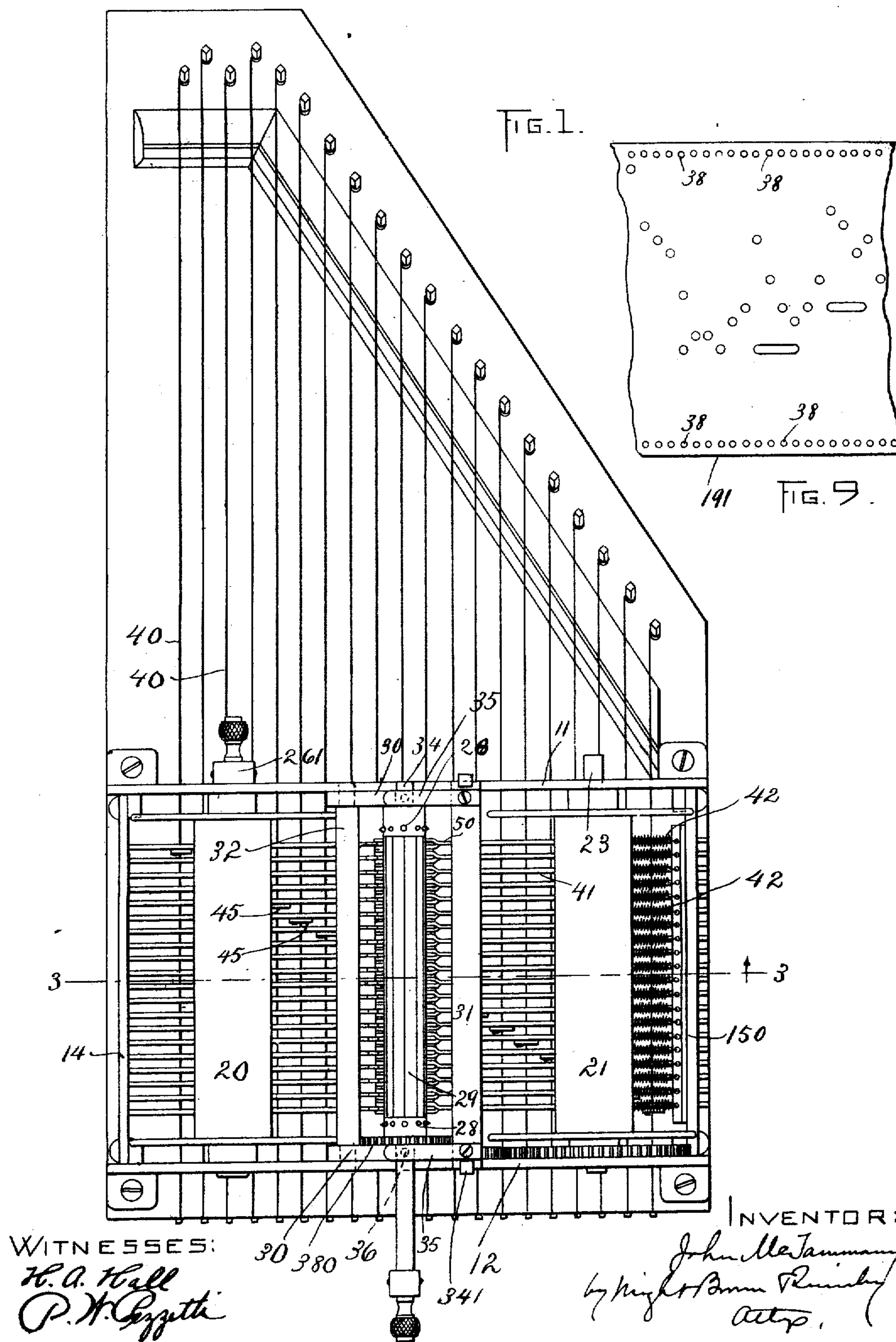


J. McTAMMANY.
MECHANICAL MUSICAL INSTRUMENT.
APPLICATION FILED MAR. 3, 1902.

916,933.

Patented Mar. 30, 1909.

