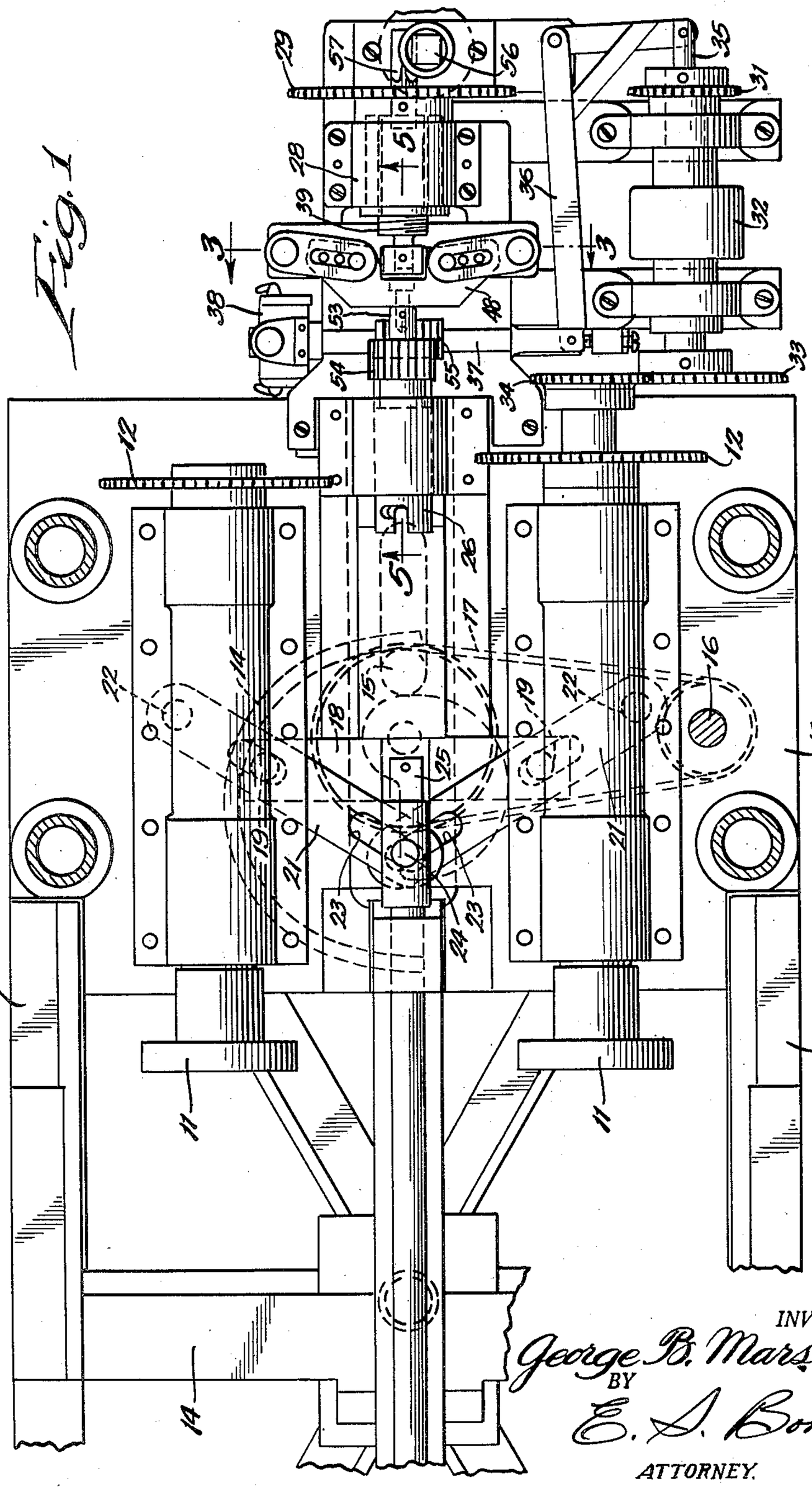
Jan. 27, 1953 G. B. MARSDEN 2,626,409

FEED MECHANISM FOR NIPPLE THREADING MACHINES AND THE LIKE

