

June 19, 1923.

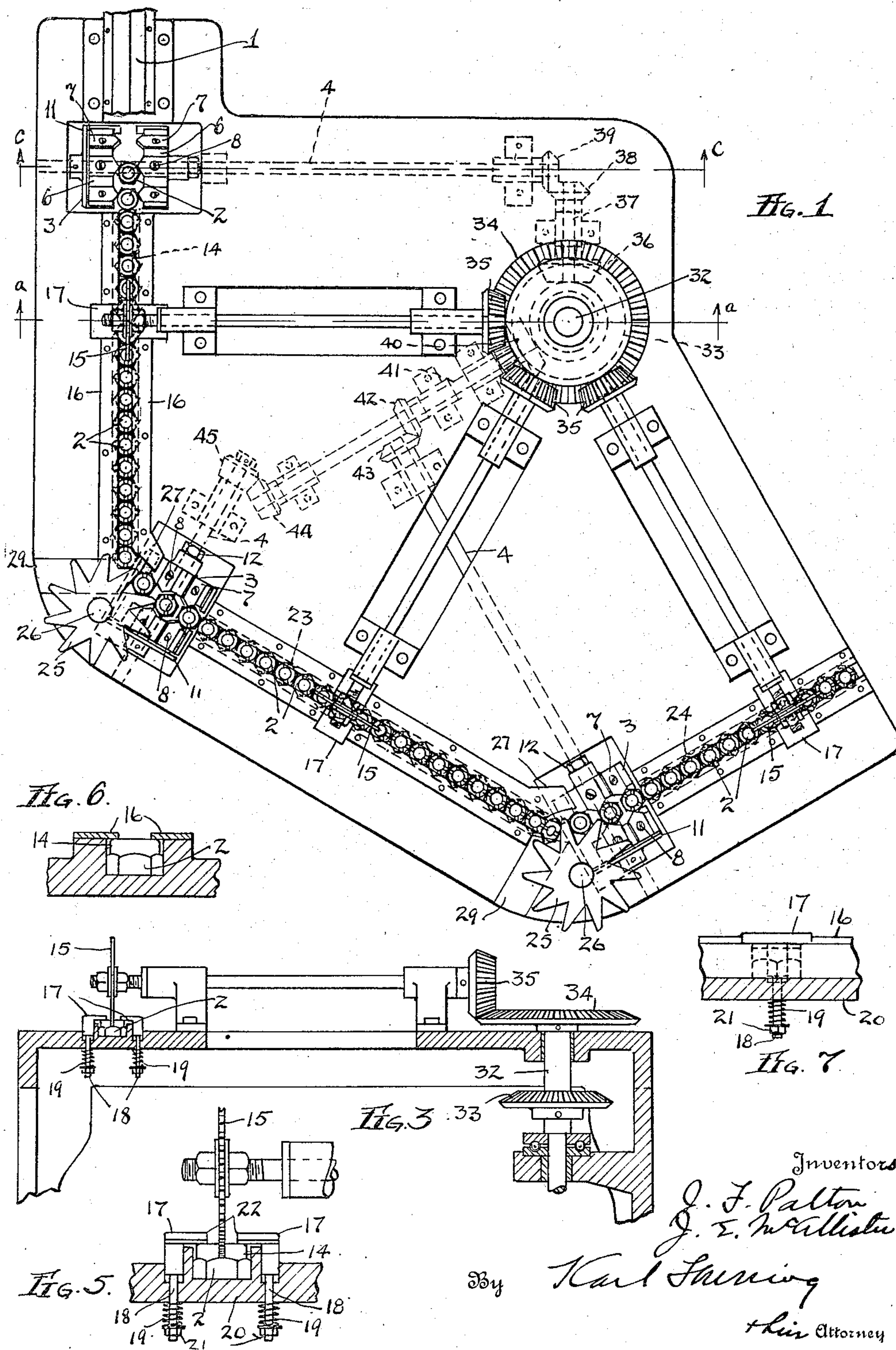
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J. F. PATTON ET AL