3 SHEETS—SHEET 1.

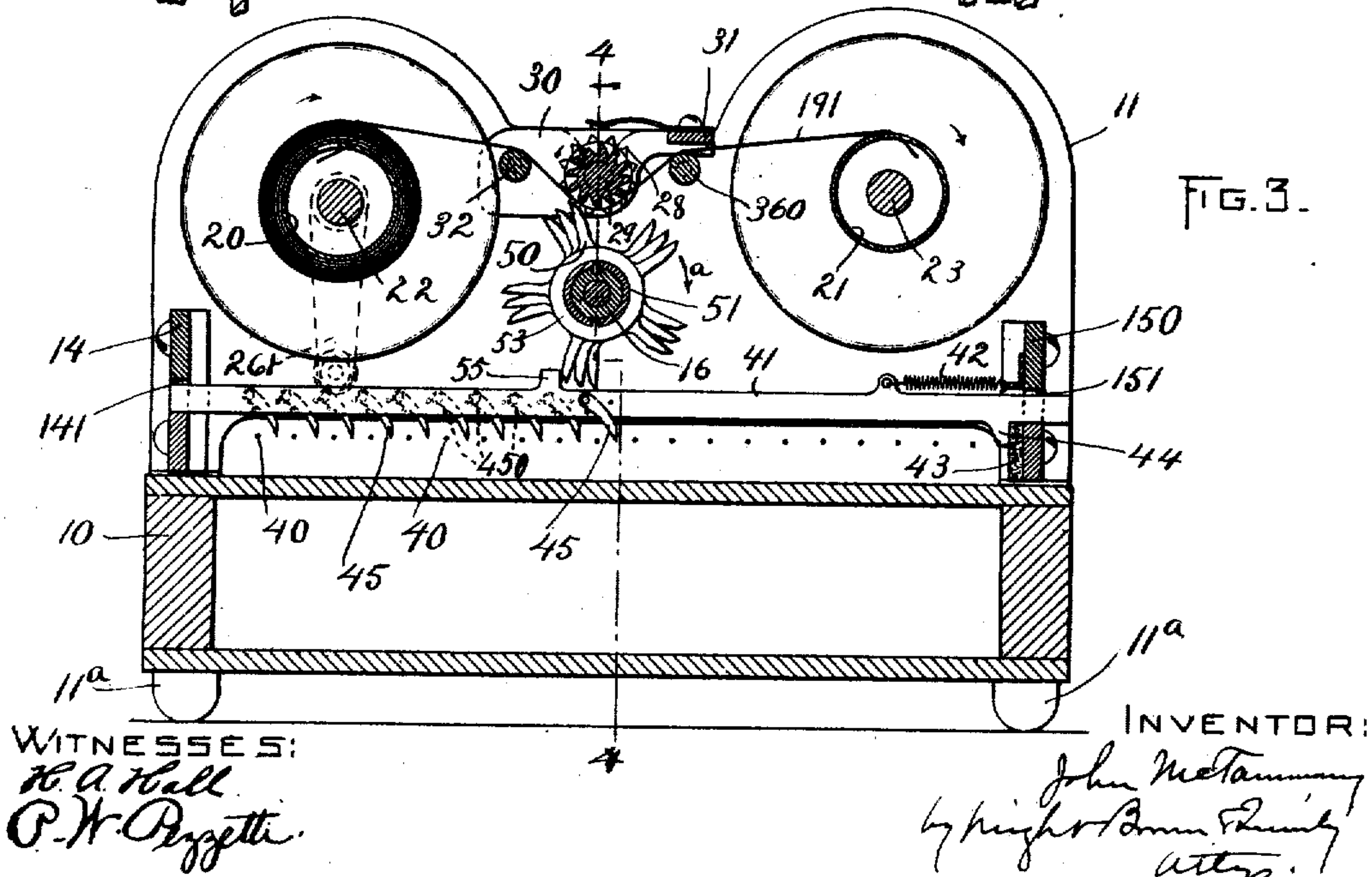