Filed Feb. 23, 1951 3 Sheets-Sheet 1

Fig. 1



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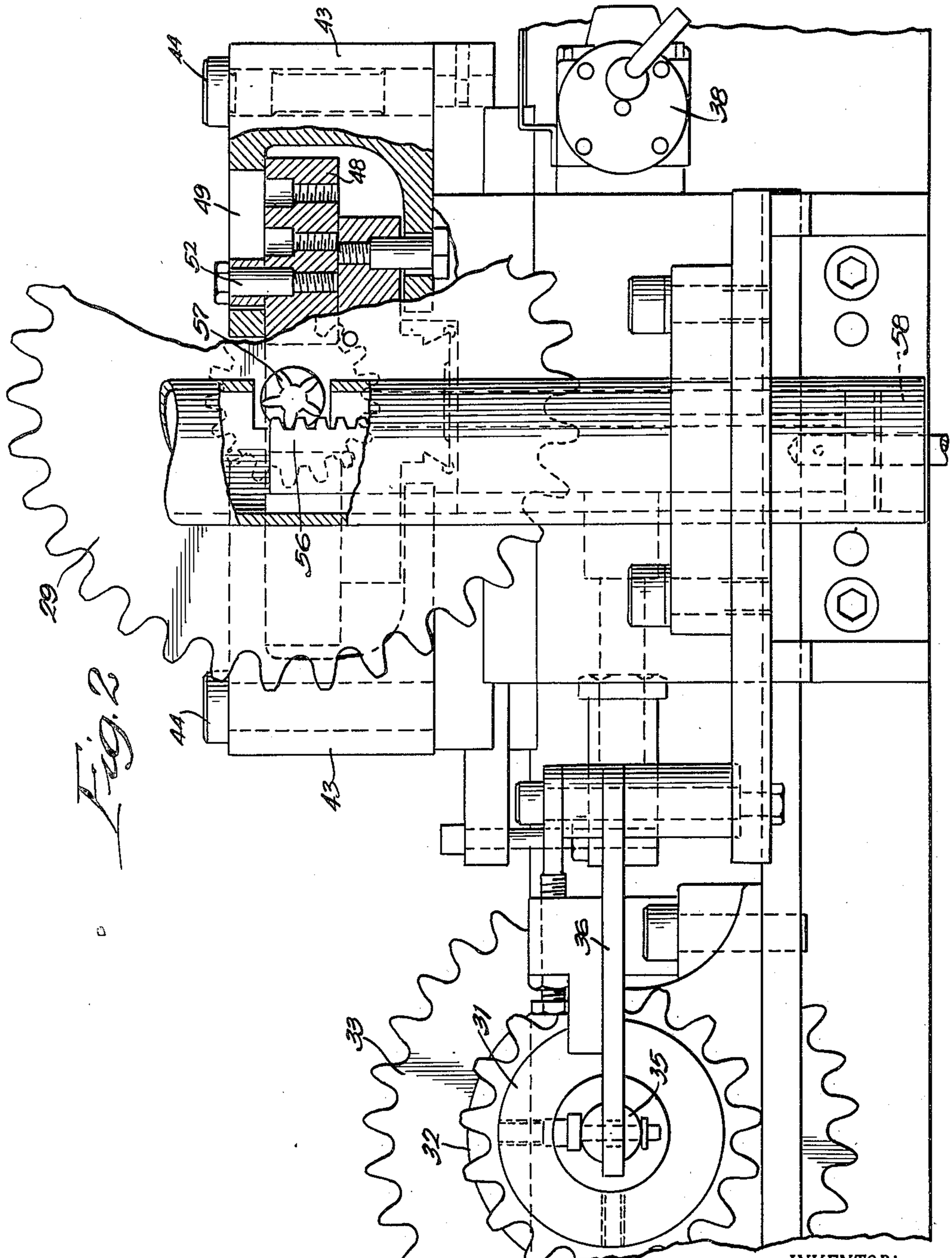