MILLING MACHINE FOR CONTINUOUS MILLING

Filed May 12, 1919

3 Sheets-Sheet 1



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3 Sheets-Sheet 2

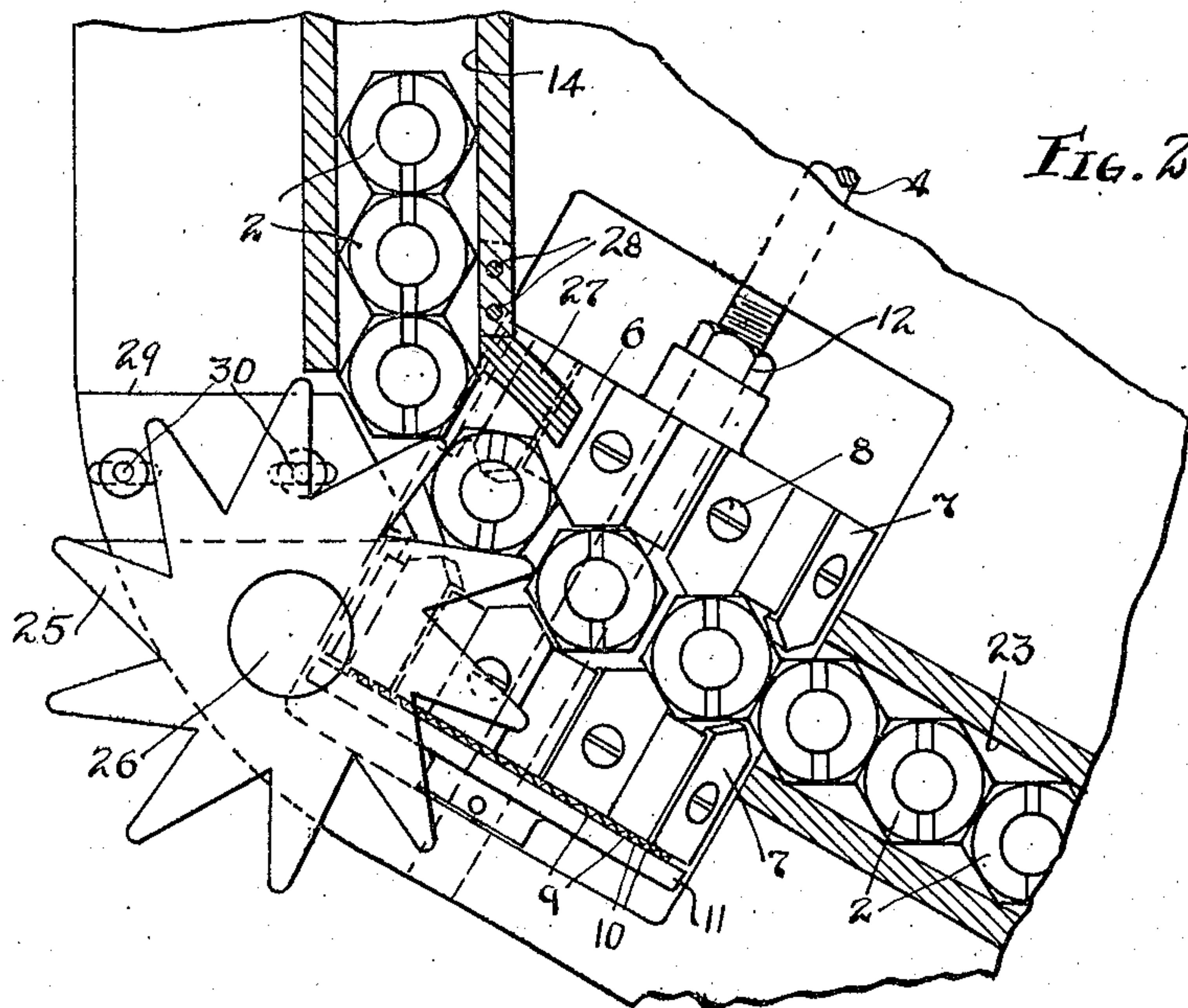


Fig. 2

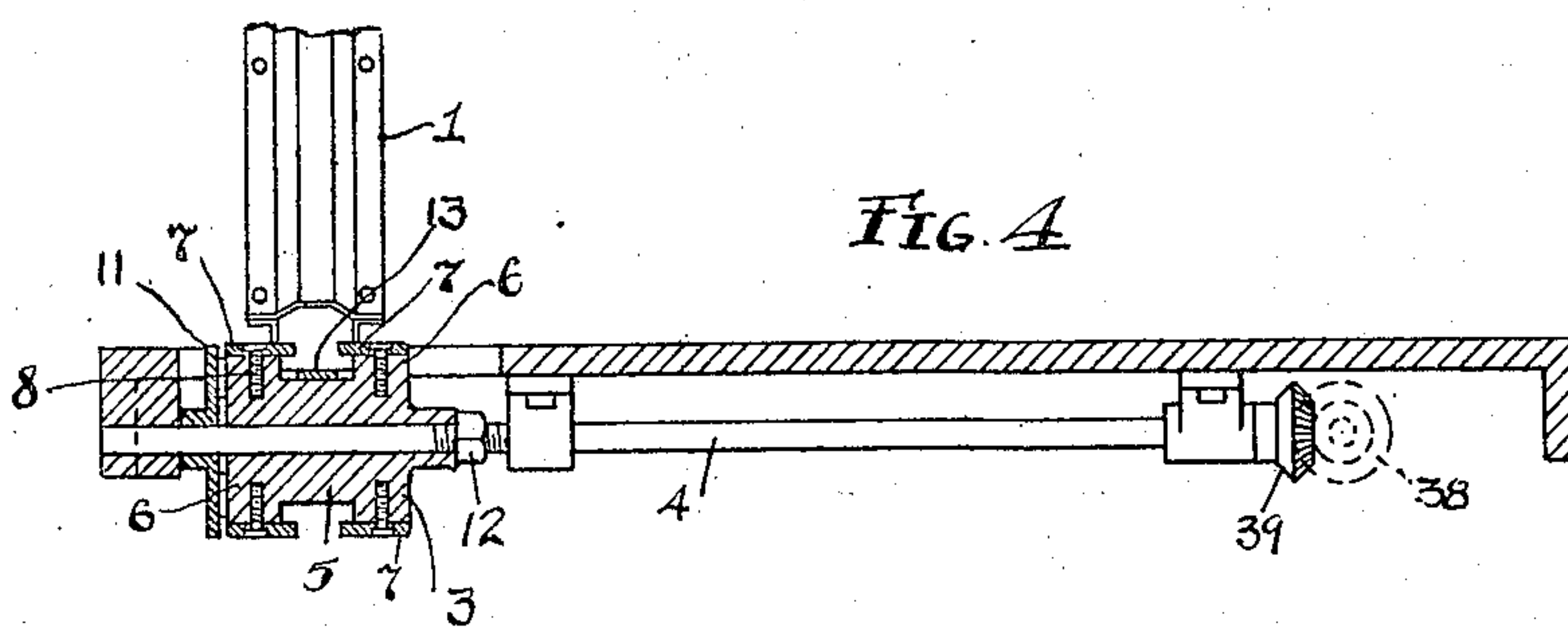


Fig. 4

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3 Sheets-Sheet 3

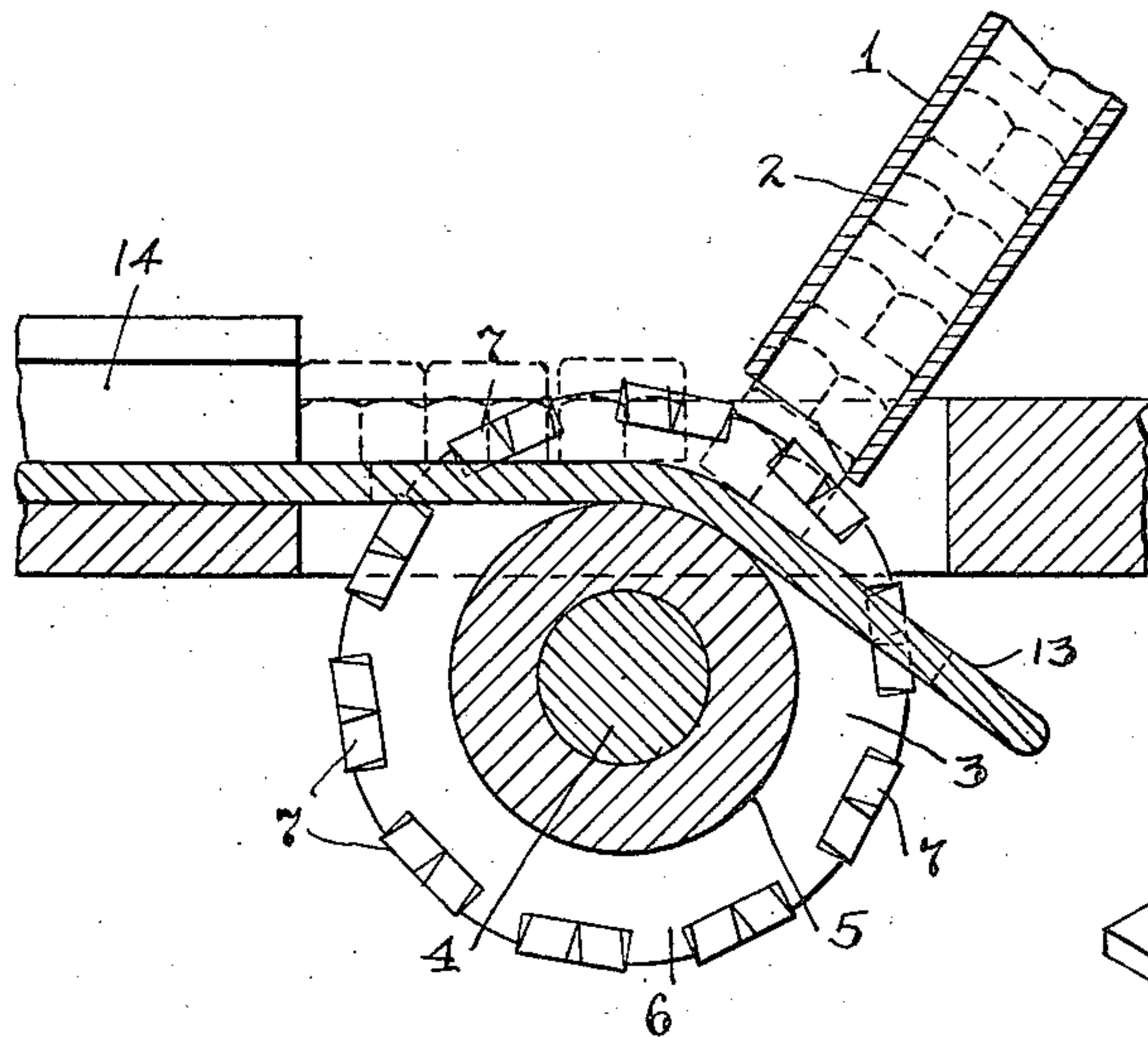


Fig. 12

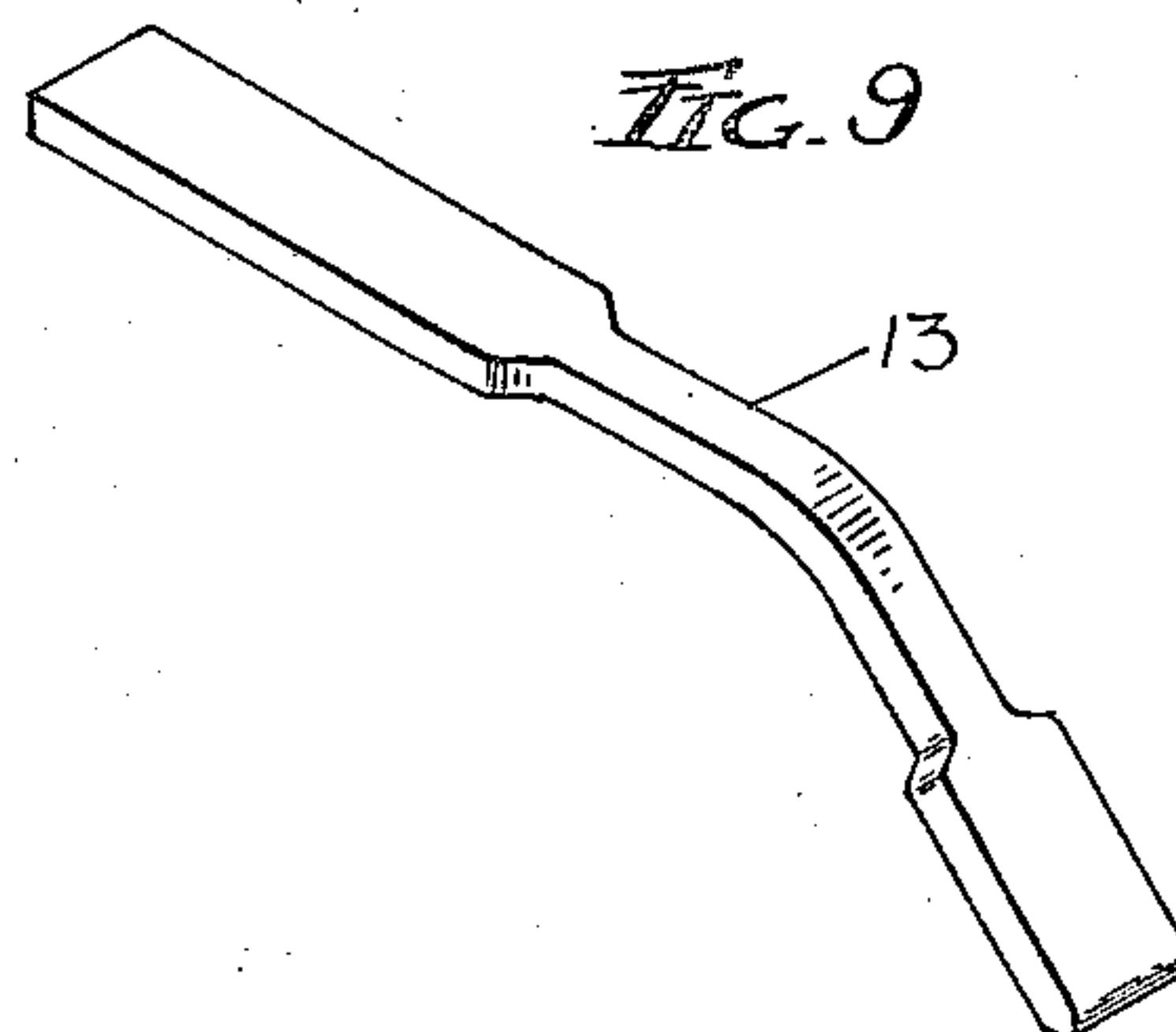


Fig. 9

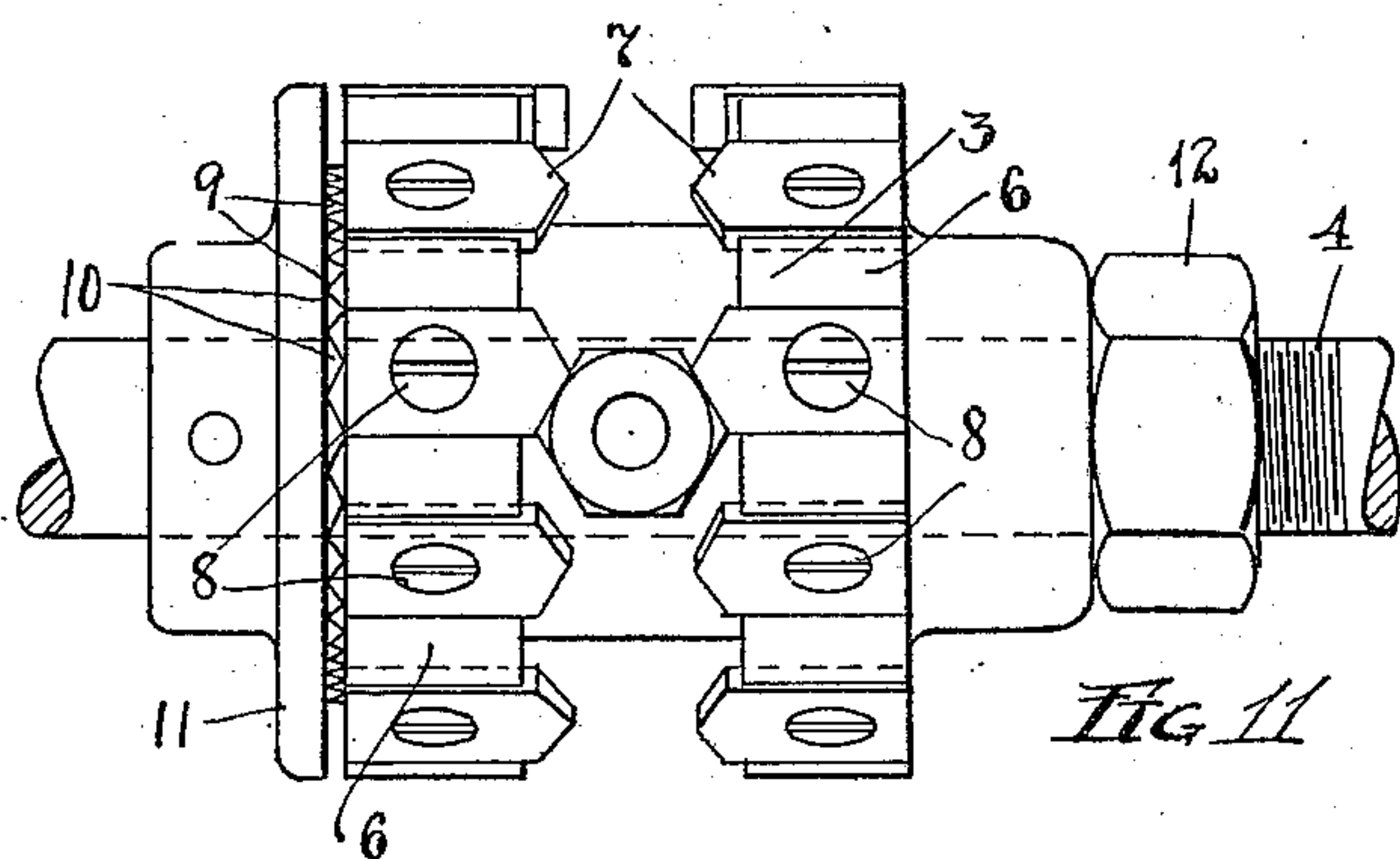


Fig. 11

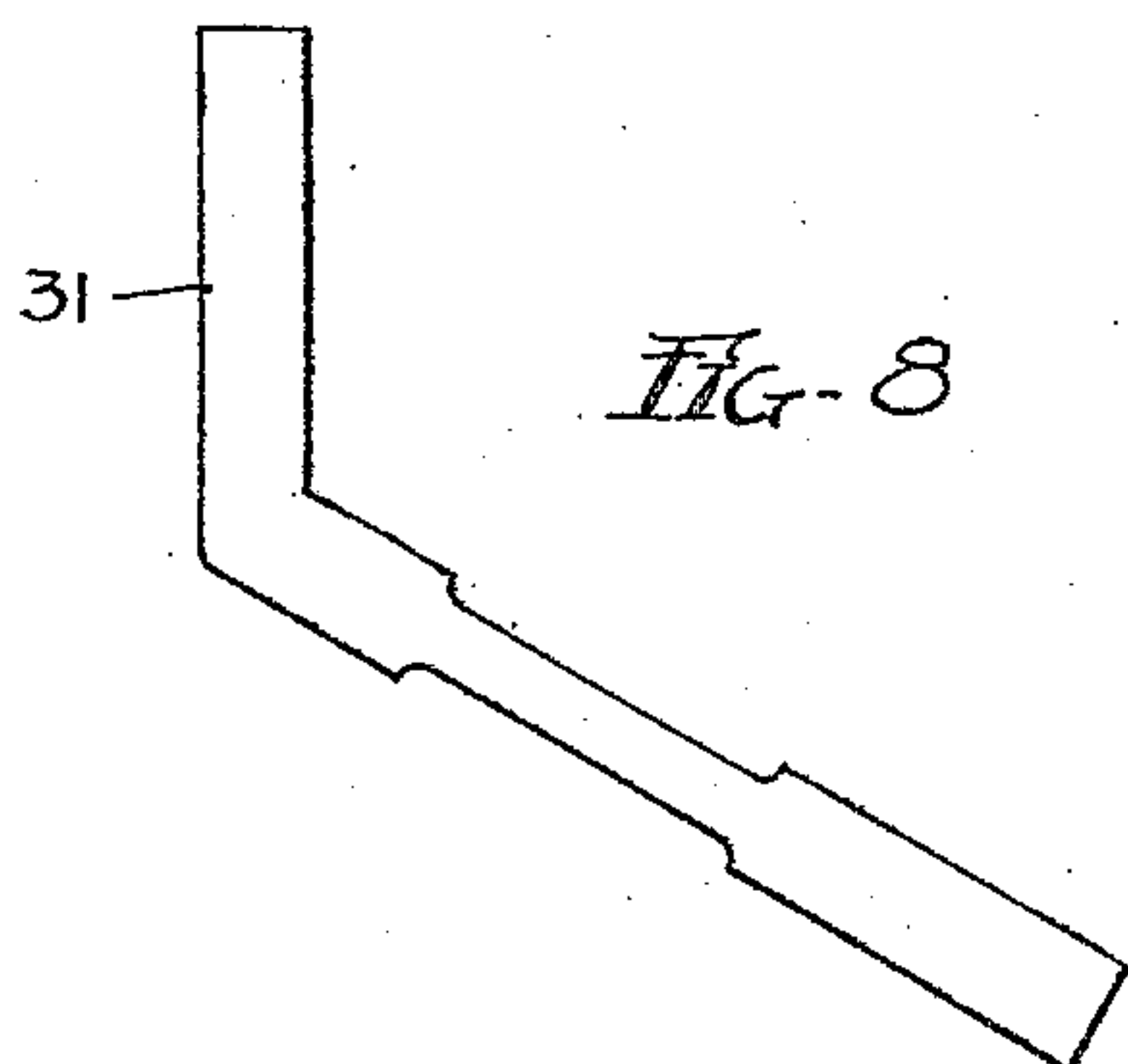


Fig. 8

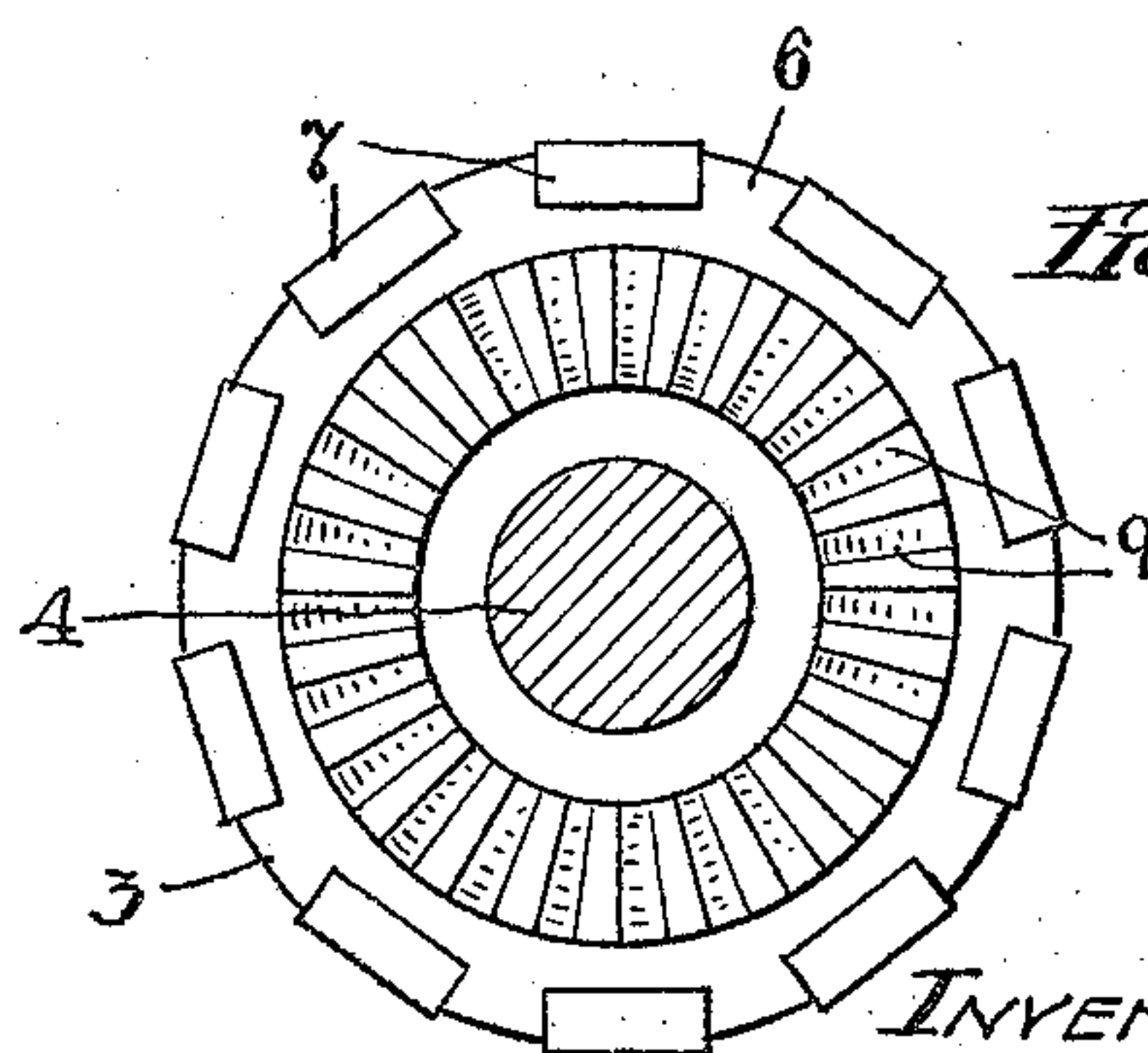


Fig. 10

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## UNITED STATES PATENT OFFICE.

JAMES F. PATTON AND JOHN E. McALLISTER, OF CLEVELAND, OHIO.

MILLING MACHINE FOR CONTINUOUS MILLING.

Application filed May 12, 1919. Serial No. 296,390.

*To all whom it may concern:*

Be it known that we, JAMES F. PATTON and JOHN E. McALLISTER, citizens of the United States, residing at Cleveland, in the State of Ohio, have invented new and useful Improvements in Milling Machines for Continuous Milling, of which the following is a specification.

Our invention relates particularly to a machine which operates upon formed blanks to convert them into castellated nuts. In general castellated nuts are hexagonal in form at their base and are provided with an upper cylindrical portion. Through a portion are milled slots which are perpendicular to the lines forming the sides of the formed blanks. It is an object of our invention to mill these slots in the formed blanks.