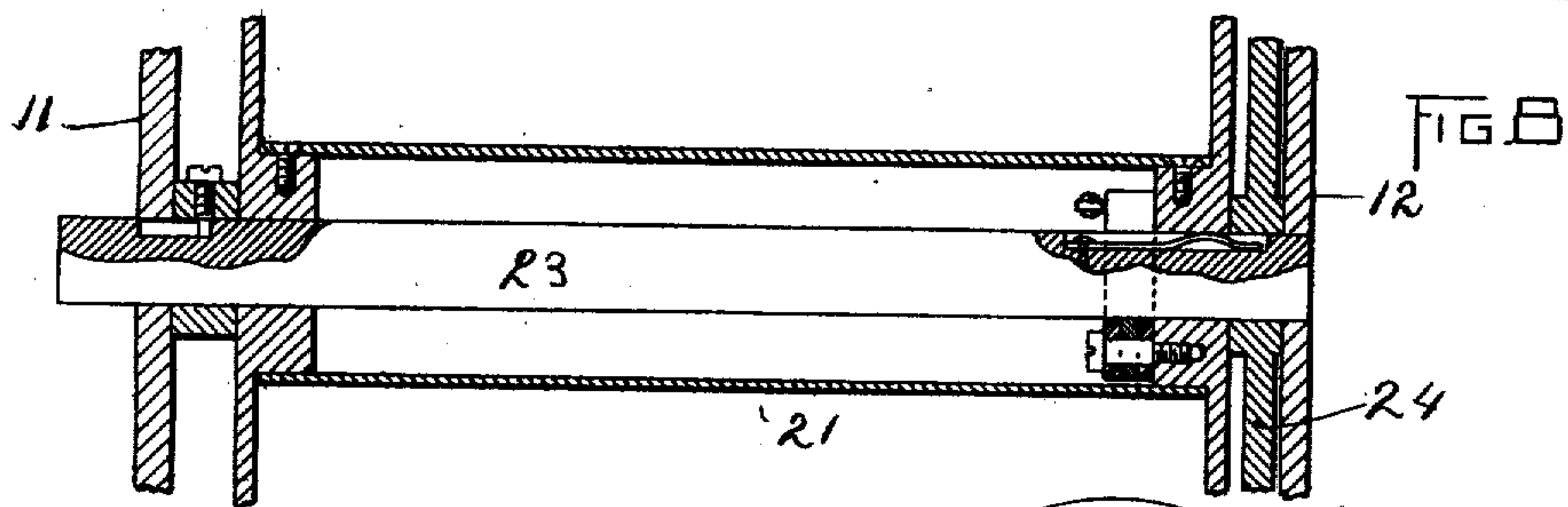
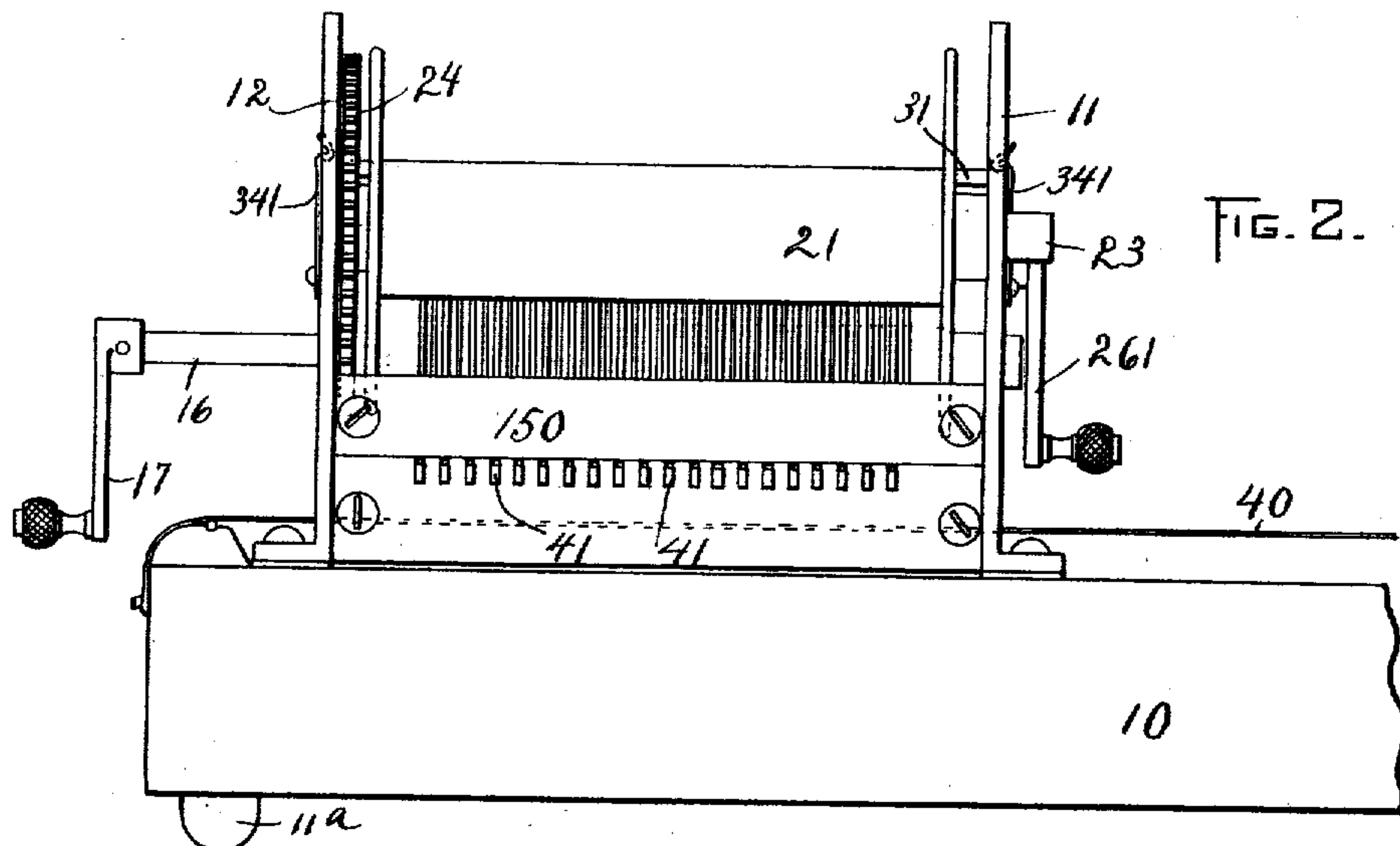