Fig. 2

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Fig. 3

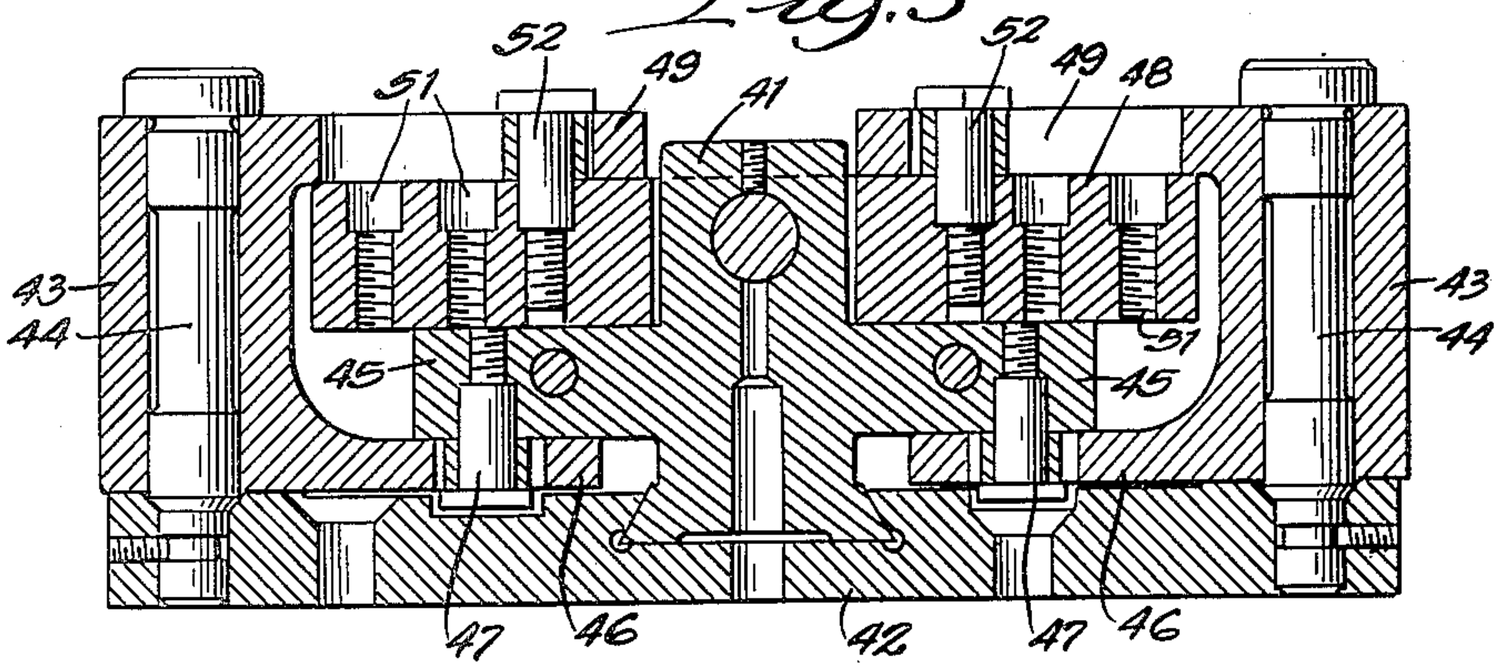


