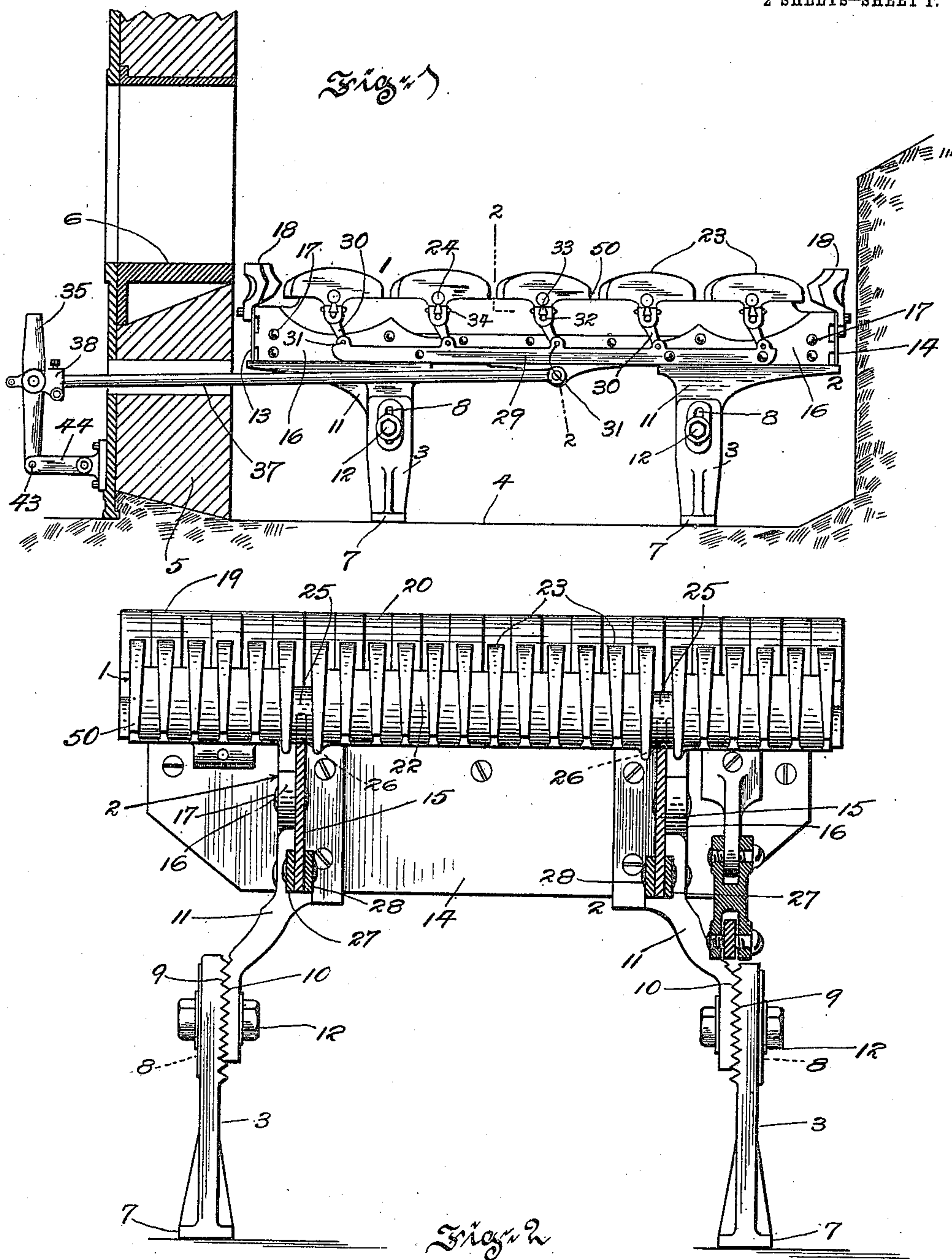


A. F. DAWSON.
FURNACE GRATE.
APPLICATION FILED SEPT. 1, 1910.

994,063.

Patented May 30, 1911.