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3 SHEETS—SHEET 2.



WITNESSES:
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P. H. Pyzette.

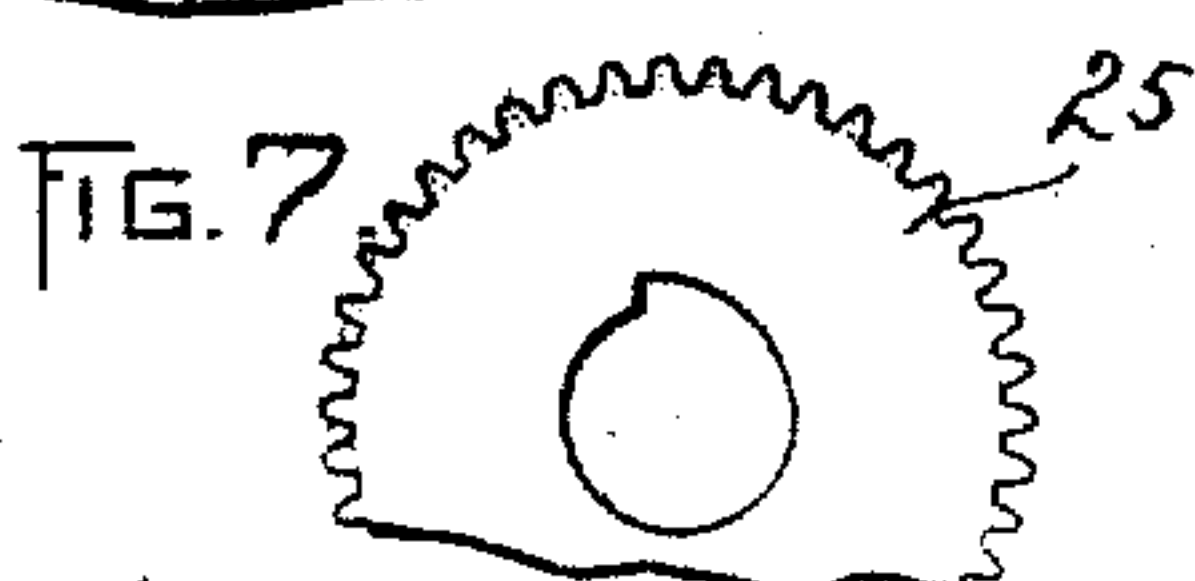
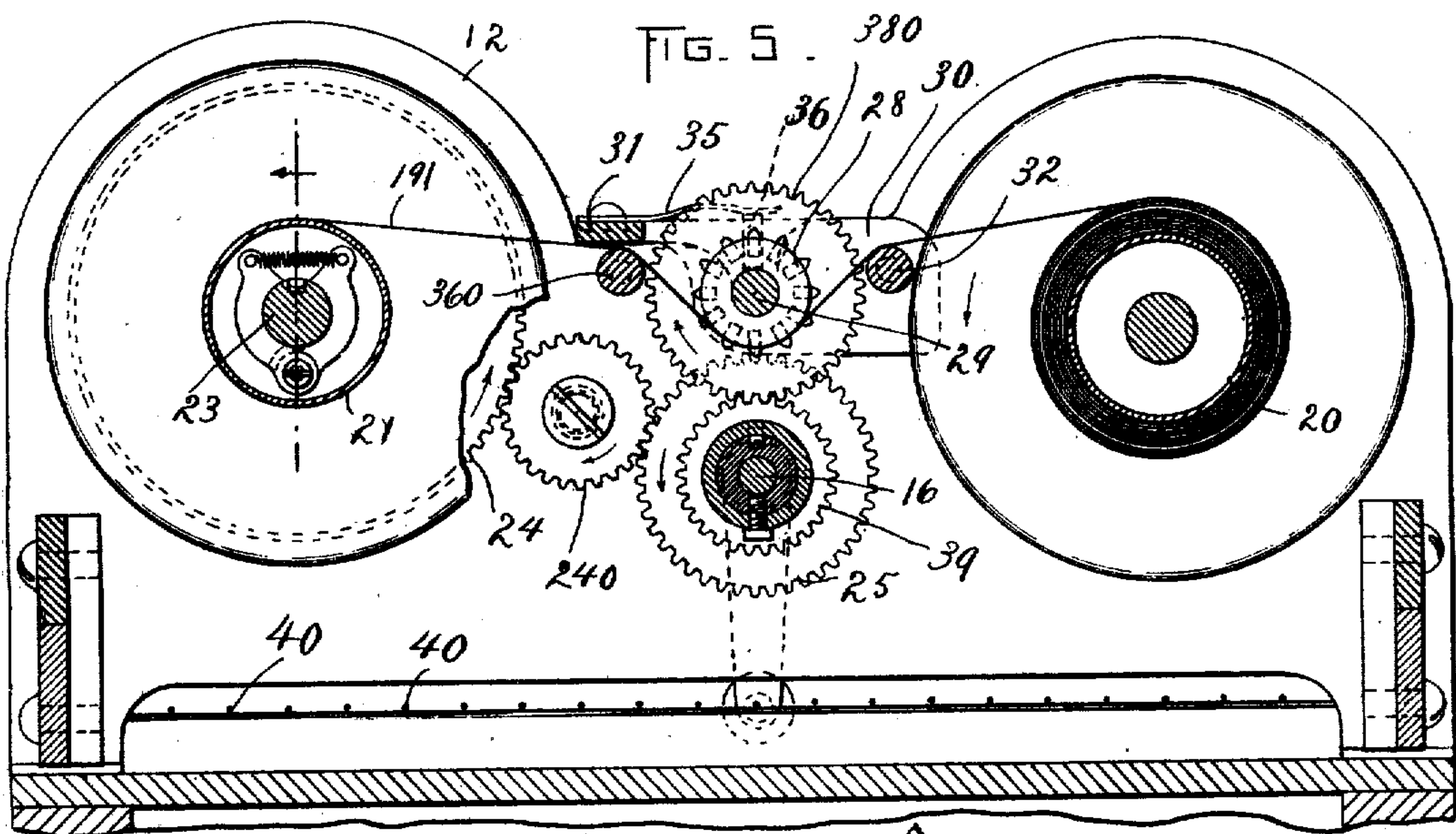