Fig. 4

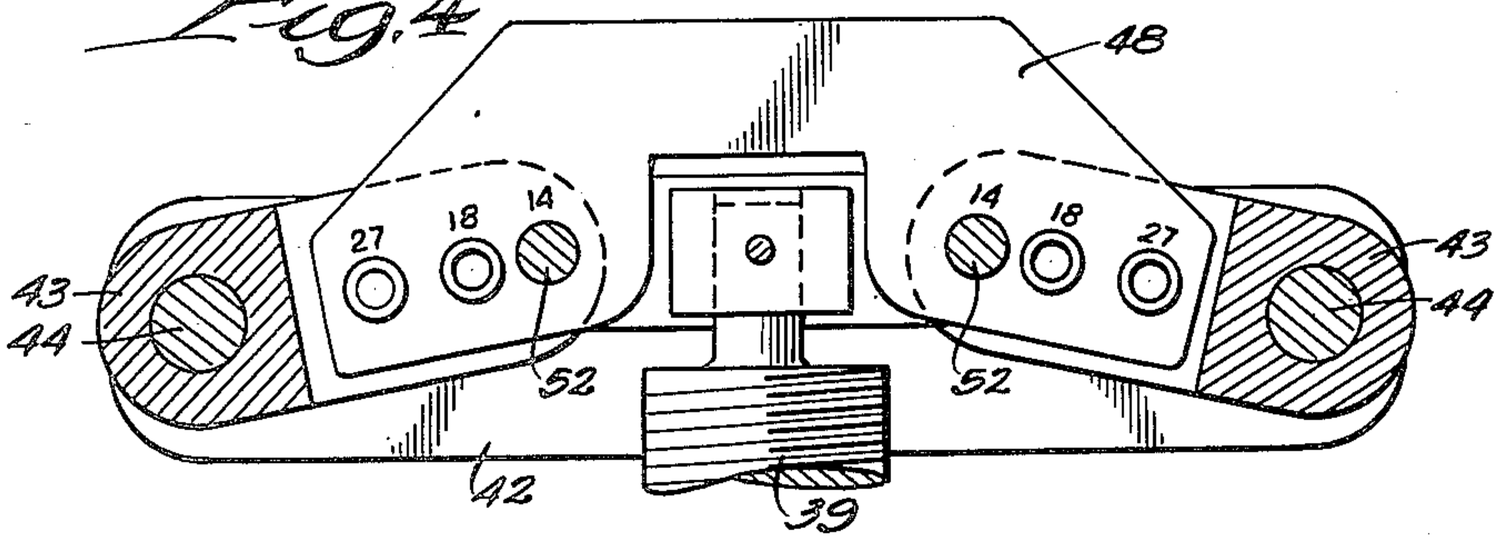
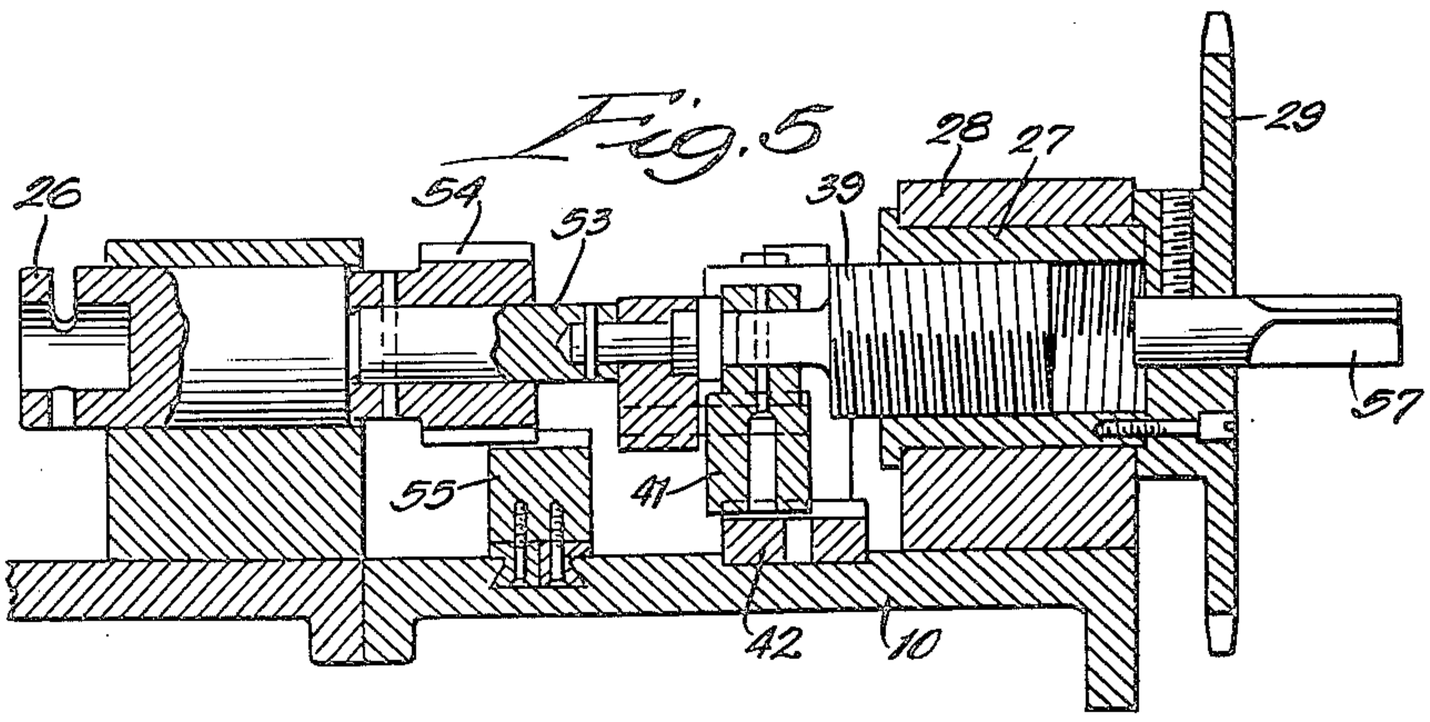