2 SHEETS—SHEET 1.



WITNESSES:
Wm C Osborn
Agnes Clarke

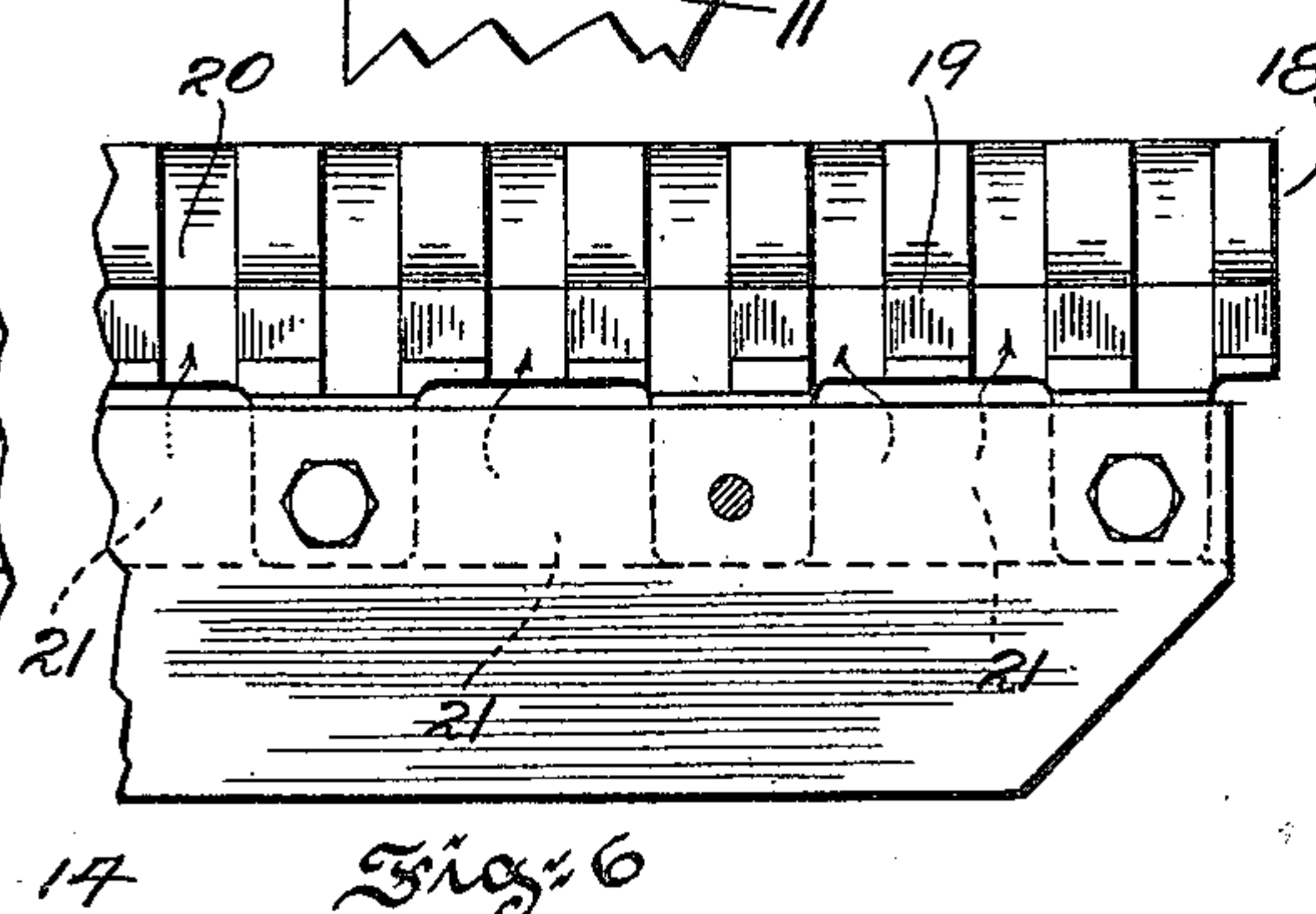
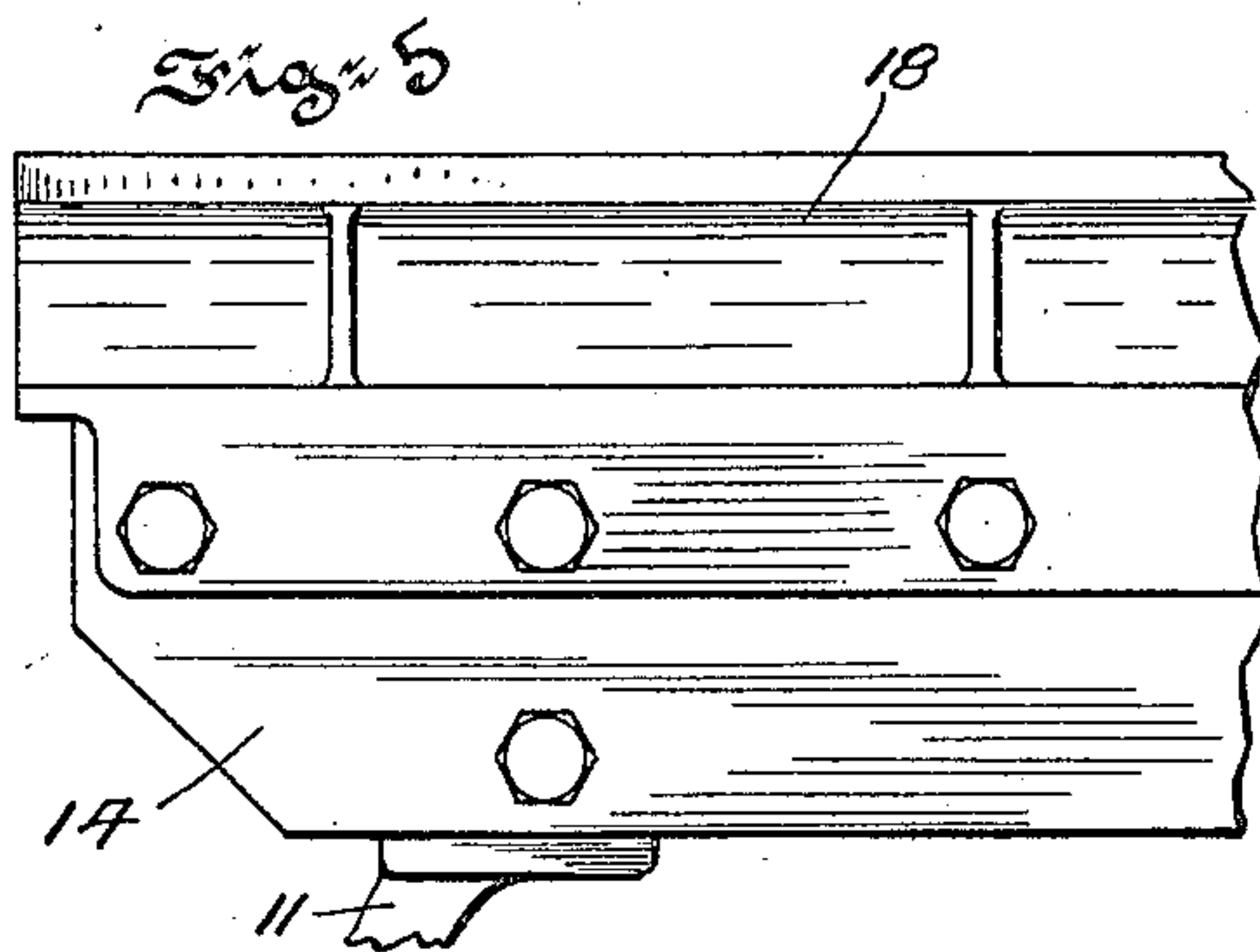