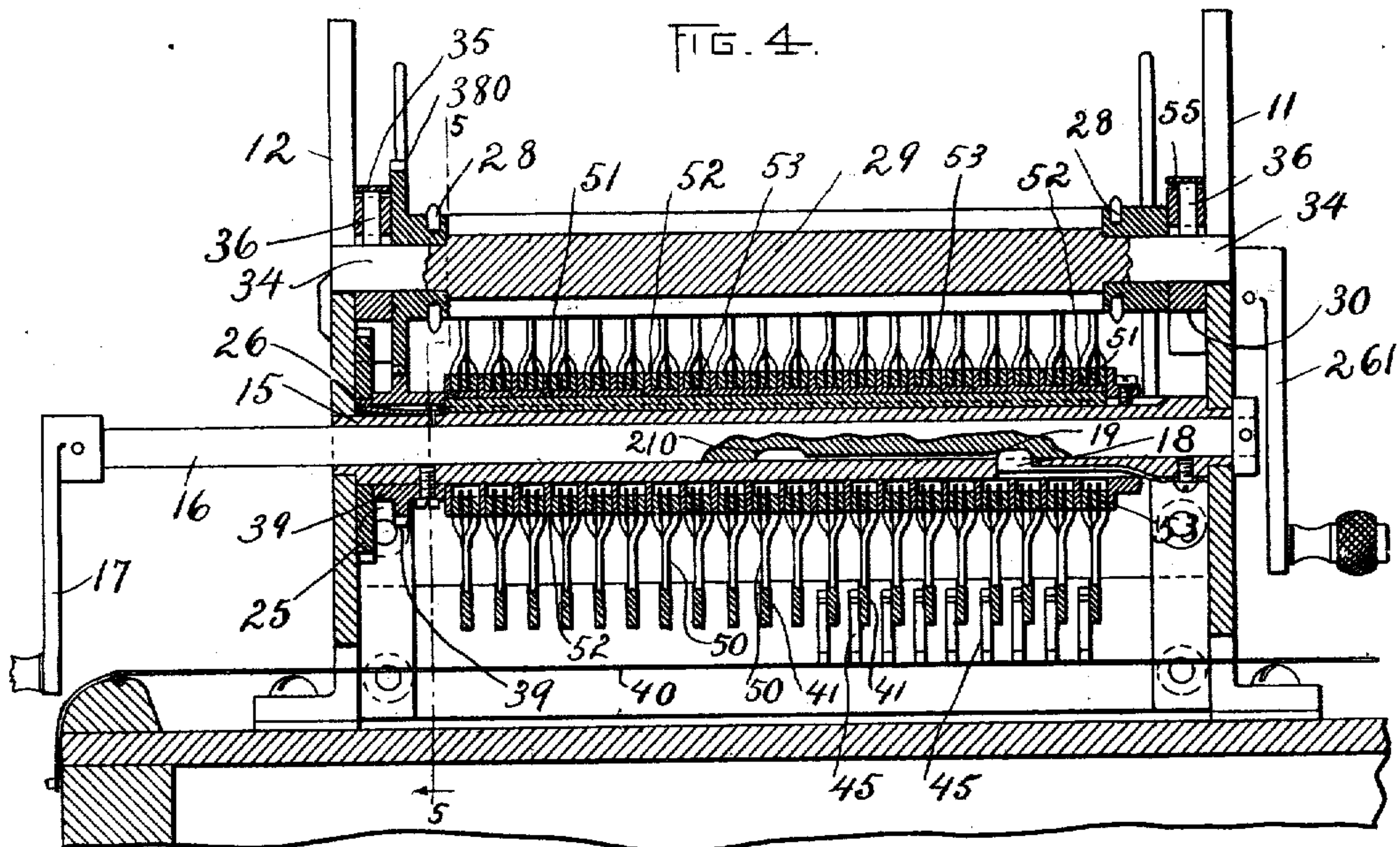
INVENTOR:
John Metammy
by Hugh B. Smith
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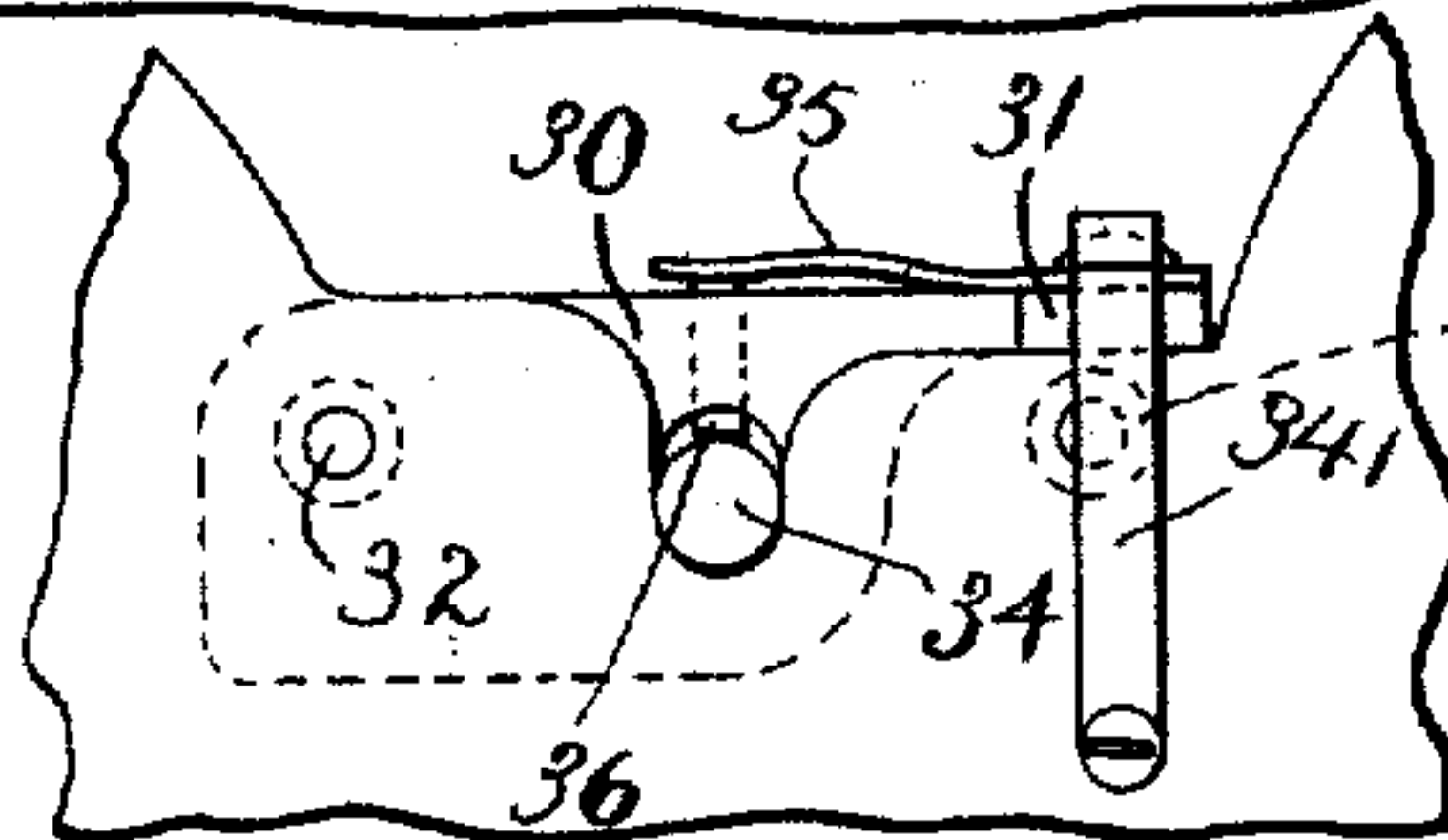
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Patented Mar. 30, 1909.