Various objects and advantages of our invention will be set forth hereinafter.

For the purpose of more fully disclosing the nature and advantages of our invention, we will describe the specific embodiment thereof illustrated in the accompanying drawing. It should be understood, however, that our invention is capable of various modifications and, therefore, it is not limited to the particular structure illustrated.

In the accompanying drawings Figure 1 is a plan view of one form of our machine. Fig. 2 is a plan view of a portion of the machine on a larger scale. Fig. 3 is a sectional view taken on the line *a—a* of Fig. 1. Fig. 4 is a section on the line *c—c* of Fig. 1 and Figs. 5 to 12 show details of the mechanism.

We provide a hopper 1 from which the formed blanks 2 drop into pockets in a feed wheel 3 which is mounted in a shaft 4 which is rotated as hereinafter described.

As shown in Figs. 11 and 12 the feed wheel consists of a central cylinder 5 between two flanges 6. The flanges are provided with inwardly extending removable teeth 7 held in place by screws 8. It will be seen that the teeth 7 are beveled at their inner ends so as to correspond to the form of the formed blanks 2. It will be understood that the teeth 7 illustrated in Fig. 11 are adapted for the particular formed blank 2 shown in position in the drawings. Formed blanks of other sizes or other contours may be accommodated by substituting for the teeth 7 herein shown, other suitably formed teeth.