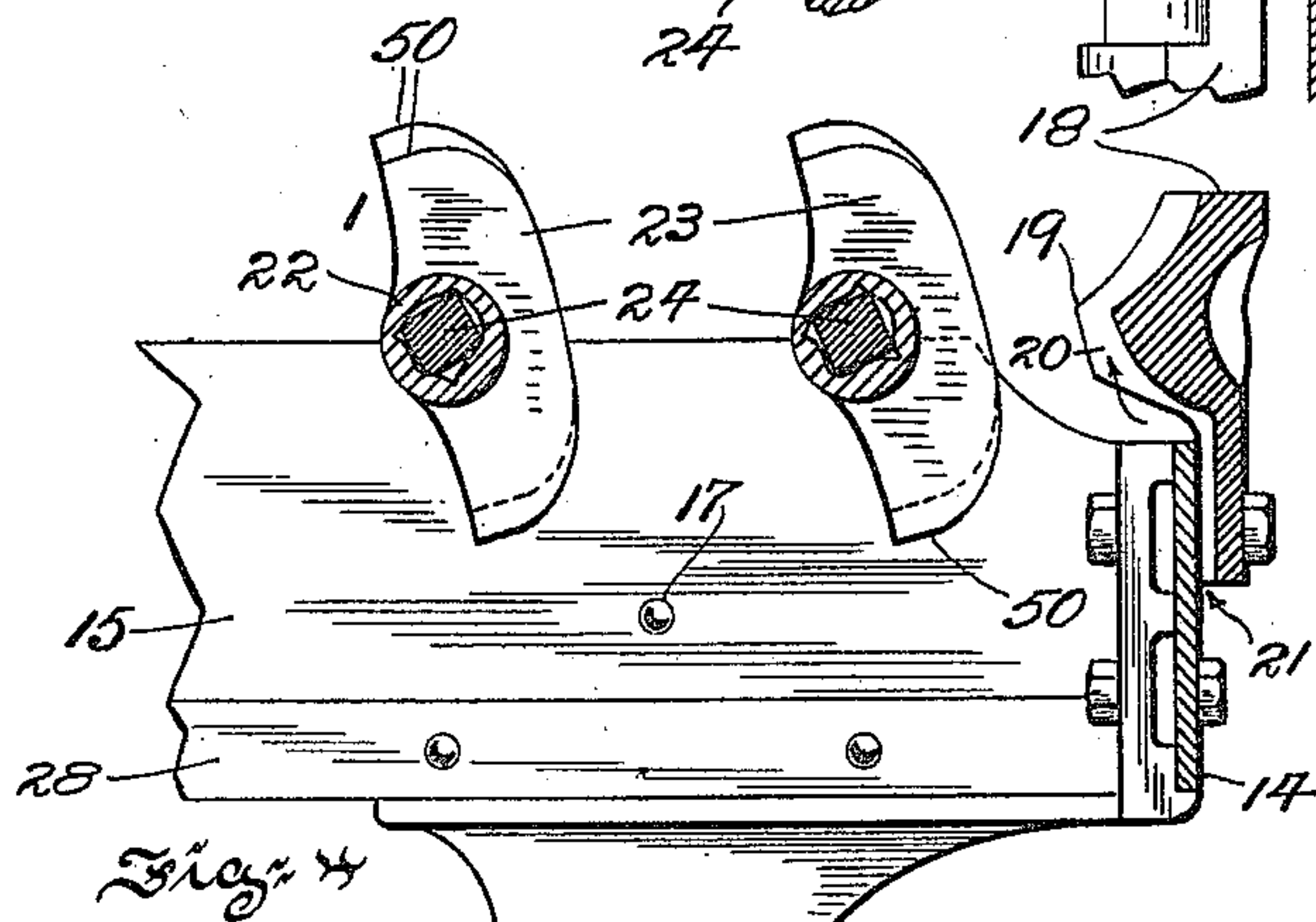
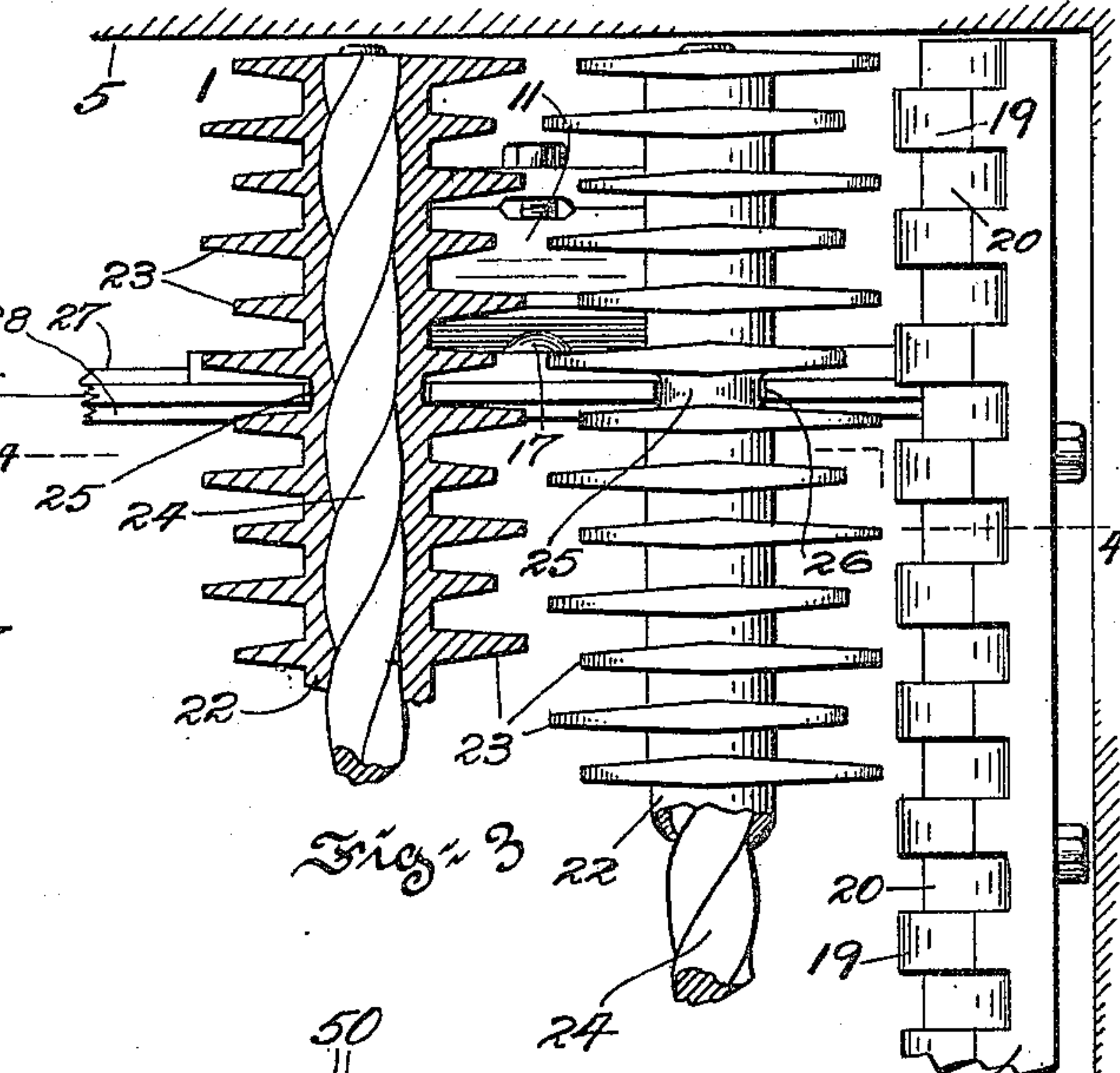
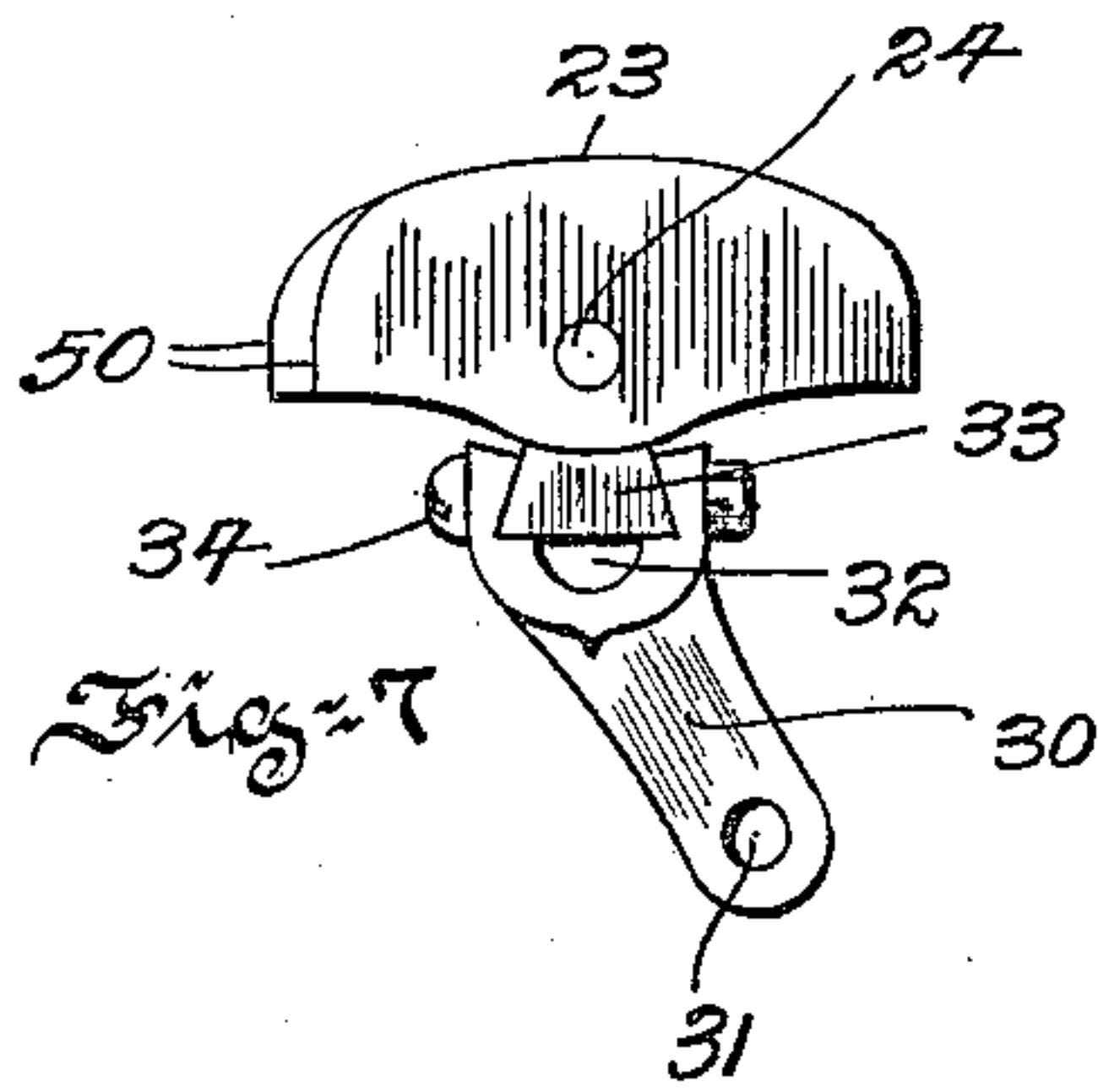