Fig. 5



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Patented Jan. 27, 1953

2,626,409

UNITED STATES PATENT OFFICE

2,626,409

FEED MECHANISM FOR NIPPLE THREADING MACHINES AND THE LIKE

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Application February 23, 1951, Serial No. 212,355

10 Claims. (Cl. 10—105)

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This invention relates to feed mechanism for nipple threading machines and the like and more particularly to a variable rate feed mechanism to accommodate the machine to threading nipples having different thread pitches.

In my co-pending application, Serial No. 187,091 filed September 27, 1950, there is disclosed and claimed, a feeding mechanism in which the work is advanced rapidly to a position adjacent to the threading head and is then fed positively into the head at a rate synchronized with the rate of rotation of the head. The present invention provides an improvement in this mechanism to enable ready adjustment thereof for different thread pitches.

It is one of the objects of the present invention to provide a feed mechanism in which the work is fed positively and which can easily be adjusted to vary the feed rate.

Another object is to provide a feed mechanism in which the feeding movement is provided by a screw and nut device connected to the work supporting carriage through an adjustable linkage which can easily be adjusted to vary the rate of movement of the work feed relative to movement of the screw and nut device.

According to one feature of the invention, the linkage includes a positively moved slide which is connected to a connecting head for moving the carriage through levers having pivots adjustable along the length thereof, the entire mechanism being extremely compact and readily accessible for adjustment.

The above and other objects and advantages of the invention will be more readily apparent from the following description when read in connection with the accompanying drawings in which:

Figure 1 is a partial plan view, with parts omitted for the sake of clarity, of a nipple threading machine having a feed mechanism embodying the invention;

Figure 2 is a partial end elevation with parts in section, looking from the right in Figure 1;

Figure 3 is an enlarged partial section on the line 3—3 of Figure 1;

Figure 4 is a horizontal section through the mechanism of Figure 3; and

Figure 5 is a longitudinal section on the line 5—5 of Figure 1.

The nipple threading machine, as partially illustrated in Figure 1 comprises a frame or base 10 which may be a table-like construction supported at a convenient height above the floor and carrying the entire mechanism. A pair of

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rotatable cutter heads, such as conventional nipple threading heads 11, are mounted on the frame on parallel axes and are adapted to be driven through a common power mechanism by means of sprockets 12 connected through sprocket chains to the power mechanism. In this way the threading heads will be driven at the same speed simultaneously to perform threading operations on nipple blanks.

At its opposite end, the frame is formed with guideways 13 on which a carriage partially shown at 14 is slidable toward and away from the heads. The carriage may carry chucks for holding the work pieces and for feeding the work pieces into the threading head as it is moved toward them.

As more particularly described in my co-pending application Serial No. 187,091, the carriage is moved by a rotatable cam 14 lying below the top of the frame and engaging a cam follower roller 15. It will be noted that the cam comprises both internal and external cam surfaces so that as it rotates, it will advance the carriage toward the heads during the first half revolution and will move the carriage away from the heads during the next half revolution. The cam is preferably driven in half revolution steps through an intermittent drive mechanism driving a shaft 16 which is connected to the cam through a sprocket chain 17.