The feed wheel 3 is loosely mounted on the shaft 4 but is provided in its end with teeth 9 preferably V shaped and adapted to mesh with correspondingly shaped teeth 10 on a disc 11 which may be pinned or otherwise suitably held against relative movement on the shaft 4. A nut 12 on the shaft 4 forces the feed wheel 3 against the disc 11 and holds the teeth 9 and 10 in engagement so that the feed wheel turns with the shaft. The nut 12 may be loosened and allow the feed wheel 3 to be moved toward the right in Fig. 11 and so draw the teeth 9 and 10 out of engagement. In this condition the feed wheel 3 may be adjusted about the shaft 4 so as to properly receive the formed blanks from the hopper 1.

Extending between the teeth 7 and over the central cylinder 5 of the feed wheel 3 is a guide bar 13 shown in perspective in Fig. 9. This guide bar forms a bottom for the pockets formed between the teeth 7 to receive the formed blanks and as the feed wheel revolves, the formed blanks are forced along this guide bar into the channel 14 into which the end of the guide bar enters and is fastened.

The channel 14 is at right angles with the axis of the feed wheel 3 so that as the wheel rotates it forces the formed blanks 2 through the channel. The channel may be of any suitable length and at a proper point in it we provide a cutter 15 which is adapted to be rotated in a manner hereinafter described and cuts a slot across one diameter of the formed blanks as they pass by the cutter. In the particular embodiment of our invention shown in the drawings, the cutter consists of the usual disc mounted over the channel 14 and acting upon the tops of the formed blanks as they are passed under the cutter. The channel is provided with retaining plates 16 which hold the formed blanks in the channel. These retaining plates do not at all times bear upon the formed blanks but allow them free passage and at the same time prevent the formed blanks from buckling or turning or being forced up. The retaining plates do, however, allow the nuts or formed blanks some freedom. While it is not necessary, we prefer to provide pressure bars 17 as shown in Figs. 3, 5 and 7 at one or both sides of the channel immediately under the cutter 15. These pressure bars have shanks 18



extending through the base 20 of the channel and surrounded by coil springs 19 which act between the bottom of the channel base 20 and nuts 21 on the ends of the shanks to hold the pressure bars 17 down. The pressure bars have noses 22 projecting over and in engagement with the formed blanks in the channel. As shown in Fig. 7 the noses of the pressure bars have a flat portion between two rounded ends so that the formed blanks may be readily fed under the pressure bars in their travel through the channel. It will be readily seen that the effect of so holding the formed blanks while being acted on by the cutter will be to produce a slot of uniform depth.