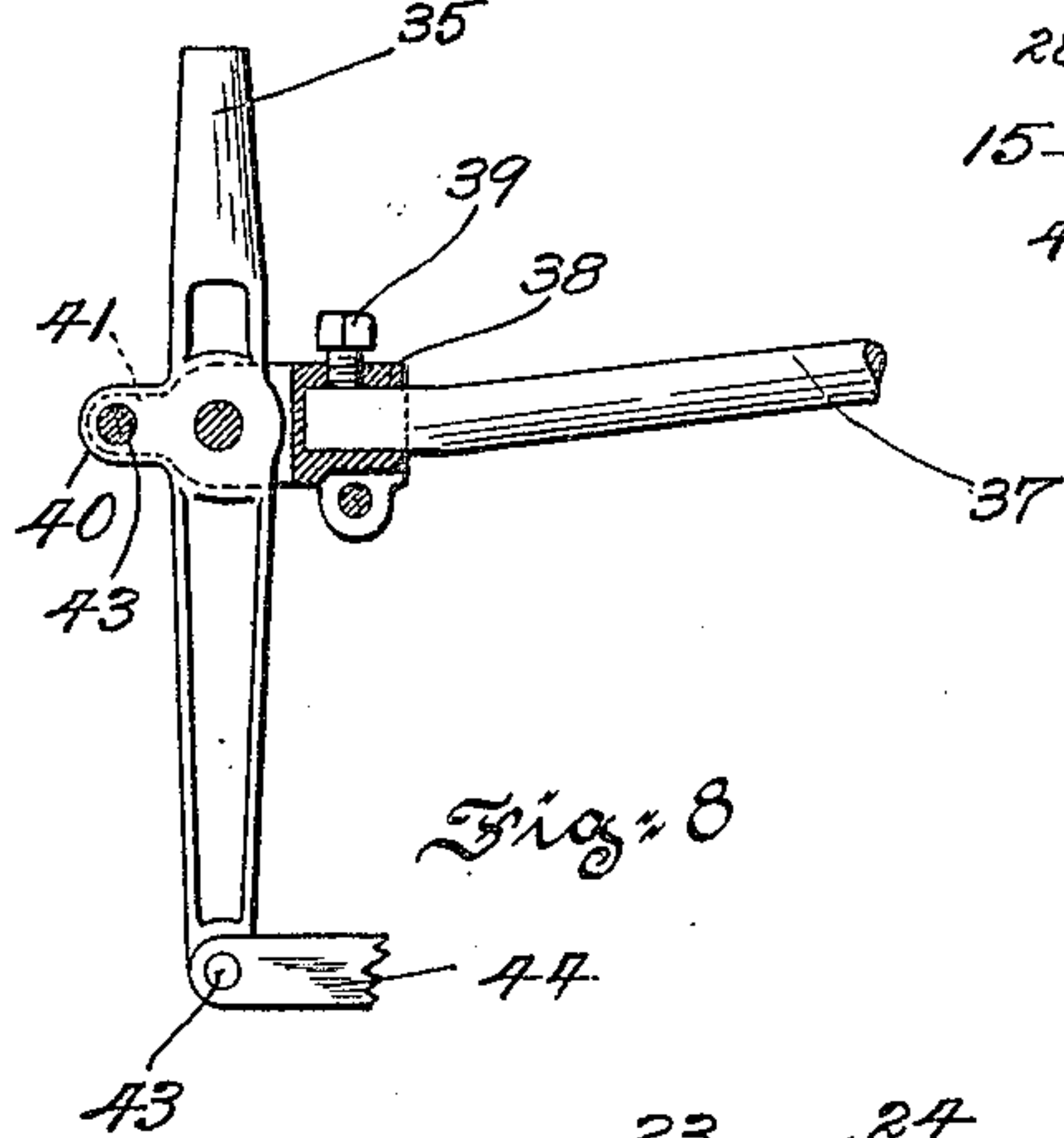
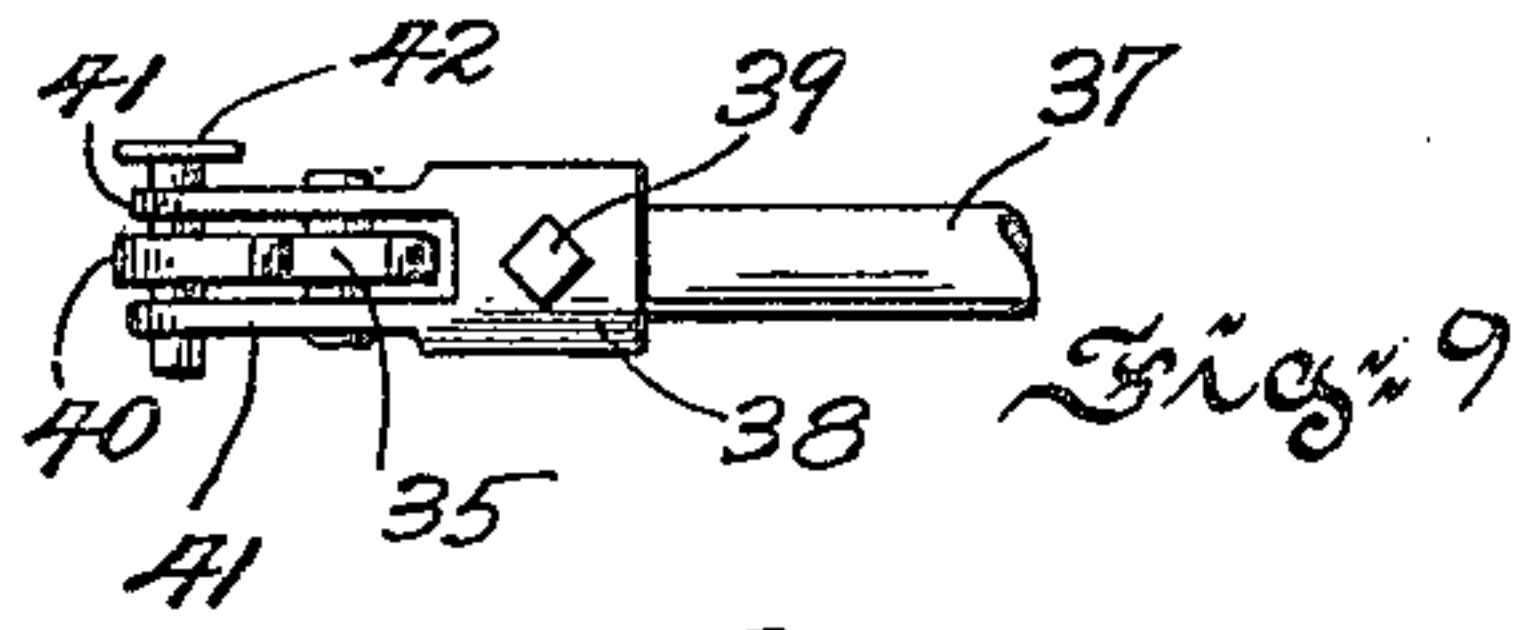
INVENTOR.
Alfred F. Dawson
BY
William E. Jackson
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A. F. DAWSON.
FURNACE GRATE.
APPLICATION FILED SEPT. 1, 1910.