The cam follower 15 is carried by a slide 18 which is slidable longitudinally on the frame toward and away from the heads. The slide 18 carries upwardly extending pins 19 which fit slidably into elongated slots in a pair of levers 21 which are pivoted at their outer ends to fixed pivots 22 adjacent to the sides of the frame. At their inner ends, the levers are formed with elongated slots 23 which fit over a pin 24 connected to the carriage. With this mechanism, as the slide is moved by the cam, it will provide a multiple movement of the pin 24 and the carriage so that a relatively small cam can be employed to impart a relatively large movement to the carriage.

When the carriage is in its forward position toward the heads, the work pieces are held adjacent it but spaced slightly from the heads so that they will not be cut. The initial feeding movement of the carriage to this position is performed rapidly by the cam and a final positive feed is then imparted to the carriage to feed the work pieces accurately into the heads at a controlled positive rate. For this purpose, the carriage carries a coupling rod 25 having a cross

pin at its outer end which is adapted to enter a bayonet type coupling sleeve **26** to be connected thereto. The sleeve **26** is moved by the positive slow feed mechanism to feed the work pieces accurately into the heads at a rate synchronized with the rate of rotation of the heads for accurate threading operations.

The slow feed mechanism, as shown, comprises a positive feed device mounted on the frame and driven at a synchronized rate. As illustrated, the feed device includes an annular internally threaded nut **27** which is mounted in a bracket on the frame for rotation and to be held against axial movement. The nut is connected to a sprocket **29**, as best seen in Figure 5, which is driven through a sprocket chain from a sprocket **31** on the frame. The sprocket **31** is connected through a clutch **32** to a sprocket **33** which is drivably connected to a sprocket **34** which is in turn driven by one of the sprockets **12**. In this way, when the clutch is engaged, a sprocket **29** and nut **27** are driven at a rate of speed accurately synchronized with the rotation of the threading heads. The clutch **32** is normally disengaged and is engaged by moving inwardly an operating rod **35** which is connected to one end of a bell crank lever **36**. The opposite end of the bell crank lever is connected through a link **37** to a fluid motor **38** which will swing the bell crank lever clockwise to engage the clutch and counter-clockwise to disengage the clutch at the end of a threading operation.

The nut **27** threadably engages a screw **39** which is mounted therein for longitudinal movement toward and away from the heads. The screw **39** is connected to a slide **41** which is slidably mounted on the frame for longitudinal movement and which is connected to the nut **39** to hold it against rotation and to move longitudinally with it. As best seen in Figures 3 and 5, the slide **41** is slidably mounted in a dovetailed slot in a supporting plate **42** which is rigidly secured to the frame **10**.

According to the present invention, the slide is connected to the coupling member **26** through an adjustable linkage which can be adjusted to provide different rates of movement of the coupling member **26** relative to movement of the slide. As best seen in Figures 3–5, this mechanism comprises a pair of U-shaped levers **43** pivotally supported at their centers on vertical pivots **44** secured in the outer ends of the support **42** at the sides of the slide. The slide is formed with laterally projecting arms **45**, spaced above the supporting plate **42** and the lower legs **46** of the levers **43** underlie the arms **45**. Pivotal connections between the legs **46** and arms **45** are provided by pins **47** extending through slightly elongated slots in the legs **46** and secured to the arms **45**. A yoke shaped connector plate **48** is mounted with the ends of its yokes lying between the upper surfaces of the arms **45** and the upper legs **49** of the levers **43**. The ends of the yoke shaped connector plate **48** are formed with a series of threaded openings **51** to receive pivot pins **52** which extend through elongated slots in the upper legs **49** of the levers. Preferably the pins **52** are headed to overlie the levers and to hold them against the connector plate to assist in supporting the connector plate. It will be seen that by placing the pivot pins **52** in different ones of the sockets **51**, the movement of the connector plate releative to the slide can easily be adjusted to produce different feed rates.

The connector plate, as best seen in Figure 1, is connected through a swivel **53** to a pinion **54**

to which the coupling **26** is rigidly secured. The pinion **54** is provided to turn the coupling **26** to engage it with the coupling rod **25** or to disengage it therefrom through the pin and slot elements. For this purpose, the link **37** carries a rack **55** meshing with the pinion **54** so that whenever the motor **38** is energized to move the link **37** and the bell crank **36** it will turn the coupling element **26**.