It will be remembered that the teeth 7 in the feed wheel 3 are formed and arranged to grasp the formed blanks in such a way as to force them forward while in direct contact with each other on their sides in contradistinction to their angles. The relative proportions of the teeth, feed wheel and formed blanks is such that after the formed blanks leave the hopper they are always in contact with each other so that there is a continuous train of formed blanks passing through the channel and they are forced under the cutter by a continuous forward movement and not by an intermittent movement. The arrangement of the formed blanks in the channel and when the cutter acts upon the formed blanks is such that the slot milled in the formed blanks is perpendicular to two of the side faces of the formed blanks.

In order to complete the milling operation on the formed blank, which requires the milling of two additional slots at an angle with reference to the first milled slot, it is necessary to feed the formed blanks, when once cut, at an angle to their first cut and then again at an angle to both the first and the second slots. It is obvious that if similar cutting mechanisms are arranged to act upon the formed blanks in their movement when so turned each blank will have in it three milled slots extending entirely across the formed blank and perpendicular to the side faces of the formed blank. The blanks when turned might be passed through channels parallel with or forming a continuation of channel 14 but we prefer to provide a channel 23 at an angle to the channel 14 and beyond that a third channel 24 at an angle to the channel 23. Associated with each of the channels 23 and 24 are corresponding cutters 15 and their associated pressure bars and appurtenances, as well as feed wheels similar to the feed wheel 3 for forcing the formed blanks through the channels and under the cutters.

In order to insure that the formed blanks will be turned properly when passing from one channel to the other, we have pro-

vided a mechanism at the angle between the channels. This consists of a transfer wheel 25 mounted on a perpendicular pivot 26 adjacent to the path of the formed blanks and arranged to receive a formed blank between each pair of points. The inner angle at the turn of the channel consists preferably of a separate plate 27 having its point cut away. This plate 27 is held by screws 28 in the channel base 20 and the screw holes in the plate are so formed that there is a little room for movement so that when the screws are loosened the plate and its guiding side may be slightly adjusted to accommodate the particular formed blanks being operated upon. Opposite the plate 27 in the outer wall of the channel at the angle is a guide 29 adjustable under the head of the bolts 30 which engage the channel base 20. The adjustable guide 29 may be so adjusted as to cause the formed blanks, when they reach it, to be forced by the pressure of the formed blanks behind them in the channel along the edge of the plate 27 while being held securely and turned about the axis of the transfer wheel 25. It will be observed that the transfer wheel which carries the nut from one channel to the other and rearranges them is driven by the nuts themselves and no external positive drive may be necessary. The feed wheel 3 for the channel to receive the formed blanks, is properly adjusted on its shaft to grasp the formed blanks as they pass from the transfer wheel 25 and force them as so turned through the channel and under the cutter. Extending from one channel to the other and over the central cylinder 5 and between the teeth 7 of the feed wheel 3 at an angle, is an angular guide bar 31 shown in plan in Fig. 8 which acts as a bottom for the pockets formed by the teeth 7 and insures a smooth even passage way for the formed blanks from one channel to the other and while being turned.

The feed wheels and the cutters may be driven by any suitable mechanism. For example we have shown a vertical shaft 32 carrying two horizontal pinions 33 and 34. The upper beveled pinion 34 engages the pinions 35 on the shafts carrying the cutters 15. The lower beveled pinion 33 engages a pinion 36 on a jack shaft 37 which in turn carries a pinion 38 engaging a pinion 39 on the shaft 4 of the feed wheel 3 associated with the channel 14. Also engaging the lower pinion 33 is a pinion 40 on the jack shaft 41 which in turn carries a pinion 42 engaging a pinion 43 on the shaft 4 of the feed wheel 3 associated with the channel 24. The jack shaft 41 also carries a pinion 44 engaging a pinion 45 on the shaft 4 of the feed wheel 3 associated with the channel 23.

It will be understood that when the ver-



tical shaft 32 is properly rotated by a motor or other suitable mechanism (not shown) it will, in turn, drive the three feed wheels in the proper direction to force the formed blanks forward through the channels and at the same time rotate the cutters in the opposite direction, that is so that the bottom or cutting points of the cutters will be operating in a direction opposite to the direction of movement of the formed blanks. In interpreting the appended claims it should be remembered that numerous changes might be made in the apparatus shown without departing from our invention.

We claim as our invention:

1. A chute containing nuts, a feed wheel receiving the nuts from the chute, removable teeth in the wheel to engage the nuts, a guide plate extending over the wheel and between the teeth, a channel supporting the guide plate through which the nuts are forced by the feed wheel, retaining plates loosely holding the nuts in the channel, pressure bars supported adjacent the channel to hold a nut, a cutter projecting between the pressure bars to cut the nuts, a spacing bar in the end of the channel, a transfer wheel adjacent the spacing bar engaging the nuts to turn them, a second channel at an angle to the first channel, a second feed wheel in line with the second channel to receive the nuts from the transfer wheel and feed them through the second channel, retaining plates loosely holding nuts in the second channel, pressure bars supported adjacent the second channel to hold a nut, a cutter projecting between the pressure bars to cut the nuts, a spacing bar in the end of the second channel, a transfer wheel adjacent the last mentioned spacing bar engaging the nuts to turn them, a third channel at an angle to the first two channels, a third feed wheel in line with the third channel to receive the nuts from the transfer wheel and feed them through the third channel, retaining plates loosely holding nuts in the third channel, pressure bars supported adjacent the third channel to hold a nut and a cutter projecting between the pressure bars to cut the nuts.

2. A chute, a feed wheel below the chute, a channel adjacent the feed wheel, a cutter over the channel, a transfer wheel adjacent the channel for transferring blanks from one channel to the next, a second channel at an angle to the first channel, a second feed wheel in line with the second channel, a cutter over the second channel, a transfer wheel adjacent the second channel for transferring blanks from one channel to the next, a third channel at an angle to the first two channels, a third feed wheel in line with the third channel, and a cutter over the third channel.

3. A channel, means for feeding nuts in

lateral contact with each other through the channel, a cutter acting on the nuts at one point in the channel, a second channel at an angle to the first channel, means for turning the cut nuts at an angle and feeding them through the second channel, means for cutting the nuts in the second channel at an angle to the first cut, a third channel at an angle to the other channels, means for again turning the cut nuts and feeding them through the third channel, means for cutting the nuts in the third channel at an angle to the other cuts, and means on the same side of the nuts as the cutters for holding the nuts from tipping when being cut.