Patented May 30, 1911.

2 SHEETS—SHEET 2.

994,063.



WITNESSES:
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UNITED STATES PATENT OFFICE.

ALFRED F. DAWSON, OF MILMONT, RIDLEY TOWNSHIP, DELAWARE COUNTY, PENNSYLVANIA.

FURNACE-GRATE.

994,063.

Specification of Letters Patent.

Patented May 30, 1911.

Application filed September 1, 1910. Serial No. 580,003.

To all whom it may concern:

Be it known that I, ALFRED F. DAWSON, a citizen of the United States, residing at Milmont, township of Ridley, county of Delaware, and State of Pennsylvania, have invented certain new and useful Improvements in Furnace-Grates, of which the following is a specification.

This invention relates to furnace grates and has more particular relation to that class of moving grates known as the rolling or rocking bar type.

The principal object of the present invention may be said to be the providing of a furnace grate so arranged, constructed and connected as to obtain more efficient results in a more economical manner than have heretofore been possible with other devices of like character.

A further object of the present invention is to provide a furnace grate constructed to provide for the admission of an increased volume of air upwardly through the grate whereby the gaseous products may be caused to be more readily consumed, thus eliminating to a great degree smoke.

A still further object of the present invention is to provide a grate in which are present interchangeable end cross-pieces for the main frame provided with air ducts leading from the outside to the inside of the grate.

