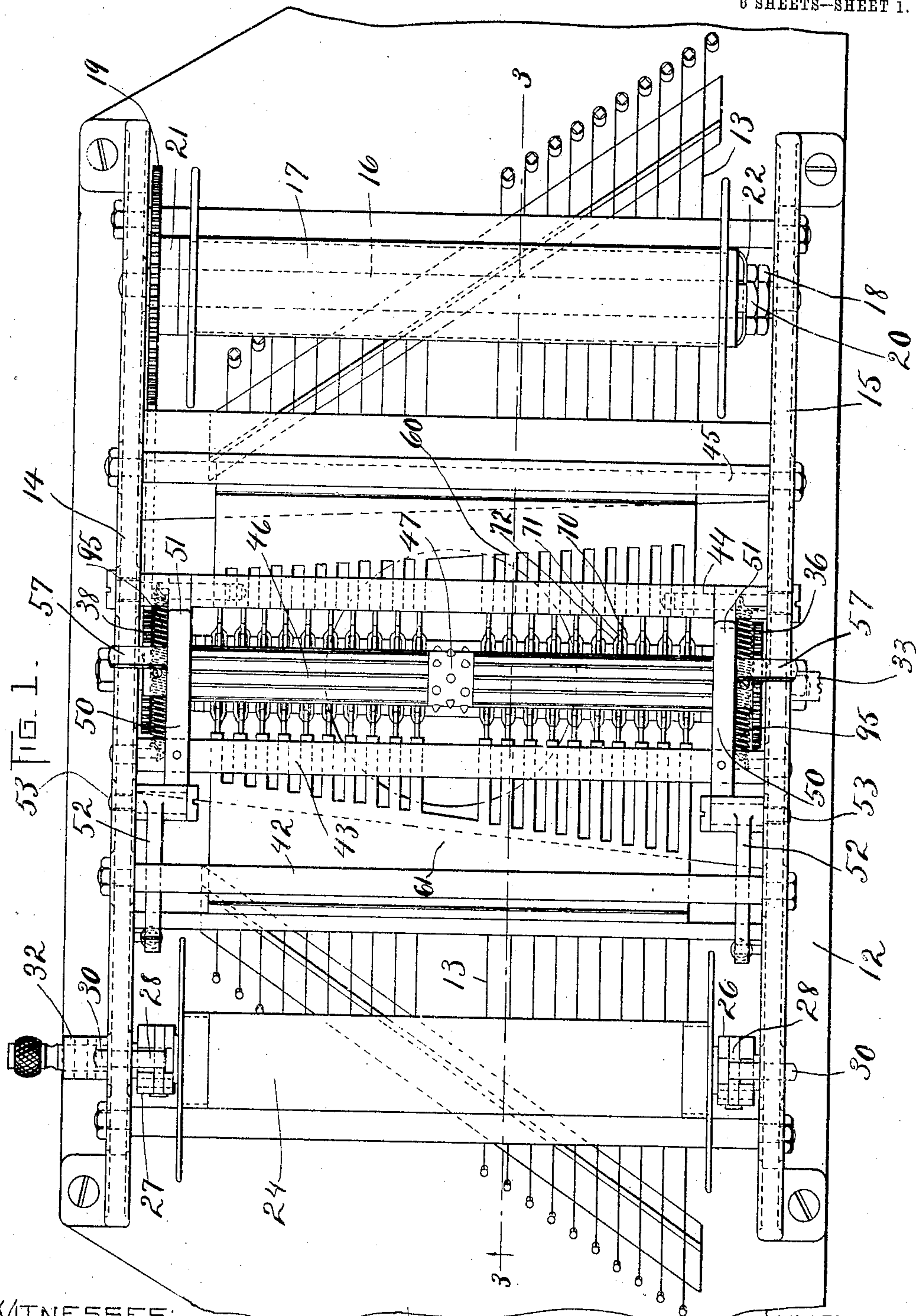
No. 844,310.

PATENTED FEB. 12, 1907.

J. McTAMMANY.
MECHANICAL MUSICAL INSTRUMENT.

APPLICATION FILED APR. 8, 1902.

6 SHEETS—SHEET 1.



WITNESSES:

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P. H. Deyette

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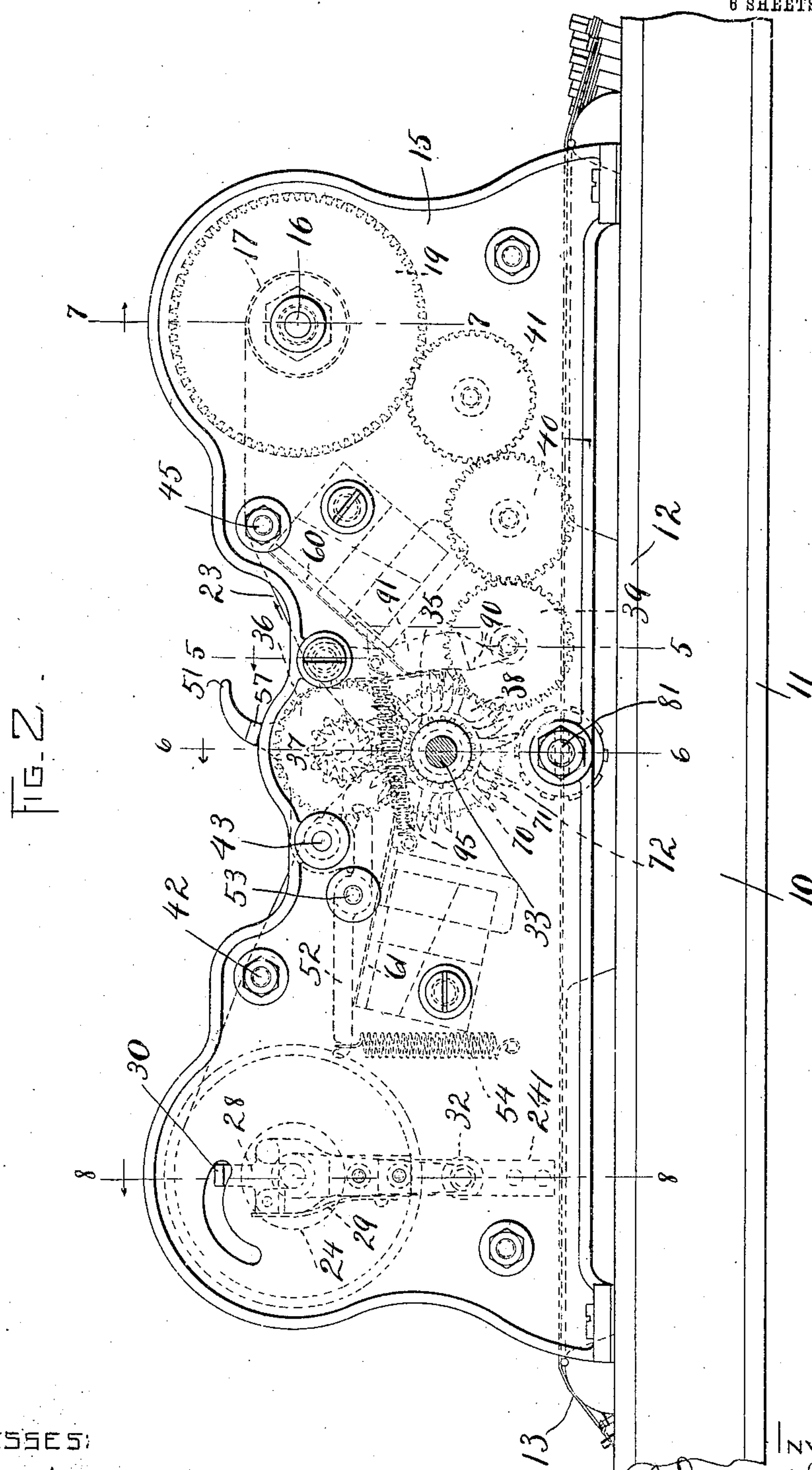
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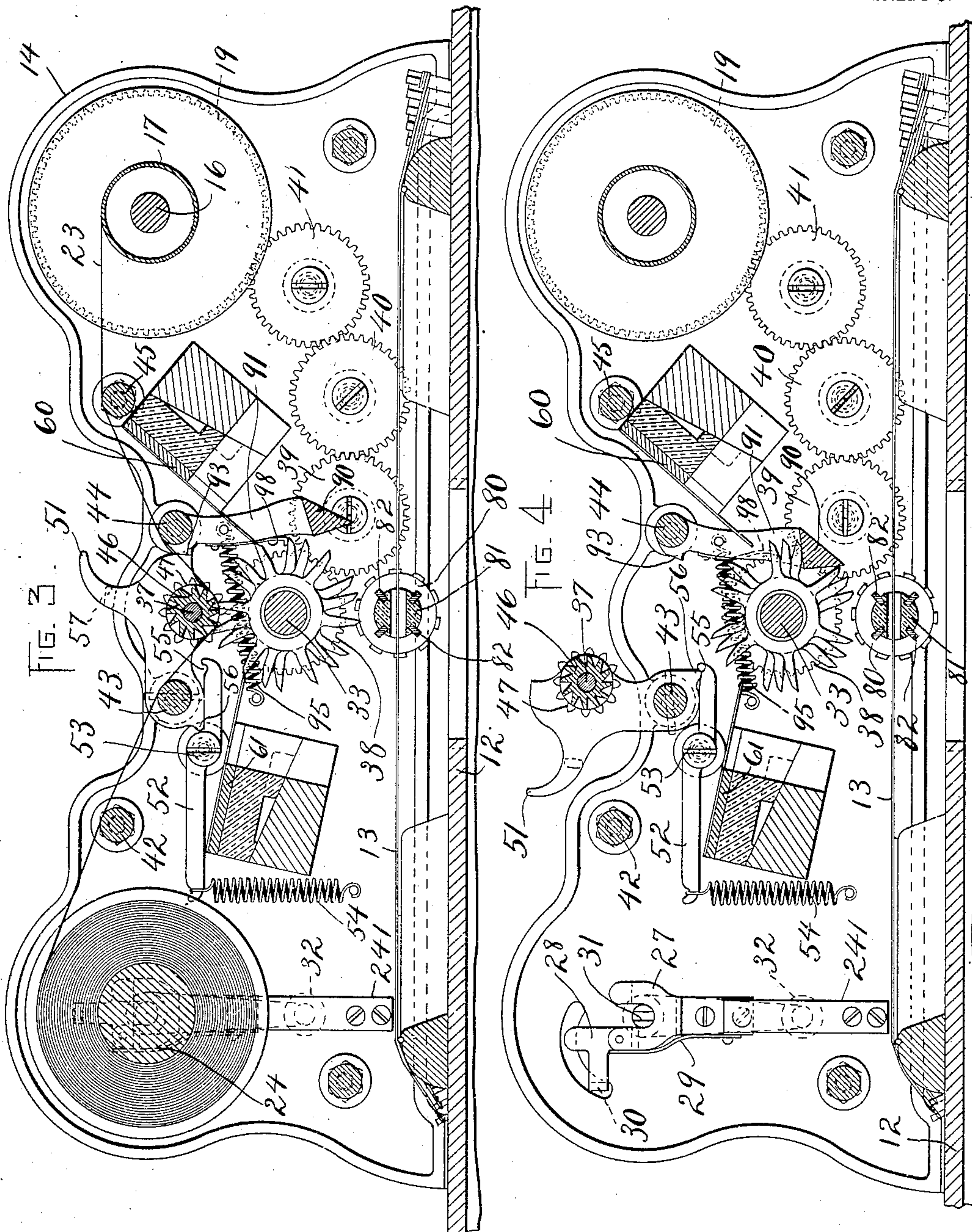
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6 SHEETS—SHEET 3.