3 SHEETS—SHEET 3.



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UNITED STATES PATENT OFFICE.

JOHN MCTAMMANY, OF PROVIDENCE, RHODE ISLAND.

MECHANICAL MUSICAL INSTRUMENT.

No. 916,933.

Specification of Letters Patent.

Patented March 30, 1909.

Application filed March 3, 1902. Serial No. 96,381.

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
5 certain new and useful Improvements in Mechanical Musical Instruments, of which the following is a specification.

This invention has relation to mechanical musical instruments of the type wherein
10 the action is governed by a selector or tune-sheet and is operated by an actuator independent of or supplemental to the tune-sheet, and it possesses features in common with the construction illustrated and described in my co-pending application, Serial
15 No. 96,382, filed March 3, 1902.

The object of the present invention is to so construct the action as to adapt it for picking the strings of a stringed instrument,
20 such as a zither, autoharp, or other equivalent instrument.

In addition, it is the object of the invention to provide for the accurate and positive feeding of the selector or tune-sheet at a
25 predetermined speed, whereby I am enabled to regulate the movement or tempo of the composition produced upon the instrument. The selector has one or more rows of perforations with which engage one or more
30 sprocket wheels driven at a predetermined speed. The perforations which govern the action bear a predetermined relation to the feeding perforations.

In my co-pending application herein-
35 before referred to, the actuator for the pickers is shown as located below the selector, and the selector is brought into operative relation with the said pickers by a grooved guide, under which the selector is
40 caused to travel, and thereby form a bend or loop. In the present instance, I combine the grooved guide and the actuator in one part and locate it above the selector whereby it performs a function of forming a loop in
45 the selector and bringing it into operative relation to the pickers, and also causes the direct actuation of the pickers when the teeth thereof enter or register with the projections in the selector. In addition to
50 these two functions, it has a third important function, to wit,—that of feeding the sheet at a predetermined rate of speed. The pickers operate vibrators located in proximity to the strings, there being for
55 each vibrator a series of pickers whereby a tremolo or trill may be produced.

On the accompanying drawings,—Figure 1 represents in plan view an instrument embodying the invention. Fig. 2 represents an end elevation of the same. Fig. 3 represents a longitudinal section on the line 3—3
60 of Fig. 1. Fig. 4 represents a section on the line 4—4 of Fig. 3. Fig. 5 represents a section on line 5—5 of Fig. 4, looking in the direction of the arrow and showing the
65 gearing connected with the driving shaft and the parts actuated thereby. Fig. 6 is a detailed view of the music-guiding means. Fig. 7 is a detailed view of one of the gear members. Fig. 8 is an axial section of the
70 take-up roll. Fig. 9 represents a portion of the selector.

The particular form of stringed instrument which is illustrated in the drawings is similar to an autoharp, but as hereinbefore stated,
75 any other equivalent stringed instrument may be employed in its stead. The said instrument has the hollow body 10 resting upon resilient supports 11^a. Upon the sounding-board of the instrument is secured
80 a frame consisting of the standards 11, 12, removably attached to the side edges of the board by screws or other fastening devices. The standards are connected by cross-bars
85 14, 150. Journaled in the standards 11 and 12 is a sleeve or hollow shaft 15 through which is passed a driving-shaft 16, as shown in Fig. 4. This shaft is adapted to be driven by any suitable motor. For convenience, I
90 have illustrated a crank or handle 17 as being secured to the end of the said shaft. The sleeve is provided with a spring key 18 adapted to engage either of two sockets 19, 210, formed in the shaft 16, which is longitudinally movable. When the instrument is not
95 in use, the driving shaft may be moved to the right to place the handle 17 within the end of the instrument, for convenience of packing and handling, but when it is desired to use the instrument, the shaft 16 is moved to the
100 left to occupy the position shown in Fig. 4, the spring-key 18 serving to connect said shaft with the hollow shaft or sleeve 15 to effect its rotation when the shaft 16 is rotated.

As previously stated, I employ a selector which consists of an elongated non-metallic strip 191. This is adapted to be wound from the roll 20 upon the roll 21. The rolls 20 and
110 21 are mounted upon shafts 22, 23, respectively, which are journaled in bearings afforded by the standards 11 and 12. On the

shaft 23 is mounted a large gear 24, intermeshing with an intermediate gear 240 and driven by a gear 25 on the hollow shaft or sleeve 15.

5 A spring clutch 26 is interposed between the hollow shaft 15 and the gear 25 and is so constructed that when the shaft 16 is rotated in the direction of the arrow *a* in Fig. 3, the gear 25 will be rotated, but will remain stationary when the shaft is rotated in the opposite direction. This construction likewise permits the reverse rotation of the winding-roll to remove the selector therefrom without effecting a consequent rotation of the hollow shaft 15. The unwinding or rewinding roll 20 may be rotated in a reverse direction by a crank-handle 261 attached to the shaft 22. The winding roll is not secured rigidly upon the shaft 23, but is frictionally connected therewith so that the speed of the winding roll does not govern the speed of movement of the selector 19.

The mechanism by which the selector is moved at a constant, predetermined speed consists of sprockets 28 secured upon the trunnions of a fluted or grooved roll 29, arranged substantially midway between the winding and unwinding rolls and directly above the driving shaft 16. The grooved roll is journaled in a frame consisting of the arms 30 and the cross-bar 31. The arms 30 are pivoted upon the ends of a guide-roll 32, but are normally held in the position shown in Fig. 3 by a spring-catch 341. The trunnions 34 34 of the grooved roll 29 are capable of vertical movement in their bearings in the arms 30 but are normally pressed downward by springs 35 and pins 36. As will be subsequently explained, this construction is provided to permit the grooved or toothed roll to yield and prevent its injuring any part of the action in case the frame which carries the said roll is forced down positively into the position shown in Fig. 3.

45 In addition to the guide-roll 32, there is a second guide-roll 360 and by inspection of Fig. 3, it will be observed that said guide-rolls are so located with respect to the rolls 20 and 21 and the grooved roll 29, that a selector in passing over the said guide-rolls 32, 360, and under the roll 29, forms a bend or loop, and is caused to travel in a tortuous or zigzag path.