A still further object of the present invention is to provide a grate in which the cast-iron grate bars are reinforced throughout their length by wrought iron spiral rods.

A still further object of the present invention is to provide an adjustable supporting frame for the grate in which the adjusting parts are provided with serrated portions to prevent slippage when the parts are in adjusted position.

A still further object of the present invention is to provide a grate in which the pendent connection between the grate bars and operating rod is strengthened by the providing of dove-tail connections between the grate bar and pendent arm whereby shearing strain on the securing bolt is eliminated.

Other objects of the invention relate to the providing of various details of constructions and arrangements of parts whereby a grate of the type recited is rendered commercially valuable.

The invention consists of the improvements hereinafter set forth and finally claimed.

The nature, characteristic features and scope of the invention will be more fully understood from the following description taken in connection with the accompanying drawings forming part hereof and in which:

Figure 1, is a longitudinal sectional view of a furnace equipped with a grate construction embodying the invention, Fig. 2, is a sectional view taken upon the line 2—2 of the grate shown in Fig. 1, but drawn to an enlarged scale, Fig. 3, is a fragmentary horizontal sectional view of the grate construction illustrating details of construction, Fig. 4, is a fragmentary view principally in section illustrating the air ducts in the end cross-pieces and also illustrating the grate bars in shifted or open position, Fig. 5, is a fragmentary view in elevation of one of the end cross-pieces shown in Figs. 3, and 4, Fig. 6, is a view in elevation thereof looking from the inside of the grate, Fig. 7, is a detail view in elevation illustrating the manner of connecting the grate bars with the pendent arms, and, Figs. 8, and 9, are views in elevation and plan respectively of the operating lever.

As shown in the drawings the grate 1, is superposed upon a generally rectangular framework 2, which in turn is supported by legs 3, which rest upon the floor or bottom of the ash-pit 4, of the furnace 5. As clearly illustrated in Figs. 1, and 2, the legs 3, which support the framework 2, are arranged with respect thereto, so that the grate may be adjusted to different heights. This is important as the top of the grate should be on a line with the bottom of the feed door opening 6. A description will now be given of this adjustable feature. The legs 3, are provided with foot portions 7, and slotted upper portions 8. The upper portions are also serrated or toothed as at 9. The serrated portions 9, register with the serrated portions 10, of depending extensions 11, of the frame 2. Bolts and nuts 12, are present for clamping together the legs 3, and extensions 11. By this construction and arrangement of parts, when the grate 1, is adjusted and clamped to the required height the serrated portions prevent slippage between the parts thereby providing an efficient adjustment.

The frame which supports the grate bars 1, comprises end plates 13, and 14, connecting which are spaced side bars 15. The end plates 13, and 14, and side bars 15, are con-

nected together through the instrumentality
 of angular plates 16, carried by the exten-
 sions 11, rivets or their equivalents 17, being
 utilized for securing the respective parts
 5 one to another. Interchangeably supported
 by the plates 13, and 14, are end cross-
 pieces 18, provided across their entire
 length with alternately disposed lugs and
 depressions 19, and 20, the depressions 20,
 10 serving to permit air to pass up through
 the furnace. As clearly illustrated in Figs.
 4, and 6, air ducts 21, are present between
 the outer walls of the plates 13, and 14, and
 the inner walls of the members 18, which
 15 communicate with some of the said depres-
 sions 20. It will be noticed that air, by
 reason of this arrangement and construction
 of parts, passes upwardly from the outside
 of the grate to and through the grate's in-
 20 terior. It may be here remarked that by
 making the cross-pieces interchangeable,
 new parts may be adjusted to place without
 in any way affecting the framework. This
 is advantageous should a cross-piece burn
 25 out.

The grate bars proper are pivotally sup-
 ported upon the side bars 15. A descrip-
 tion will now be given of these grate bars,
 reference being had more particularly to
 30 Figs. 2, 3, and 4. These grate bars com-
 prise web portions 22, having formed in-
 tegral therewith leaves 23, having straight
 portions 50, terminating in a generally con-
 vex curve. The leaves 23, are shown as
 35 having staggered relation with one another.
 To strengthen the general construction of
 the grate bars and more particularly the
 web portions the said webs are reinforced,
 when the grate bar is cast, by means of a
 40 reinforcing rod 24, shown in the drawings as
 being of spiral contour. The cross-section
 of the spiral reinforcing rod being irregu-
 lar, the metal of the web in casting flows
 in and around the irregular portions of the
 45 reinforcing rod and provides a web possessed
 of great strength. As illustrated in Figs.
 2, and 3, the web 22, just described is pro-
 vided with bearings 25, between the leaves
 23, the said bearings resting in recessed por-
 50 tions 26, upon the side rails 15. As it will
 be readily apparent from the drawings the
 spaces between the leaves are quite narrow,
 consequently the side rails 15, must be
 quite narrow to fit therebetween. As the
 55 said rails 15, are comparatively thin in
 cross-section it has been found necessary to
 stiffen the same by reinforcing strips 27,
 and 28, arranged adjacent the lower parts of
 said rails, see Fig. 2. Connecting each of the
 60 grate bars 1, and the oscillating rod 29, are
 pendent arms 30. As shown in Fig. 1, the
 pendent arms 30, have pivotal connections
 as at 31, with the oscillating rod 29, and
 are provided at their upper portions with
 65 a recessed portion 32, adapted to receive a