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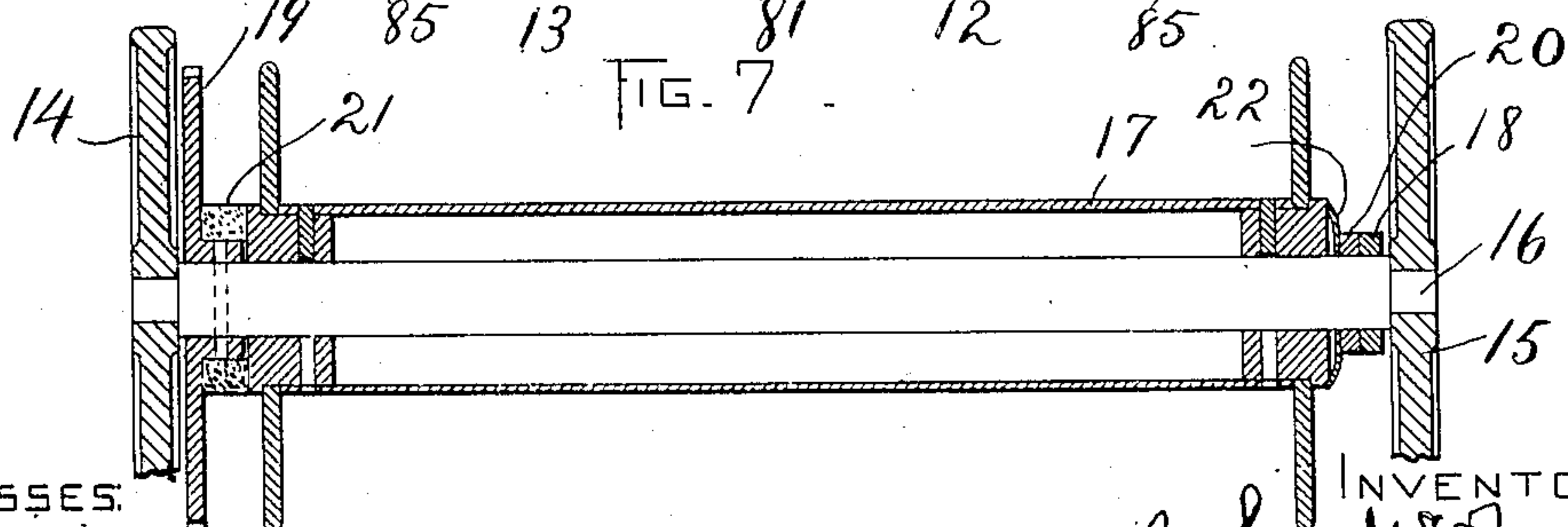
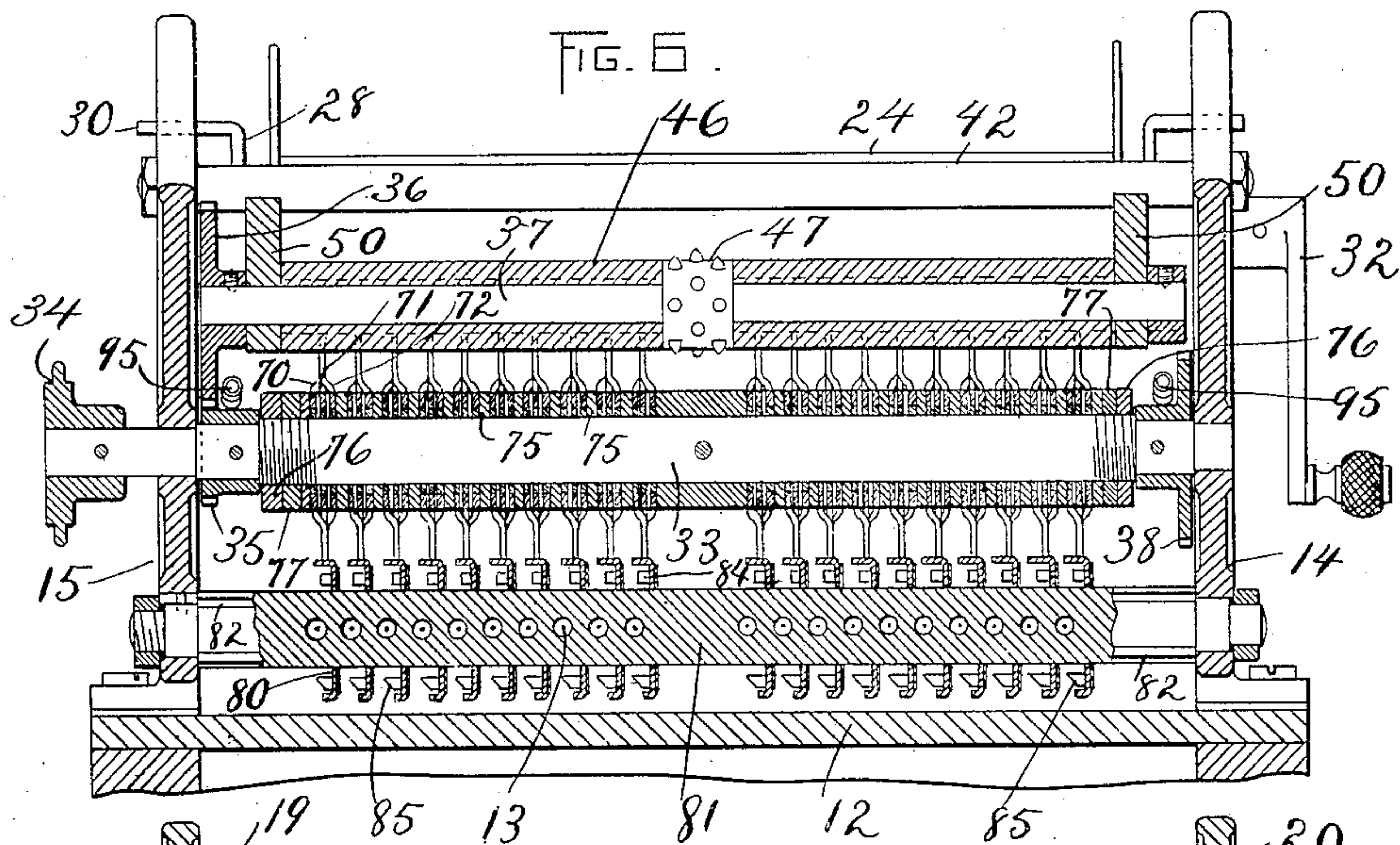
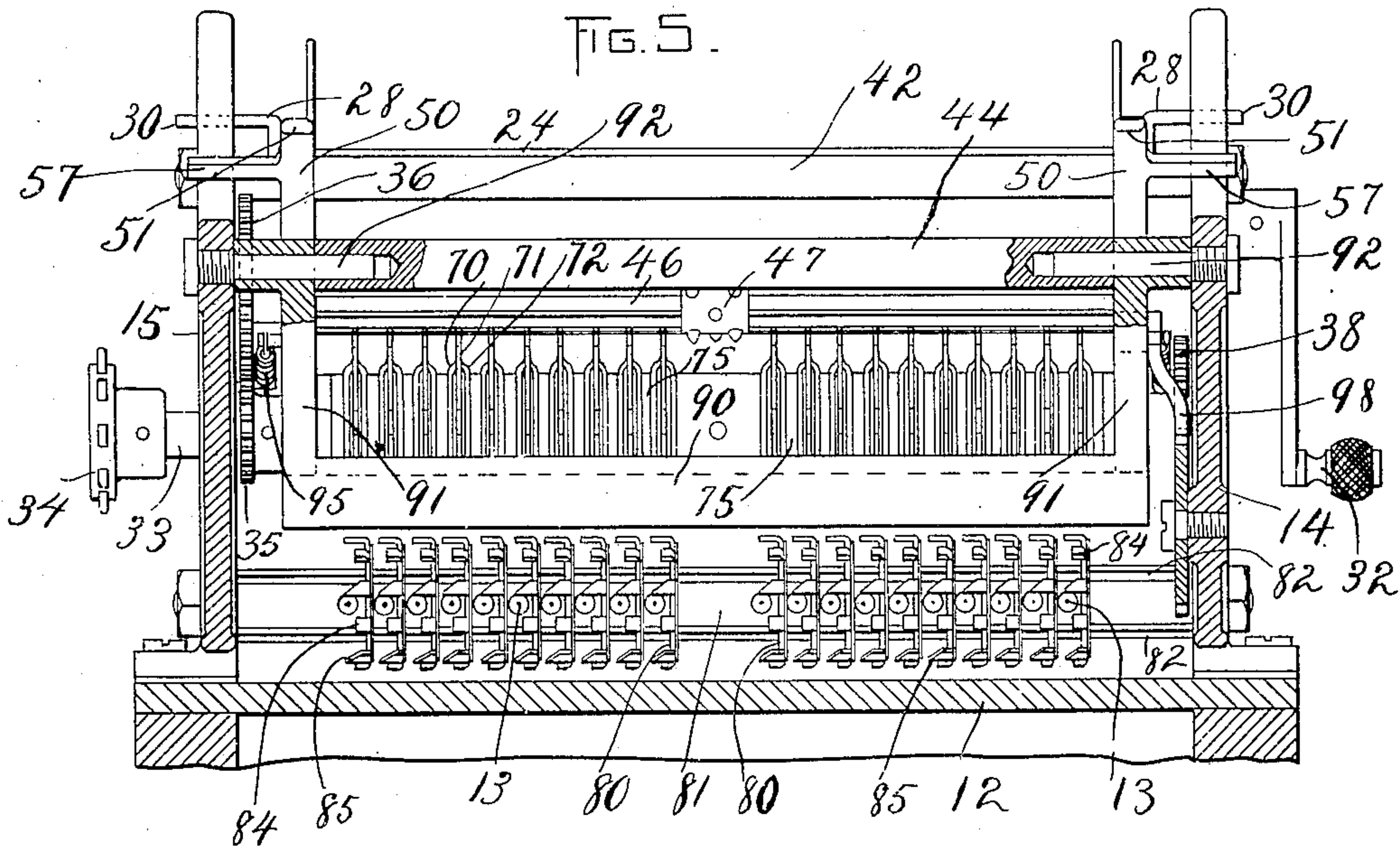
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6 SHEETS—SHEET 4.