The sprockets 28 and the complementary perforations 38 in the edges of the selector 191 are evenly spaced, so that when the said fluted roll 29 is rotated, by means to be described, the selector is caused to travel at a constant predetermined speed, so long as the speed of rotation of the shaft 16 is unchanged.

The grooved roll 29 is provided with a gear 380 meshing with and driven by a pinion 39 rigidly secured to the hollow shaft 15. The roll 29 performs the function of a guide for

the selector, as well as means for moving the selector; and in addition it serves to positively actuate the action of the instrument.

The mechanism controlled or governed by the selector and actuated by the roll 29 for effecting the vibration of the sounding devices or strings comprises the following parts. Located above the strings or sounding devices which are indicated at 40, and placed in a plane parallel to the plane of the strings, are parallel vibrators equal in number to the strings. Each vibrator consists of a bar 41 passed loosely through apertures 141, 151, in the cross-bars 14 and 150.

Each bar is held yieldingly to the right by a spring 42 attached at one end to a lug on said bar, and at its other end to the cross-bar 15. A strip of felt or other sound-deadening material, indicated at 43, is secured to the inner wall of the cross-bar 150, and each bar 41 has a projection 44 to rest thereagainst. Each of the bars 41 carries a projection such as a pivoted latch 45 for engaging its string. The latch is free to yield upwardly when its bar is moved to the left to slide or ride over a string, but is prevented from reverse movement when the bar is moved in the opposite direction by contact with a stop pin 450 carried by the bar 41 (see Fig. 3), whereby the latch carries the string a short distance with it, and then releases it to effect its vibration.

The actuation of the vibrators is effected by a plurality of sets of pickers 50, mounted upon the hollow shaft or sleeve 15. There are three pickers in each set, each consisting of a star-wheel having five points or teeth. All of the teeth of the pickers of each set are bent to lie in the same plane, transverse to the axis of rotation of said pickers. Each set of pickers 50 is frictionally mounted upon a collar 51, keyed to the hollow shaft 15. Each collar has a flange 52, so that the flanges of two adjacent collars serve to hold the pickers against longitudinal movement and to increase the frictional engagement of the collars with the pickers. Between the pickers of each set are spacers or washers 53 for still further increasing the frictional engagement. These spacers perform another function, namely, that of preventing one picker from imparting its individual movement to an adjacent picker of the same set.

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 29. As soon as a perforation in the selector registers with one of the teeth, the frictional engagement of the picker with its supporting shaft is such that it is carried forward with the selector until it is engaged by

the teeth of the fluted roll 29 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 thereof engages a lug 55 on the vibrator immediately therebeneath, and forces the said vibrator against the stress of the spring 42 toward the left. As soon as the vibrator is released, however, the spring 42 draws it quickly in the opposite direction, and the latch 45 causes the string to vibrate in the manner described. The precise construction of the pickers is set forth in my co-pending application hereinbefore referred to.

Inasmuch as there are three pickers for each vibrator and each string, the pickers are caused to successively engage and release the vibrator 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 29 may be formed in any one of a plurality of ways, but its construction as illustrated has been found to serve all general purposes. The path of rotation of the ends of the teeth on the roll intersects the path of rotation of the ends of the picker-teeth, but, as stated, in case the frame is moved downward toward the picker when the teeth of the picker extend upwardly the springs 35 yield to prevent damage to the parts until the pickers are rotated sufficiently to permit the grooved roll to be moved down to its proper or operative position.

The roll and picker form a couple of rotation devices, but their engagement is governed by the selector which passes between them.

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 a perforated selector, an actuator located on one side of the selector, and a sounding device and picker located on the other side of said selector, said picker having fixed picking teeth moving in a constant path about a fixed axis, said teeth being adapted to register with and project through the perforations in the selector into engagement with said actuator.

2. A mechanical musical instrument comprising a perforated selector, an actuator located on one side of the selector, and a sounding device and a picker located on the other side of said selector, said picker comprising a rotary member provided with fixed picking teeth moving in a constant path about a fixed axis, said teeth being adapted to regis-

ter with and project through the perforations in the selector into engagement with said actuator.

3. A mechanical musical instrument comprising a rotary toothed actuator, a sounding device, a picker, and a perforated selector located between said actuator and said picker, said picker having fixed picking teeth or points moving in a constant path about a fixed axis and adapted to project through the perforations in the selector into engagement with the teeth of said actuator.

4. A mechanical musical instrument comprising a rotary toothed actuator, a sounding device, a rotary picker having fixed picking teeth traveling in a constant path about a fixed axis, and a perforated selector located between the actuator and the picker, said selector traveling in a path intersecting the path of the teeth of the picker, whereby the imperforated portion of the selector arrests the movement of the picker until a perforation registers with a tooth of the picker and permits said tooth to project through said selector into engagement with said actuator.

5. A mechanical musical instrument comprising a grooved actuator, means for rotating said actuator, a picker having fixed teeth and rotatable on a fixed axis, and having its teeth adapted to enter the grooves of said actuator, and a perforated selector between said actuator and picker for governing their engagement and disengagement.

6. A mechanical musical instrument comprising a grooved actuator, means for rotating said actuator, a toothed picker, means for frictionally rotating said picker into operative engagement with said actuator, and a perforated selector between the picker and the actuator, which arrests and releases the picker, and governs the engagement and disengagement of said picker with and from the actuator.

7. A mechanical musical instrument, comprising an action consisting of a pair of normally disengaged rotary members, one driving and the other driven, whose engaging portions travel in unvarying paths, means for rotating the driving member, a sounding device adapted to be operated by the driven member, and a selector located between said members for governing their engagement and disengagement.

8. A mechanical musical instrument, comprising a sounding device, a rotary picker having fixed teeth, a perforated selector intersecting the path of movement of the teeth of the picker, and an actuator adapted to engage the teeth of said picker and provided with means for feeding said selector.