depending portion 33, of the grate bars.
 As clearly illustrated this forms a dove-
 tail coupling. Bolt and nut connections 34,
 are present to hold these parts together. In
 this connection the above recited parts serve 70
 to strengthen the connecting members and
 likewise serve to eliminate shearing strain
 of the grate bars upon the bolt connections
 34. As shown in Fig. 2, the parts 33, are lo-
 cated upon opposite ends of the grate bars 75
 so that the operating levers may be connect-
 ed from either side. Pivotaly connecting
 the oscillating bar 29, and the operating
 lever 35, is a rod 37, see Figs. 1, 8, and 9.
 As clearly shown in Figs. 8, and 9, the rod 80
 37, is fitted within a socket 38, and secured
 thereto by means of a screw 39. The socket
 38, in turn has pivotal connection with the
 operating lever 36. The lever 35, has ex-
 tending forwardly therefrom a lug 40, cen- 85
 trally apertured, and the socket 38, has ex-
 tending forwardly therefrom a pair of lugs
 41, that straddle the lug 40, the lugs 41, be-
 ing also apertured. The said apertures are
 adapted to register with the opening in the 90
 lug 40, when the grate bars are in the posi-
 tion shown in Fig. 1, a pin 43, being pres-
 ent to lock the parts together. When in
 this position the grate bars cannot be moved
 but by removing the pin 42, the parts are 95
 free to operate. The lever 35, has pivotal
 relation as at 43, with a link 44, which in
 turn has pivotal relation with the fur-
 nace 5.

It is thought that the operation of the 100
 above described grate will be understood
 without resort to further description. It
 may be remarked, however, that when mov-
 ing the grate from the position shown in
 Fig. 1, to that shown in Fig. 4, a relatively 105
 large opening is created between adjacent
 grate bars thereby permitting clinkers and
 the like to readily pass to the ash-pit. How-
 ever, by virtue of the straight portions 50,
 of the grate bars a relatively small opening 110
 may be made by a slight movement of the
 operating lever to permit fine ashes to grav-
 itate to the ash-pit without disturbing the
 bed of fuel. Further a large amount of air
 is permitted to pass up through the grate 115
 bars by virtue of the staggered relation of
 the leaves of the grate bars and the air
 ducts in the end cross-pieces 18. This large
 admission of air serves to cause a furnace
 to consume practically all of the gases with- 120
 in the combustion chamber thereby eliminat-
 ing smoke, and in practice demonstrating
 that a saving of fuel to the extent of at least
 28 per cent. may be effected.

Having thus described the nature and ob- 125
 jects of the invention what I desire to se-
 cure by Letters Patent is:

1. A grate bar comprising a cylindrical
 rib having formed integral therewith trans-
 versely extending staggered leaves and a one 130

piece reinforcing element embedded in its entirety within said rib and extending throughout the length thereof.

2. A grate bar comprising a cylindrical rib having formed integral therewith transversely extending staggered leaves and a one piece reinforcing element of relatively large cross-section embedded in its entirety within said rib and extending throughout the length thereof.

3. A cast iron grate bar comprising a cylindrical rib having formed integral therewith transversely extending staggered leaves each of said leaves having convexed top surfaces and two opposite straight perpendicular ends and a wrought iron reinforcing bar of relatively large cross-section embedded in its entirety within said rib and extending throughout the entire length thereof.

4. A grate bar comprising a cylindrical rib having formed integral therewith transversely extending leaves and a one piece spirally formed wrought iron reinforcing bar wholly embedded within said rib and extending throughout the length thereof, said reinforcing bar forming an interlock connection with said cylindrical rib.

5. In a grate construction, a frame consisting of side bars and end plates, grate parts carried by said side bars and cross-pieces detachably secured to the outer sides of said end plates the cross-pieces being provided upon their inner faces with laterally disposed alternately arranged lugs and depressions, air ducts being formed between the abutting faces of the end plates and the cross-pieces which communicate with some of said depressions, whereby air may pass upwardly from the outside of the grate to and through the grate's interior.

6. In a grate construction, a frame consisting of side bars and end plates, grate bars provided with staggered leaves journaled in the side bars said staggered leaves permitting free access of air between the grate bars, means for rocking said grate bars, cross-pieces detachably secured to the outer sides of said end plates the cross-pieces being provided with laterally disposed alternately arranged lugs and depressions at their tops and recessed portions at their bottoms forming air ducts between the outer faces of the end plates and the inner faces of the cross-pieces, said air ducts communicating with some of said depressions, whereby air may pass upwardly from the outside of the grate to the grate's interior and between said staggered leaves.

7. In a grate construction, a frame consisting of side bars and end plates, grate parts carried by said side bars, cross-pieces detachably secured to the outer sides of said end plates the cross-pieces being provided upon their inner faces and adjacent their tops with laterally disposed alternately arranged lugs and depressions and being further provided upon their inner faces and below said lugs and depressions with recesses forming air ducts between the outer faces of the end plates and the inner faces of the cross-pieces which communicate with some of said depressions, whereby air may pass upwardly from the outside of the grate to and through the grate's interior.

In testimony whereof I have hereunto signed my name.

ALFRED F. DAWSON.

Witnesses:

WILLIAM J. JACKSON,
AGNES CASKEY.