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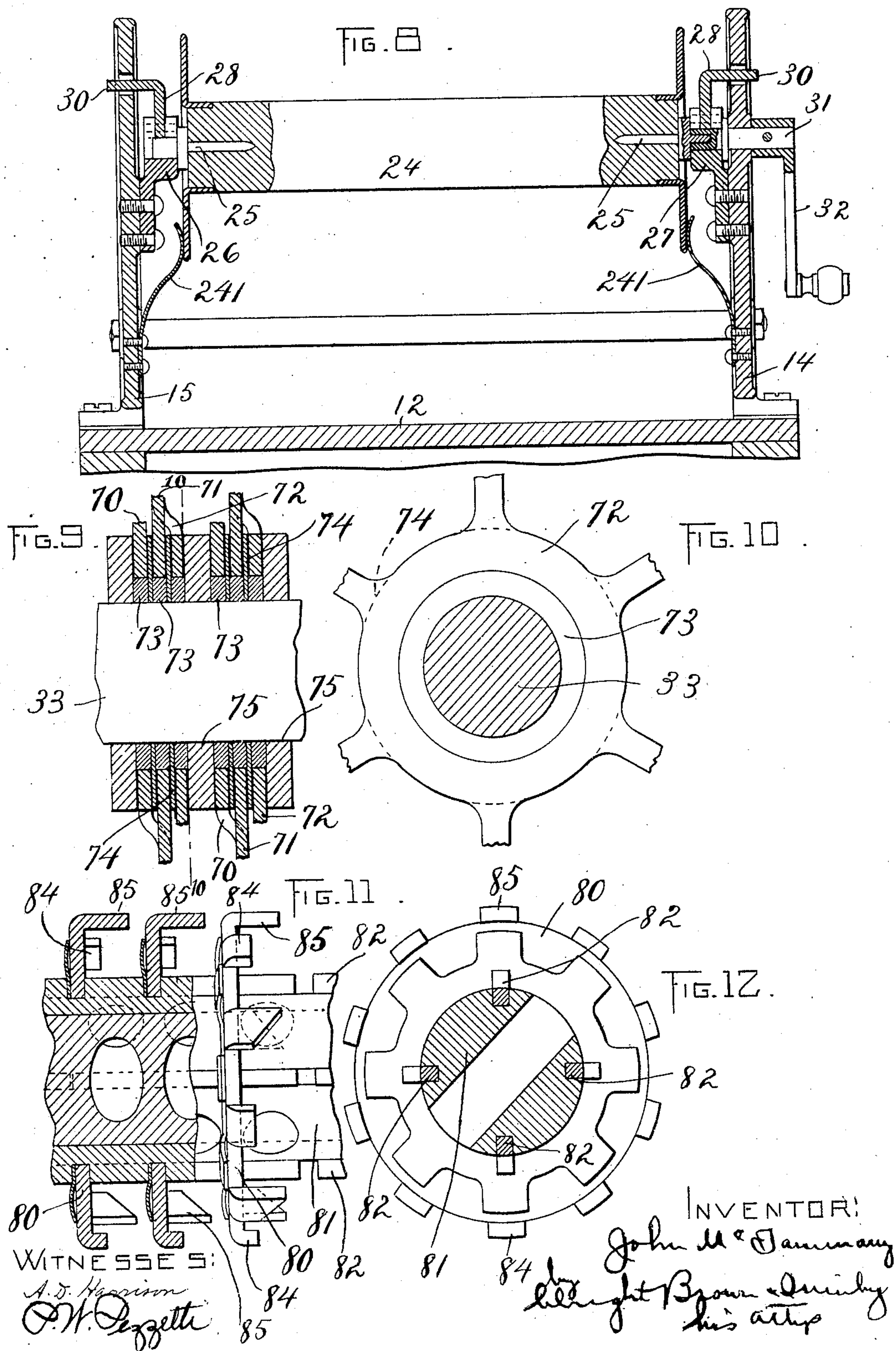
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6 SHEETS—SHEET 5.