In operation of the mechanism, the parts will be in the position shown in Figure 1 at the beginning of a threading operation. Assuming that work pieces are held in chucks on the carriage, the cam **14** will be turned through one half revolution to advance the carriage to a position adjacent the threading heads and will then stop. At this time, the motor **38** will be energized to rock the bell crank **36** clockwise, thereby to engage the clutch **32** and at the same time will turn the pinion **24** and coupling member **26** to connect the coupling member **26** to the coupling member **25**. With the clutch **32** engaged, the nut **27** will be driven at a speed synchronized with the speed of the threading heads and will move the screw **39** longitudinally to the right to move the carriage further toward the cutting heads to effect a threading of the work pieces. The rate of movement of the carriage will be determined by the position of the pins **52** and can be adjusted by moving the pins **52** to thread work pieces of different standard pitches. It will be seen that this operation can be performed very easily and quickly so that by merely changing the threading heads and adjusting the pins **52**, the machine can be set for different threading operations.

At the completion of the threading operation, the motor **38** will again be energized in the opposite direction to disconnect the coupling **26** from the pin **25** and to disengage the clutch **32**. At the same time the cam **14** will again be driven through an additional one half revolution to return to the position illustrated and to move the carriage away from the threading heads.

The screw and nut mechanism is returned to its position ready for a subsequent operation by a rack **56**, as shown in Figure 2, which meshes with a pinion **57** on a short stub shaft carried by the sprocket **29**. The rack **56** is connected to a weight **58** which tends to move it downward so that when the clutch **32** is disconnected, the forces of gravity on the weight **58** acting on the rack and pinion will turn the sprocket **29** and nut **27** in the reverse direction to the initial position illustrated in the drawings. Thus the mechanism is reset for a subsequent threading operation.

While one embodiment of the invention has been shown and described, it is not to be taken as a definition of the scope of the invention, reference being had for this purpose to the appended claims.

What is claimed is:

1. In a feeding mechanism for nipple threading machines and the like having a frame, feed means comprising a device mounted on the frame to produce a lineal movement, a slide slidably mounted on the frame and connected to the device to be moved thereby, a lever pivoted on the frame and having a pivotal connection with the slide to be swung thereby as the slide is moved and a connector member having a pivotal connection with the lever and adapted to be connected to a carriage to move it, one of the pivotal connections being adjustable lengthwise of the lever to vary the rate of movement of the connector member relative to the rate of movement of the device.

2. In a feeding mechanism for nipple threading

machines and the like having a frame, feed means comprising a device mounted on the frame to produce a lineal movement, a slide slidably mounted on the frame and connected to the device to be moved thereby, a pair of levers pivoted on the frame at points at opposite sides of the slide and extending toward and having pivotal connection with the slide, and a connector plate overlapping the levers and having pivotal connection therewith, one of the pivotal connections with the levers being adjustable lengthwise of the levers to vary the rate of movement of the connector plate relative to the rate of movement of the device.

3. In a feeding mechanism for nipple threading machines and the like having a frame, feed means comprising a device mounted on the frame to produce a lineal movement, a slide slidably mounted on the frame and connected to the device to be moved thereby, a pair of U-shaped levers pivoted on the frame at their centers at opposite sides of the slide and extending toward the slide, pivotal connections between the slide and one leg of each of the levers, a connector plate lying between the legs of the levers, and pivotal connections between the connector plate and the other legs of the levels, the pivotal connections with one leg of each lever being adjustable lengthwise of the lever to vary the rate of movement of the connector plate relative to the rate of movement of the device.

4. In a feeding mechanism for nipple threading machines and the like having a frame, feed means comprising a device mounted on the frame to produce a lineal movement, a slide slidably mounted on the frame and connected to the device to be moved thereby, laterally projecting arms on the slide spaced above the frame, a pair of U-shaped levers pivoted at their centers on vertical axes at opposite sides of the slide with their lower legs underlying and pivotally connected to the arms, a connector plate lying between the arms and the upper legs of the levers, the connector plate having a series of openings therein to receive pivot pins at points spaced lengthwise of the levers and the upper legs of the levers having elongated slots therein registering with the series of openings.