4. A cutter, means for feeding nuts past the cutter, means for turning the nuts, a second cutter, means for feeding the turned nuts past the second cutter, means for again turning the nuts, a third cutter, means for feeding the nuts as finally turned past the third cutter, and means on the same side of the nuts as the cutters for holding the nuts from tipping when acted on by the cutters.

5. A chute for holding nuts, a wheel below the chute having pockets to receive the nuts in contact with each other at one point, removable sides for the pockets, a channel, a guide plate extending into the channel and over the wheel between the sides of the pockets and forming the bottom of the pockets, means for turning the wheel to force the nuts over the guide plate and through the channel in contact with each other, retaining plates loosely holding the nuts in the channel and means for cutting the nuts on one diameter.

6. A chute for holding nuts, a feed wheel below the chute, a channel adjacent the feed wheel, a cutter over the channel, means for turning the nuts, a second channel at an angle to the first channel, a second feed wheel in line with the second channel, a cutter over the second channel, means for turning the nuts, a third channel at an angle to the first two channels, a third feed wheel in line with the third channel, and a cutter over the third channel.

7. A channel, means for feeding nuts through the channel, a cutter acting on the upper sides of nuts at one point in the channel, a second channel at an angle to the first channel, means for turning the cut nuts at an angle and feeding them through the second channel, and means for cutting the nuts in the second channel at an angle to the first cut.

8. A chute, a feed wheel below the chute, a channel adjacent the feed wheel, a cutter over the channel, a transfer wheel adjacent the channel for transferring blanks from one channel to the next, a second channel at an angle to the first channel, a second feed wheel



in line with the second channel, and a cutter over the second channel.

9. A channel, means for feeding hexagonal nuts in lateral contact with each other through the channel, a cutter acting on the upper sides of nuts at one point in the channel, a second channel at angle of sixty degrees to the first channel, means for turning the cut nuts and feeding them through the second channel, means for cutting the nuts in the second channel at an angle of sixty degrees to the first cut, a third channel at an angle of sixty degrees to the second channel, means for again turning the cut nuts and feeding them through the third channel, and means for cutting the nuts in the third channel at an angle of sixty degrees to the other cuts.

10. A chute, a feed wheel below the chute grasping the nuts by their side walls, a channel adjacent the feed wheel, a cutter over the channel, a transfer wheel adjacent the channel and grasping the nuts by their side walls, for transferring blanks from one channel to the next, a second channel at an angle to the first channel, a second feed wheel in line with the second channel, a cutter over the second channel, a transfer wheel adjacent the second channel for transferring blanks from one channel to the next, a third channel at an angle to the first two channels, a third feed wheel in line with the third channel, and a cutter over the third channel.

11. A channel, means for feeding hexagonal nuts in lateral contact with each other through the channel, a cutter acting on the nuts at one point in the channel, a second channel at an angle of sixty degrees to the first channel, means for turning the cut nuts and feeding them through the second channel, means for cutting the nuts in the second channel at an angle of sixty degrees to the first cut, a third channel at an angle of sixty degrees to the other channels, means for again turning the cut nuts and feeding them through the third channel, means for cutting the nuts in the third channel at an angle of sixty degrees to the other cuts, and means on the same side of the nuts as the cutters for holding the nuts from tipping when being cut.

12. A chute, a feed wheel below the chute grasping the nuts by their side walls, a channel adjacent the feed wheel, a cutter adjacent the channel, a transfer wheel adjacent the channel for transferring blanks from one channel to the next, a second channel at an angle to the first channel, a second feed wheel in line with the second channel, a cutter adjacent the second channel, a transfer wheel adjacent the second channel for transferring blanks from one channel to the next, a third channel at an angle to the first two channels, a third feed wheel in

line with the third channel, a cutter adjacent the third channel, and holding means adjacent the cutters.

13. A channel, means for feeding hexagonal nuts in lateral contact with each other through the channel, a cutter acting on the upper sides of the nuts at one point in the channel, a second channel at an angle of sixty degrees to the first channel, means for turning the cut nuts and feeding them through the second channel, means for cutting the upper sides of the nuts in the second channel at an angle of sixty degrees to the first cut, and means for holding the nuts from tipping when being cut.

14. A cutter, means for feeding nuts past the cutter, means for holding the nuts from tipping when acted on by the cutter, means for turning the nuts, a second cutter, means for feeding the turned nuts past the second cutter, means for holding the nuts from tipping when acted on by the second cutter, means for again turning the nuts, a third cutter, means for feeding the nuts as finally turned past the third cutter, and means on the same side of the nuts as the cutters for holding the nuts from tipping when acted on by the third cutter.

15. A chute for holding nuts, a wheel below the chute having pockets to receive the nuts in contact with each other at one point, removable sides for the pockets, a channel, a guide plate extending into the channel and over the wheel between the sides of the pockets and forming the bottom of the pockets, means for turning the wheel to force the nuts over the guide plate and through the channel in contact with each other, retaining plates loosely holding the nuts in the channel, means for cutting the nuts on one diameter, and means for holding the nuts from tipping while being cut.

16. A plurality of slotting cutters, a plurality of channels adapted to guide nuts into proper engagement with the corresponding cutters so as to form slots therein, and a transfer wheel for transferring the nuts from one channel to the following channel for the purpose of rearranging the nuts so as to feed them properly past the following cutter and form slots therein at a predetermined angle to the slots cut by the preceding cutters.

17. A chute for holding nuts, a wheel below the chute having pockets to receive the nuts in contact with each other at one point, a channel, a guide plate extending into the channel, and over the wheel and forming the bottom of the pockets, means for turning the wheel to force the nuts over the guide plate and through the channel in contact with each other, and means for cutting the nuts on one diameter.

18. A cutter, means for feeding nuts past the cutter, means on the same side of



the nuts as the cutters for holding the nuts from tipping when acted on by the cutter, a second cutter, means for feeding the nuts past the second cutter, means for holding the nuts from tipping when acted on by the second cutter, a third cutter, means for feeding the nuts past the third cutter, and means for holding the nuts from tipping when acted on by the third cutter.

19. A chute for holding nuts, a wheel below the chute having pockets to receive the nuts, removable sides for the pockets, a channel, means for turning the wheel to force the nuts through the channel, means for cutting the nuts on one diameter, and means for holding the nuts from tipping while being cut.

20. A chute for holding nuts, a wheel below the chute having pockets to receive the nuts in contact with each other at one point, removable sides for the pockets, a channel, a guide plate extending into the channel and over the wheel between the sides of the pockets and forming the bottom of the pockets, means for turning the wheel to force the nuts over the guide plate and through the channel in contact with each other, retaining plates loosely holding the nuts in the channel, means for cutting the nuts on one diameter, and means for turning the nuts and cutting them on another diameter.