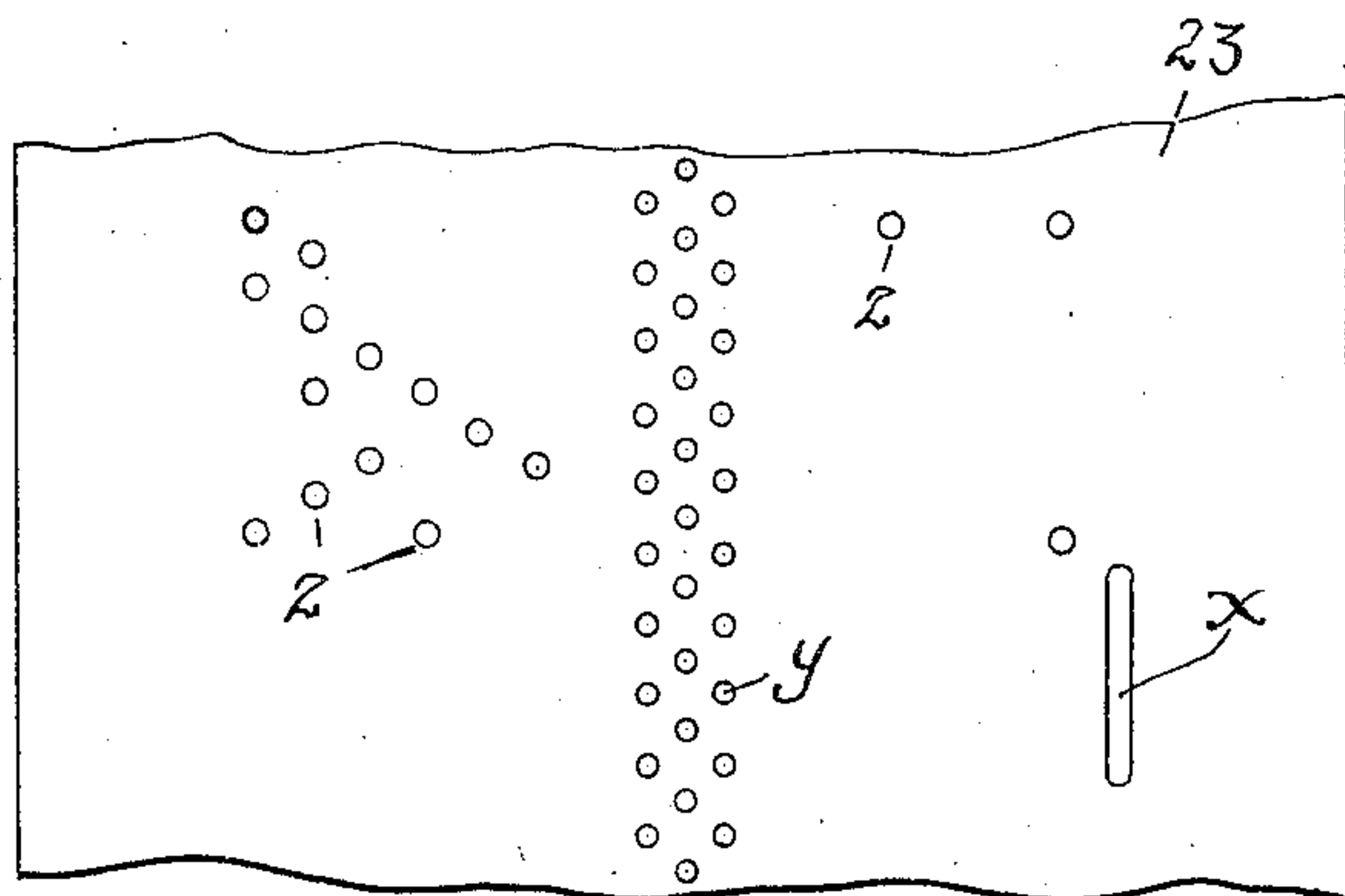
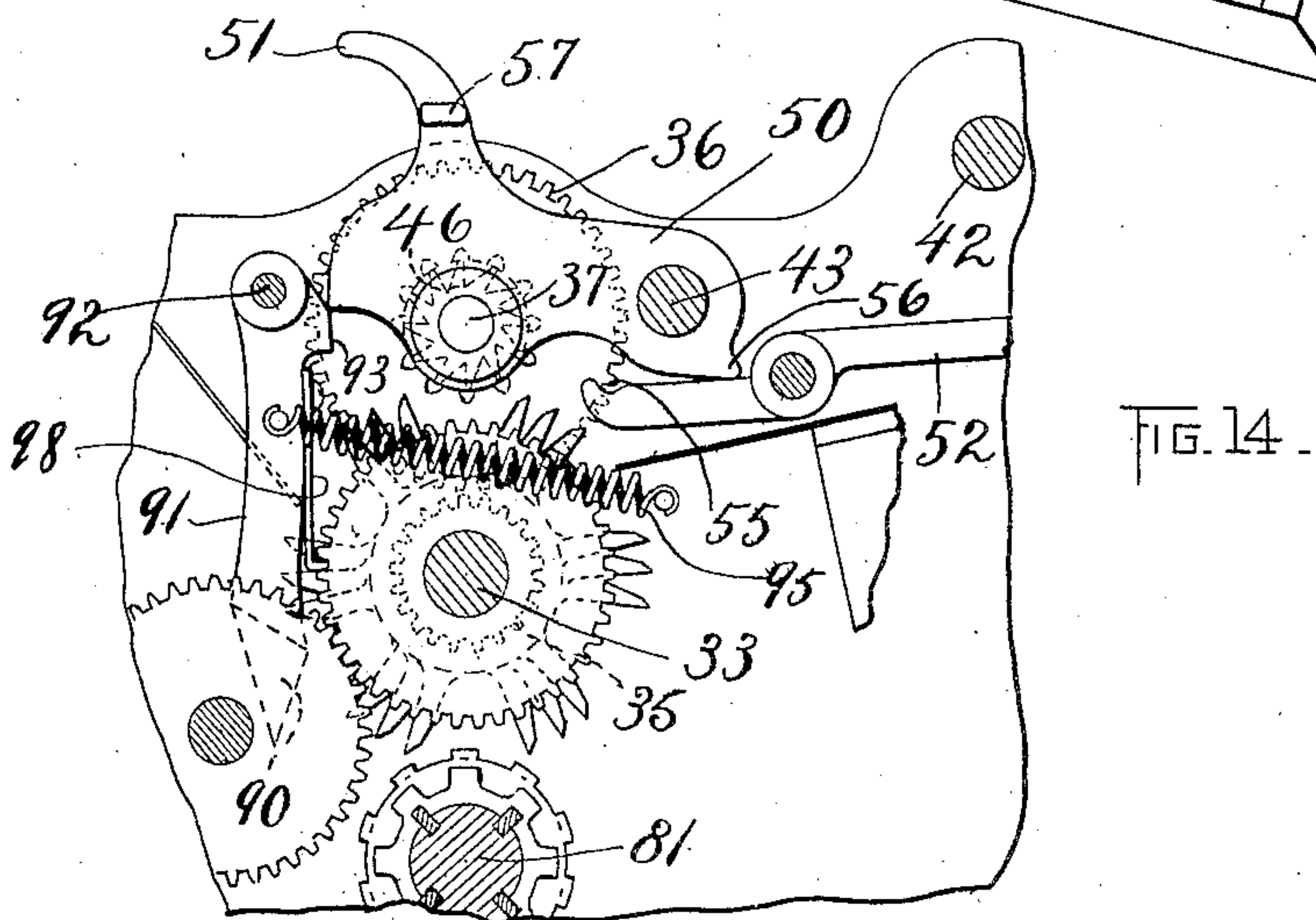
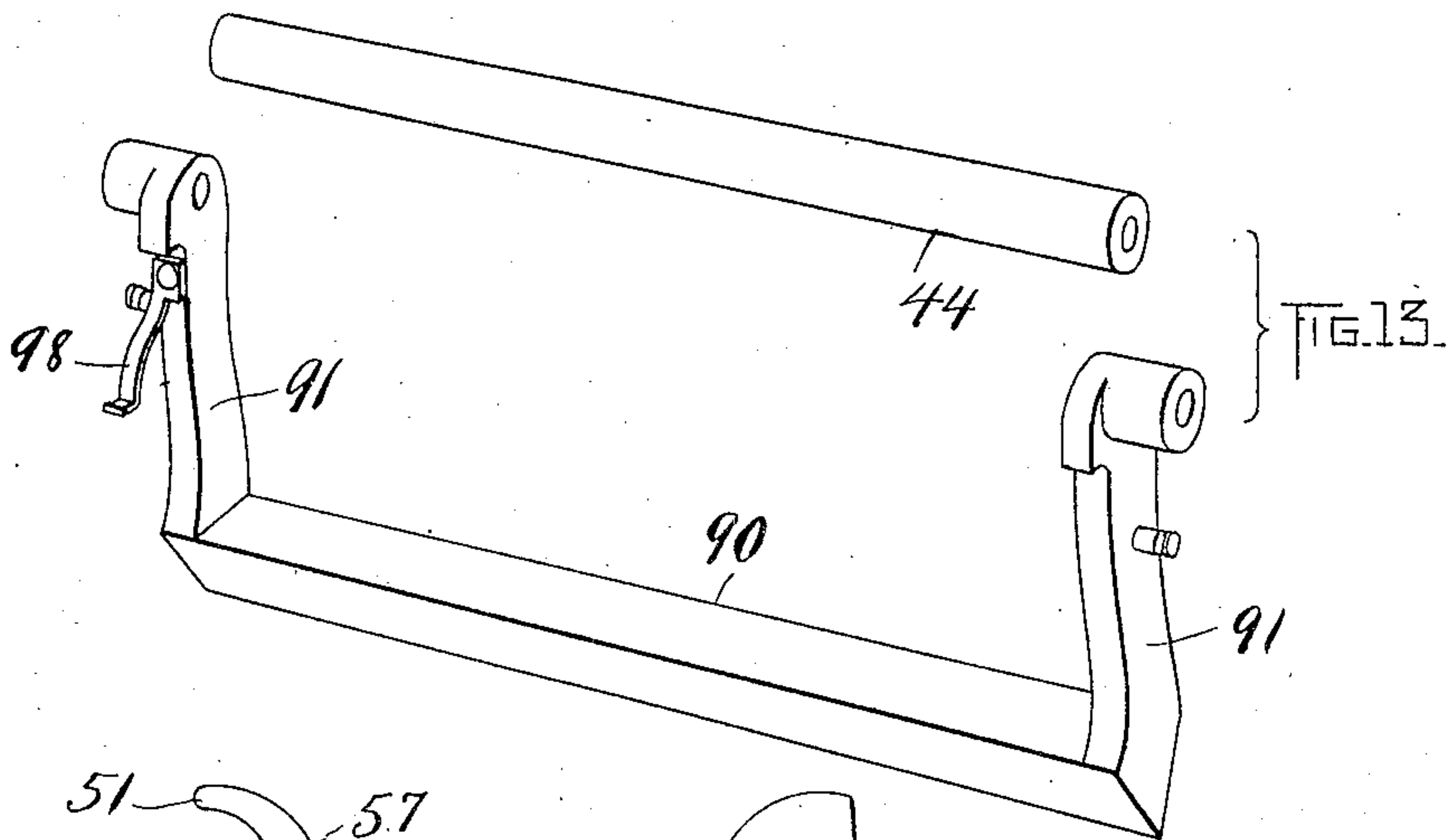
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6 SHEETS—SHEET 6.