9. A mechanical musical instrument comprising a sounding device, a rotary picker having fixed teeth, a perforated selector, intersecting the path of movement of the teeth of the picker, an actuator for said

picker having means for feeding said selector, and a movable frame for said actuator.

10. A mechanical musical instrument comprising a sounding device, a rotary picker having fixed teeth, a perforated selector, intersecting the path of movement of the teeth of the picker, and a rotary grooved actuator for said picker having sprocket teeth for feeding said selector.

11. A mechanical musical instrument comprising a sounding device, a rotary toothed picker, a perforated selector intersecting the path of movement of the teeth of the picker, a driving shaft on which said picker is frictionally mounted, an actuator for said picker having sprocket teeth for feeding the selector, and gearing connecting the driving-shaft with the actuator.

12. A mechanical musical instrument comprising a sounding device, a rotary toothed picker, a perforated selector, intersecting the path of movement of the teeth of the picker, a rotary actuator for the picker, said selector passing between the picker and the actuator, and yielding means for holding said actuator in operative position.

13. A mechanical musical instrument comprising sounding devices, a flexible perforated selector, rotary toothed pickers, guides for the selector, and a rotary roll mounted between said guides and opposite the pickers to form a bend or loop in the selector opposite the pickers to intersect the path of movement of the teeth of said pickers, whereby said teeth will project through the perforations in said selector, said roll being provided with means to engage said teeth of the pickers when the latter project through such perforations in the loop or bend in the selector.

14. A mechanical musical instrument comprising a sounding device, a rotary toothed picker, a flexible perforated selector, a rotary roll mounted to form a bend or loop in the selector to intersect the path of movement of the teeth of said picker, the said selector passing between the picker and the roll, said roll having means engaging a tooth of the picker when it projects through a perforation in the loop or bend in the selector, and means for yieldingly mounting said roll.

15. A mechanical musical instrument comprising a sounding device, a rotary picker having fixed picking teeth, an actuator for said picker, a selector for governing the action of the picker, means for imparting movement to said selector, and a vibrator intervening between the sounding device and the picker.

16. A mechanical musical instrument comprising a sounding device, a rotary picker having fixed picking teeth, an actuator for said picker, a selector for governing the action of the picker, means for impart-

ing movement to said selector independent of the movement of said picker, and a reciprocatory vibrator intervening between the sounding device and the picker.

17. A mechanical musical instrument comprising a sounding device, a rotary picker having fixed picking teeth, an actuator for said picker, a selector for governing the action of the picker, means for imparting movement to said selector independent of the movement of said picker, a vibrator moved in one direction by the picker, and a spring for moving the vibrator in the opposite direction.

18. A mechanical musical instrument comprising a sounding device, a single vibrator therefor, and a series of toothed pickers adapted to actuate said vibrator.

19. A mechanical musical instrument comprising a sounding device, a single spring-tensioned reciprocatory vibrator therefor, and a series of toothed pickers adapted to actuate said vibrator.

20. A mechanical musical instrument comprising a sounding device, a single spring-tensioned reciprocatory vibrator therefor, and a series of toothed pickers adapted to actuate said vibrator, and having their teeth in the same plane transverse to their action of rotation.

21. A mechanical musical instrument comprising a series of sounding devices, a series of reciprocatory bars having means to engage said sounding devices, a series of rotary star-wheels for actuating said bars, an actuator for said star-wheels, and a selector for governing the actuation of said star-wheels.

22. A mechanical musical instrument comprising a series of strings, a series of reciprocatory bars having means for engaging and releasing the strings, a support for said bars, means for cushioning their operative stroke, and a selector for governing the operation of said bars.

23. A mechanical musical instrument comprising a series of strings, a series of reciprocatory bars having means for engaging and releasing the strings, a support for said bars, means for cushioning their operative stroke, a selector for governing the operation of said bars, and an actuator independent of said selector for causing the actuation of said bars.

24. In a mechanical musical instrument, a rotary member and a rotary actuator occupying fixed axial relations with respect to each other said member and said actuator being provided with complementary engaging portions which travel in fixed paths, and an intervening perforated selector which governs the coaction of said actuator and member.

25. In a mechanical musical instrument, a string, a bar having a dog loosely pivoted

thereon, a stop for limiting the movement of the dog in one direction, means for moving said bar in one direction to cause said dog to ride over said string, and a spring to retract said bar and cause said dog to pick said string.

26. In a mechanical musical instrument, a string, a bar having a dog loosely pivoted thereon, a stop for limiting the movement of the dog in one direction, means for moving said bar in one direction to cause the said dog to ride over said string, a spring to retract said bar and cause said dog to pick said string, and a buffer or cushion to receive the impact of the bar on its retracted stroke.

27. A mechanical musical instrument comprising a tone-producer, an action, an elongated selector or tune-sheet having perforations at different lengths for varying the duration of tones of said tone producer, and a plurality of pickers adapted to be successively actuated during the passage of a single elongated perforation.

28. A mechanical musical instrument, comprising a main frame, a flexible selector, a guide under which the selector passes, guide rolls on both sides of the guide over which the selector passes, one of said rolls

being mounted on the main frame, and a movable frame supporting the guide and the other of said rolls, said guide rolls being separated by a space greater than the diameter of the movable guide whereby the latter may pass between the former.

29. A mechanical musical instrument, comprising a selector, parallel shafts, means on one of said shafts to feed the selector, pickers on the other of said shafts, and means for rotating said shafts.

30. A mechanical musical instrument comprising a rotary shaft, rotary pickers frictionally mounted on said shaft, said pickers having teeth moving in a constant path about a fixed axis, a sounding device which is caused to be sounded by said teeth, a perforated selector through which the teeth of said pickers are adapted to project, and a single actuating member adapted to engage the teeth of said pickers when they project through said selector.

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

JOHN McTAMMANY.

Witnesses:

A. D. HARRISON,
P. W. PEZZETTI.