5. In a feeding mechanism for nipple threading machines and the like having a frame and a rotatable cutting head on the frame, feed means comprising screw and nut members threaded together, means mounting one of said members on the frame for rotation, means to hold the other member against rotation, one of the members being held against axial movement on the frame and the other being mounted for axial movement, means to drive the rotatably mounted member in synchronism with the rotatable head, a linkage on the frame connected to the axially movable member to be moved thereby, a connector carried by the linkage to be shifted thereby, and adjusting means in the linkage to adjust the rate of movement of the connector relative to the rate of movement of the axially movable member.

6. In a feeding mechanism for nipple threading machines and the like and a rotatable cutting head on the frame, feed means comprising screw and nut members threaded together, means mounting one of said members on the frame for rotation, means to hold the other member against rotation, one of the members being held against axial movement on the frame and the other being mounted for axial movement, means to drive the rotatably mounted member in synchronism

with the rotatable head, a slide slidable on the frame and connected to the axially movable member to be moved thereby, levers pivoted on the frame and having pivotal connections with the slide and a connector plate overlapping the levers and having pivotal connections therewith, one of the pivotal connections with each lever being adjustable lengthwise of the lever to vary the rate of movement of the connector plate relative to the rate of movement of the slide.

7. Feeding mechanism for nipple threading machines and the like comprising a frame, a rotatable cutting head on the frame, a carriage on the frame movable toward and away from the cutting head, a feed device mounted on the frame and drivably connected to the cutting head to produce a lineal movement proportional to the rotation of the cutting head, a connector member including means to connect it to the carriage to move the carriage toward the head, a slide on the frame connected to the feed device to be slid thereby, levers pivoted on the frame and having pivotal connections with the slide, and pivotal connections between the levers and the connector member, one of the pivotal connections with each lever being adjustable lengthwise of the lever to vary the rate of movement of the connector member and carriage relative to the rate of movement of the feed device and slide.

8. Feeding mechanism for nipple threading machines and the like comprising a frame, a rotatable cutting head on the frame, a carriage on the frame movable toward and away from the cutting head, a feed device mounted on the frame and drivably connected to the cutting head to produce a lineal movement proportional to the rotation of the cutting head, a connector member including means to connect it to the carriage to move the carriage toward the head, a slide on the frame connected to the feed device to be slid thereby, laterally projecting arms on the slide spaced above the frame, a pair of U-shaped levers pivoted at their centers on vertical pivots at opposite sides of the slide with their lower legs underlying and pivotally connected to the arms, the connector member lying between the arms and the upper legs of the levers, the upper legs of the levers having elongated slots therein registering with the connector members, and a pivot pin extending through the slot in each of the upper legs and connectible to the connector member in any one of a plurality of spaced positions to adjust the movement of the connector member relative to the slide.

9. Feeding mechanism for nipple threading machines and the like comprising a frame, a rotatable cutting head on the frame, a carriage on the frame movable toward and away from the head, a nut mounted on the frame for rotation but held against axial movement, means drivably connecting the nut to the head to turn the nut at a speed proportional to the speed of the head, a screw threaded in the nut, a slide on the frame connected to the screw to hold it against rotation whereby the screw and slide will be moved as the nut turns, a connector member connected to the carriage to move the carriage and an adjustable linkage connected to both the connector member and the slide to transmit movement therebetween and adjustable to vary the rate of movement of the connector member relative to the rate of movement of the slide.

10. Feeding mechanism for nipple threading machines and the like comprising a frame, a rotatable cutting head on the frame, a carriage on

the frame movable toward and away from the head, a nut mounted on the frame for rotation but held against axial movement, means drivably connecting the nut to the head to turn the nut at a speed proportional to the speed of the head, a screw threaded in the nut, a slide on the frame connected to the screw to hold it against rotation whereby the screw and slide will be moved as the nut turns, a connector member having means to connect it to the carriage, a pair of levers pivoted on the frame at the sides of the slide and having pivotal connections with the slide, and pivotal connections between the levers and the connector member, one of the pivotal connections to

each lever being adjustable lengthwise of the lever to vary the rate of movement of the connector member relative to the rate of movement of the slide.

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REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
2,548,937	Bodmer	Apr. 17, 1951
2,561,992	Bruitt	July 24, 1951