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UNITED STATES PATENT OFFICE.

JOHN McTAMMANY, OF PROVIDENCE, RHODE ISLAND, ASSIGNOR TO F. A. McTAMMANY, OF NEW YORK, N. Y.

MECHANICAL MUSICAL INSTRUMENT.

No. 844,310.

Specification of Letters Patent.

Patented Feb. 12, 1907.

Application filed April 8, 1902. Serial No. 101,916.

To all whom it may concern:

Be it known that I, JOHN McTAMMANY, of Providence, in the county of Providence and State of Rhode Island, have invented certain new and useful Improvements in Mechanical Musical Instruments, of which the following is a specification.

This invention has relation to mechanical musical instruments. Its objects are, first, the provision of an instrument with which may be employed a selector of indeterminate length, whereby musical compositions may be reproduced without regard to the number of measures; second, to provide an instrument of the class named whereby a greater variety of tone-producers may be used, finer effects may be obtained, and musical compositions of a higher grade of excellence may be performed than heretofore, and, third, to provide an instrument having certain improvements whereby it is rendered strong and durable and unlikely to get out of order or to be injured when subjected to ordinary use.

The action operates upon two or more different kinds of sounding devices or tone-producers, although this is not essential in the simplest form of the invention. To make clear this feature of the invention, the instrument is illustrated as being provided with two musical combs and with a set of strings such as those of an autoharp. The action includes a plurality of pickers which directly engage the tongues of the combs, and a plurality of string-vibrators, actuated by said pickers, to engage and release the strings in predetermined order to cause them to sound in unison with the combs. The invention contemplates, however, the substitution of other tone-producers for those illustrated, and the employment of reeds in lieu of the strings would not be a departure from the invention.

On the accompanying drawings, Figure 1 represents in plan view a mechanical musical instrument embodying the invention. Fig. 2 represents a side elevation of the same. Figs. 3 and 4 represent sections on the line 3 3 of Fig. 1 looking in the direction of the arrow. Fig. 5 represents a section on the line 5 5 of Fig. 2. Fig. 6 represents a section on line 6 6 of Fig. 2. Fig. 7 represents a section on line 7 7 of Fig. 2. Fig. 8 represents a section on line 8 8 of Fig. 2. Fig. 9 repre-

sents a magnified section through the pickers. Fig. 10 represents a section on line 10 10 of Fig. 9. Figs. 11 and 12 represent the vibrators for the strings. Fig. 13 represents the safety-wedge. Fig. 14 represents the safety device in engagement with the gearing upon the first movement of the rack to vertical position. Fig. 15 represents a portion of the selector or tune-sheet.

On the drawings, 10 indicates the body of the instrument, which in shape is substantially similar to a zither or autoharp. This body has a base-board 11, and the sounding-board 12, upon which the frame for the action is supported. Across the sounding-boards are passed the strings 13. The frame for the action comprises the two standards 14 15, secured at their lower ends to the sounding-board 12, near the side edges thereof, said standards being arranged parallel with the strings, as indicated. In said standards is journaled a shaft 16 for the winding-roll, which takes up the selector, as will be subsequently explained.

The winding-roll is indicated at 17, and it is frictionally mounted upon the shaft, being held between a collar 18 and a gear 19 by rings 20 and 21, of suitable friction material, such as leather, and by a spring 22, interposed between the ring 20 and the end of the roll. The gear 19 is pinned to the shaft and transmits power thereto from the main driving-shaft of the machine, as will be set forth in detail.

The selector is indicated at 23 and is preferably formed of paper or other flexible non-metallic material, which may be provided in suitable lengths. Each selector is initially wound upon a cylinder or roll 24, whereby it can be sent through the mails with facility. The body of the roll may be formed of wood, and in each end is driven a pin or gudgeon 25 25. The two pins rest in open bearings 26 27, respectively, and are maintained in place by pivoted latches 28, held in operative position by springs 29, each latch having a projection 30 extending through a slot in the standard by which it may be moved to an inoperative position to permit the removal of the roll 24.

Journaled in the standard 14 is a shaft 31, to which is attached a crank 32. The end of the shaft 31 is slotted or grooved to receive a tongue on the end of the pin 25; so that when

the roll 24 is inserted in the instrument the pin 25 may be engaged with the shaft 31, after which the latches 28 hold the roll removably in position. Springs 241 engage the end of the roll 24 to retard its rotation, as shown in Fig. 8.