21. A chute containing nuts, a feed wheel receiving the nuts from the chute, removable teeth in the wheel to engage the nuts, a guide plate extending over the wheel and between the teeth, a channel supporting the guide plate through which the nuts are forced by the feed wheel, retaining plates loosely holding the nuts in the channel, pressure bars supported adjacent the channel to hold a nut, a cutter projecting between the pressure bars to cut the nuts, a spacing bar in the end of the channel, a transfer wheel adjacent the spacing bar engaging the nuts to turn them, a second channel at an angle to the first channel, a second feed wheel in line with the second channel to receive the nuts from the transfer wheel and feed them through the second channel, retaining plates loosely holding nuts in the second channel, pressure bars supported adjacent the second channel to hold a nut, and a cutter projecting between the pressure bars to cut the nuts.

22. A chute containing nuts, a feed wheel receiving the nuts from the chute, a guide plate extending over the wheel and between the teeth, a channel supporting the guide plate through which the nuts are forced by the feed wheel, retaining plates loosely holding the nuts in the channel, pressure bars supported adjacent the channel to hold a nut a cutter projecting between the pressure bars to cut the nuts, a spacing bar in the end of the channel, a transfer wheel adja-

cent the spacing bar engaging the nuts to turn them, a second channel at an angle to the first channel, a second feed wheel in line with the second channel to receive the nuts from the transfer wheel and feed them through the second channel, a guide plate extending between the channels and over the feed wheel, retaining plates loosely holding nuts in the second channel, pressure bars supported adjacent the second channel to hold a nut, and a cutter projecting between the pressure bars to cut the nuts.

23. A chute containing nuts, a feed wheel receiving the nuts from the chute, a guide plate extending over the wheel, a channel supporting the guide plate through which the nuts are forced by the feed wheel, retaining plates loosely holding the nuts in the channel, pressure bars supported adjacent the channel to hold a nut, a cutter projecting between the pressure bars to cut the nuts, a spacing bar in the end of the channel, a transfer wheel adjacent the spacing bar engaging the nuts to turn them, a second channel at an angle to the first channel, a second feed wheel in line with the second channel to receive the nuts from the transfer wheel and feed them through the second channel, a guide plate extending between the channels and over the second feed wheel, retaining plates loosely holding nuts in the second channel, pressure bars supported adjacent the second channel to hold a nut, a cutter projecting between the pressure bars to cut the nuts, a spacing bar in the end of the second channel, a transfer wheel adjacent the last mentioned spacing bar engaging the nuts to turn them, a third channel at an angle to the first two channels, a third feed wheel in line with the third channel to receive the nuts from the transfer wheel and feed them through the third channel, a guide plate extending from the second to the third channel and over the third feed wheel, retaining plates loosely holding nuts in the third channel, pressure bars supported adjacent the third channel to hold a nut and a cutter projecting between the pressure bars to cut the nuts.

24. A chute containing nuts, a feed wheel receiving the nuts from the chute, teeth in the wheel to engage the nuts, a guide plate extending over the wheel and between the teeth, a channel supporting the guide plate through which the nuts are forced by the feed wheel, pressure bars supported adjacent the channel to hold a nut, a cutter projecting between the pressure bars to cut the nuts, a spacing bar in the end of the channel, a transfer wheel adjacent the spacing bar engaging the nuts to turn them, a second channel at an angle to the first channel, a second feed wheel in line with the second channel to receive the nuts from the transfer wheel and feed them through the second channel, pres-



sure bars supported adjacent the second channel to hold a nut, a cutter projecting between the pressure bars to cut the nuts, a spacing bar in the end of the second channel, a transfer wheel adjacent the last mentioned spacing bar engaging the nuts to turn them, a third channel at an angle to the first two channels, a third feed wheel in line with the third channel to receive the nuts from the transfer wheel and feed them through the third channel, pressure bars supported adjacent the third channel to hold a nut, and a cutter projecting between the pressure bars to cut the nuts.

25. A channel, means for feeding nuts through the channel, a transfer wheel to receive and turn the nuts as they leave the channel and a second channel into which the nuts pass from the transfer wheel.

26. A channel, means for feeding nuts through the channel, means for cutting the nuts in the channel, a second channel, means for cutting the nuts in the second channel, and a transfer wheel to receive the cut nuts from the first channel and turn them and deliver the turned nuts to the second channel.

27. A chute for holding nuts, an adjustable feed wheel for receiving the nuts from the chute and adjustable as to position for nuts of different sizes, and a channel through which the wheel feeds the nuts.

28. Two channels for nuts, a transfer wheel for transferring nuts from one channel, and an adjustable wheel for receiving the nuts from the transfer wheel and feeding them through the second channel.

29. A chute for holding nuts, a feed wheel having pockets for receiving the nuts from the chute, a channel, a guide plate extending into the channel and over the wheel and forming the bottom of the pockets, and means for turning the wheel to force the nuts over the guide plate and through the channel.

30. Two channels for nuts, a transfer wheel for transferring nuts from one channel, a feed wheel having pockets for receiving the nuts from the transfer wheel, a guide plate extending into both channels and over the wheel and forming the bottom of the pockets, and means for turning the feed wheel to force the nuts over the guide plate and through the second channel.

31. A channel for nuts, a transfer wheel for transferring nuts from the channel, adjustable side pieces in the channel to cause the nuts to enter the transfer wheel properly and a second channel into which the nuts pass from the transfer wheel.

32. In a machine for castellating nuts, the

combination of a guide way, a rotary cutter operating in the guideway, and a wheel having teeth to receive and act on nuts to introduce same in and form a row in the guideway, whereby the cutter successively acts on the nuts.

33. In a machine for castellating nuts, the combination of a guideway, a rotary cutter operating in the guideway, and a feed wheel having teeth shaped to consecutively feed individual nuts to the guideway to form a row and simultaneously move the row to the cutter.

34. In a machine for castellating nuts, a guideway, a cutter operating above the guideway, a feeding means for forcing the nuts along the guide-way and past the cutter, and a chute for delivering the nuts successively to the feeding means.

35. In a machine for castellating nuts, a guide-way formed to receive and guide the nuts in a row formation, a positively driven cutter operating above the guide-way, an inclined chute, and a feeding means comprising a positively driven tooth wheel to select the nuts singly from the chute and deliver them to and force them lengthwise the guide-way.

36. In a machine for castellating nuts, the combination of a guideway, and a cutter operating in the guideway, and a feed wheel for introducing a row of nuts to the guideway and imparting continuous movement to the nuts, whereby the nuts are successively cut by the cutter.

37. A channel, means for passing nuts through the channel in contact with each other, means inserted between certain of the nuts for rearranging the nuts so arranged that there is continuous contact between the stream made up of the nuts and the inserted means.

38. In a machine for milling nuts, a rigid seat for the nut, a rotary cutter operating on the nuts on the side opposite the seat, and a spring pressed pressure bar adjacent the cutter for holding the nut from tipping while being cut.

39. In a machine for milling nuts, a rigid seat for the nut, a rotary cutter operating on the nuts on the side opposite the seat, and means for continuously forcing the nuts past the cutter, and means for assuring a cut of uniform depth across same nut.

40. A channel, means for passing nuts through the channel, and means driven by the nuts themselves for rearranging the nuts.

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JOHN E. McALLISTER.