The main driving-shaft of the instrument is indicated at 33, and it is located below the plane of the axes of the shafts 16 and 31. On the end of this shaft which projects beyond the standard 15 is secured a driving-sprocket 34, to which power may be transmitted from any suitable driving mechanism, such as a spring or electric motor. In lieu of the sprocket, however, a crank may be attached to the shaft 33 to rotate it. This shaft serves two functions in that it indirectly effects the feeding of the selector and the actuation of the sounding devices or tone-producers. It is provided with a pinion 35, intermeshing with and driving a gear 36 on a shaft 37 immediately above the shaft 33, but below the plane of the axes of the shafts 16 and 31. The shaft 33 is likewise provided with a gear 38, which through a train of gears 39, 40, and 41 imparts power to the gear 19 on the shaft 16, hereinbefore referred to. The gears 39, 40, and 41 are journaled on short shafts secured to the inner face of the standard 14. The selector passes from the roll 24 to the roll 17 over guides 42, 43, 44, and 45, but under the shaft 37, whereby it is caused to follow a tortuous or divergent path and to form, as it were, a loop or bend between the guides 43 and 44. Upon the shaft 37 is secured a grooved, fluted, or toothed roll 46. Substantially midway between its ends this roll is equipped with a selector-feeding sprocket 47, having teeth or points adapted to enter one or more lines of perforations y , arranged in a row in the selector substantially midway between the side edges thereof. The selector is provided on either side of said row or rows of perforations with other perforations z , which govern the pickers. The shaft 37 is journaled in a rack, comprising the end bars 50 and the guide 43, to which they are pinned, this guide being journaled at its ends in the standards 14 and 15. The said end bars are provided with hooked projections 51 for lifting them from horizontal to vertical position. In order to hold the rack in a horizontal position, there are provided two levers 52, respectively fulcrumed at 53 and having their longer ends connected to springs 54, as illustrated in Figs. 3 and 4. The shorter arms of said levers bear against the end bars 50 of the rack when the rack is in horizontal position and hold it yieldingly from rising. In the ends of the shorter arms are sockets 55, with which projections 56 on the end bars 50 may be engaged, when the rack is raised to vertical position and to prevent it from accidentally dropping to horizontal position. When in

horizontal position, the lugs 57, projecting laterally from the hooks 51, rest upon the tops of the standards. The levers 52 and spring 54 constitute one form of a spring-lock or locking mechanism for holding the rack in either of two positions.

In addition to the strings, which constitute one form of sounding devices or tone-producers, there are two musical combs 60 61. These combs are secured to suitable supports and are arranged at an inclination whereby the tongues may be simultaneously engaged by the pickers, as will be subsequently explained. At the center of each comb some teeth or tongues are omitted, since the perforations which govern the action of the pickers are located in the selector on both sides of the rows of perforations by which the selector is fed. Where the feeding-sprockets on the roll 46 are formed at the ends thereof, its teeth or tongues need not be omitted, but may extend continuously from one end of the comb to the other.

Frictionally mounted upon the shaft 33 are a plurality of sets of pickers, there being three pickers in each set, with their teeth or points lying in the same plane transverse to their axis of rotation. The pickers of each set are indicated at 70 71 72, respectively. Each picker is journaled upon a collar 73, fitting frictionally upon the shaft 33, said collar being a little wider than the picker. (See Fig. 9.) Between each pair of the collars is a spacer or separator 74, which is keyed upon the shaft to rotate therewith, and between each set of pickers there is a thicker separator or spacer 75, likewise keyed to the shaft. These separators and pickers are all held upon the shaft between lock-nuts 76 77, screwed on the ends thereof. They are all jammed tightly together, but inasmuch as the pickers are thinner than their supporting-collars they are not bound, but are free to rotate upon the said collars or to permit the rotation of said collars when their movement is retarded. (See Fig. 9.) There is one set of pickers for each tongue or each string, and each one of the pickers of each set causes the sounding of both tongues and of the string which corresponds thereto. The pickers are preferably in the form of star-wheels and may have any number of teeth or points, although in the present instance each one is illustrated as having six. The outer ends of the teeth of the pickers travel in a circle which intersects the path of movement of the selector, and consequently they are arrested and held against movement by the unperforated portion of the selector which is passing under the grooved roll 46. As soon as a perforation in the selector registers with one of the teeth the frictional engagement of the picker with its supporting-collar and shaft is such that it is carried forward with the selector until it is engaged by a tooth on the fluted roll, which

rotates it at a peripheral speed equal to the speed of movement of the selector, the other pickers of the same set being arrested and held from movement by the unperforated portion of the selector which immediately follows. As the picker is advanced by the actuator another tooth or point thereof engages a tongue on the comb 60, while still another engages a tongue on the comb 61. The third tooth effects the actuation of a string vibrator, as will be subsequently explained. Inasmuch as there are three pickers for each tooth of the comb and for each string vibrator, the pickers are caused to successively engage and operate them when an elongated perforation registers with said pickers, the actuation of the sounding devices continuing until an unperforated portion of the selector arrests the further rotation or movement of the pickers. The fluted roll constitutes a positive actuator for operating the pickers when permitted by the perforations in the selector.

The tendency of the shaft 33 is to rotate all of the pickers with it, but, as previously stated, they are held against rotation by the unperforated portion of the selector, which intersects their path of movement as it passes underneath the grooved or fluted roll 46, and when the tooth of a picker is released from the fluted roll the picker continues to move until it is arrested by the engagement of its teeth with another picker of the same set.

The "string-vibrators," as I term those contrivances in the action which effect the vibration of the strings, consists of disks 80, journaled upon a cylindrical bar 81, extending between the standards of the frame and arranged in the plane of the strings 13. This bar or support 81 is provided with a perforation for each string, the perforation being large enough to prevent the bar being engaged by the string when vibrated. Each disk is free to rotate independently of the others and is held in place by a plurality of notched keys 82, as shown. On the periphery of each disk are series of feeding-teeth 84 and string-engaging points or teeth 85, which are beveled, as shown. The vibrators are so arranged that the path of rotation of the teeth 84 intersects the path of rotation of the outer ends of the teeth of the pickers, hereinbefore referred to, so that each time a picker is rotated one step it engages a tooth 84 of the string-vibrator immediately therebelow, and partially rotates it to cause its teeth 85 to engage and release its string and effect the vibration thereof for the production of a tone. From this it is apparent that each time a picker is partially rotated by the fluted roll it causes the sounding of two tongues and a string, and of course the strings and tongues are pitched in unison.

In order to prevent injury to the pickers in the insertion of a selector in the prepara-

tion of the instrument for playing, a device is provided for automatically moving all of the pickers to a position where they will not be engaged by the fluted roll. This device consists of a wedge 90, hung upon arms 91, journaled upon pins 92, passed through the standard. These pins likewise serve as journals for the guide-roll 44 hereinbefore referred to. The said arms are provided with cams 93, which are engaged by the end bars 50 of the rack when the rack is in horizontal position to throw the wedge to an inoperative position, as in Fig. 3. Springs 95 are attached to said arms, however, and when the rack is lifted the springs draw the arms toward the shaft 33, so that the wedge engages the pickers and moves them to a position where they are incapable of injury by the fluted roll. At the same time a spring-latch 98 on one of the arms engages the teeth of the gear 38 and holds said gear against rotation. (See Fig. 14.) Thus the rewinding of the selector upon the roll 24 may be effected without the rotation of the train of gearing, since the roll 17 is only frictionally mounted upon its supporting-shaft.

Referring once more to the feeding of the selector, it will be observed that inasmuch as this is accomplished by the sprocket 47 the selector is fed accurately and positively at a predetermined speed or at a speed bearing a predetermined relation to the speed of the driving-shaft 33. Consequently the tempo or movement of the composition produced upon the instrument is accurately regulated. The perforations in the selector which govern the action bear a predetermined relation to the feeding perforations, which are evenly spaced.

The grooved roll is of course provided with a predetermined number of teeth or corresponding grooves, and these grooves bear a predetermined relation to the feeding-points on the sprocket. Consequently in laying out the perforations on the selector the action-governing perforations are so related to the perforations which receive the feeding-points of the sprocket, and therefore to the grooves and teeth in the toothed roll, that when a picker-point enters one of the action-governing perforations it registers with a groove in the toothed roll and not with a tooth therein. Practically the teeth and corresponding grooves on the actuator or toothed roll are so spaced as to represent tones of the shortest duration, and consequently if the selector were provided with a single elongated perforation equal in length to the circumference of the actuator or toothed roll twelve tones of the shortest duration would be produced in succession. In lieu of the single elongated perforation the sheet might be provided, however, with twelve perforations set closely together within the limits referred to.

A marked advantage is secured in this instrument by locating the feeding-sprocket in position to engage the sheet midway between its side edges. The paper varies
 5 greatly with changes in the weather, being liable to shrink or swell under atmospheric influences. When the feeding perforations are located near the margins of the sheet or selector, the swelling and shrinking of the
 10 sheet throws the feeding perforations out of alinement with the points or teeth on the sprocket-wheels and also throws the action-governing perforations out of alinement with the pickers or movable portions of the action.
 15 According to this invention, however, the location of the feeding perforations in the middle of the sheet greatly reduces the extent to which the sheet may shrink or swell on either side, and consequently little or no
 20 difficulty is experienced in the employment of a sheet or selector formed of paper, such as has been met with in prior instruments.

In mechanical musical instruments in which elongated selectors are employed it
 25 has been customary to move the sheet by a winding-roll. This has proved to be objectionable in that the accumulation of coils of the selector upon the winding-roll constantly affects the speed of the selector and
 30 destroys the tempo or movement of the musical composition. In the present instrument, however, this objection is not present, since, as previously stated, the selector is fed by the sprocket and is taken up by the
 35 frictionally-driven winding-roll, the speed of which constantly varies as the selector is wound thereon.

It may be stated that each picker forms with the roll a "couple of rotation" whenever their engagement is permitted by the
 40 selector which passes between them. The teeth of the pickers are in constant potential relation to the actuator or grooved roll when they are resting upon the unperforated portion of the selector, although at such time
 45 they are in inactive position.

I do not herein claim any of the features illustrated, described, and claimed in application Serial No. 96,381, filed March 3, 1902,
 50 or in application Serial No. 96,383, filed March 3, 1902, by myself and Eugene A. Ford.

Having thus explained the nature of the invention and described a way of constructing and using the same, although without attempting to set forth all of the forms in which it may be made or all of the modes of its use, I declare that what I claim is—

1. A mechanical musical instrument comprising tone-producing devices, pickers therefor, a grooved roll for actuating said pickers, a feeding-sprocket, and an elongated selector or music-sheet having two sets of perforations one for the feeding-sprocket and
 60 the other for the pickers, said perforations

being so related that when a picker-tooth enters a perforation therefor it accurately registers with a groove in the roll.

2. A mechanical musical instrument comprising tone-producing devices, a shaft, a plurality of pickers loosely mounted on said shaft, mechanism whereby said pickers are caused to actuate said tone-producing devices, and means for setting said pickers in
 70 actuate but detained inactive position ready for operation. 75

3. A mechanical musical instrument comprising tone-producing devices, a plurality of rotatable pickers, a selector and a movable rack through which said selector passes, and
 80 means governed by said rack for moving said pickers into predetermined position when the said rack is moved to inoperative position and holding them in said position until the rack is returned to operative position. 85

4. A mechanical musical instrument comprising a plurality of rotary pickers, and a wedge for setting and rendering said pickers in inoperative position.

5. A mechanical musical instrument comprising a plurality of rotary pickers, a selector governing said pickers, a toothed actuator movable toward and from said pickers, and means for automatically moving the pickers
 90 to actuate but detained position when the actuator is moved into operative position. 95

6. A mechanical musical instrument comprising a plurality of rotary pickers, a selector governing said pickers and adapted to be moved bodily toward and from them, and
 100 means for automatically moving and then locking the pickers when the selector is moved out of engagement therewith.

7. A mechanical musical instrument comprising a plurality of rotary pickers, a shaft
 105 on which said pickers are mounted to rotate independently of each other, a bar for simultaneously alining said pickers and a spring for actuating said bar.

8. A mechanical musical instrument comprising a plurality of rotary pickers, a shaft
 110 on which said pickers are mounted to rotate independently of each other, a beveled or wedge-shaped bar for causing said pickers to simultaneously assume the same relative
 115 relative positions, a winding-roll gearing for said roll, and means for holding said gearing against reverse rotation.

9. A mechanical musical instrument comprising a plurality of sounding devices, an
 120 elongated longitudinally-movable selector having a row of perforations, a driving-sprocket having teeth for engaging the perforations driving the selector at a constant speed, and pickers having fixed teeth for
 125 causing the sounding device to produce a tune, said selector having perforations of different lengths and means whereby each picker is actuated one or more times according to the length of the perforations. 130

10. A mechanical musical instrument comprising a string, a shaft having an aperture through which a string passes, a rotary vibrator on said shaft having a fixed point to
 5 engage the string, and means for imparting to said vibrator an intermittent rotation, said means comprising a star-wheel adapted to coact upon said vibrator, a continuously-rotating actuator with which said star-wheel
 10 is adapted to coact, and a selector for governing the action of the star-wheel.

11. A mechanical musical instrument comprising two independent series of tone-producing devices, a plurality of star-wheels or
 15 pickers having fixed teeth for causing the said tone-producing devices to produce tones simultaneously, a selector for governing the operation of said star-wheels or pickers, and a toothed actuator independent of the selector
 20 for actuating said star-wheels or pickers.

12. A mechanical musical instrument comprising a string, a rotary vibrator having points for engaging the string, and having teeth additional to said points, a selector and
 25 a selector-governed picker for engaging the teeth on said vibrator and effecting a step-by-step rotation thereof.

13. A mechanical musical instrument comprising a hollow body, strings stretched
 30 across said body, a frame supported on said body, rolls on said frame, a perforated selector above the strings movable from one roll to the other, and an action consisting of toothed mechanism above the selector,

means for rotating said toothed mechanism, 35
 pickers below the selector with fixed teeth adapted to project through said selector so as to be actuated by said toothed mechanism, and a shaft for supporting the pickers.

14. A mechanical musical instrument comprising a plurality of sounding devices, pickers having fixed teeth for effecting the actuation thereof, a selector having perforations for governing but not causing the action of the
 40 pickers, and having additional perforations for engagement with the feeding-sprocket, said last-mentioned perforations being located substantially midway between its margins or side edges and means for actuating
 45 the pickers. 50

15. A mechanical musical instrument comprising sounding devices, rotary pickers having fixed teeth for picking said devices, a shaft substantially parallel to the axis of rotation of said pickers and having a sprocket
 55 intermediate of its ends, and a non-metallic selector having perforations for governing but not affecting the action of the pickers and having a row or rows of perforations intermediate of its side edges or margins for
 60 engagement with the sprocket and means for actuating said pickers.

In testimony whereof I have affixed my signature in presence of two witnesses.

JOHN McTAMMANY.

Witnesses:

M. B. MAY,
 P. W. PEZZETTI.