Oct. 31, 1950 E. ST. PIERRE ET AL 2,527,688

CARRIER RING AND DIAL ASSEMBLY

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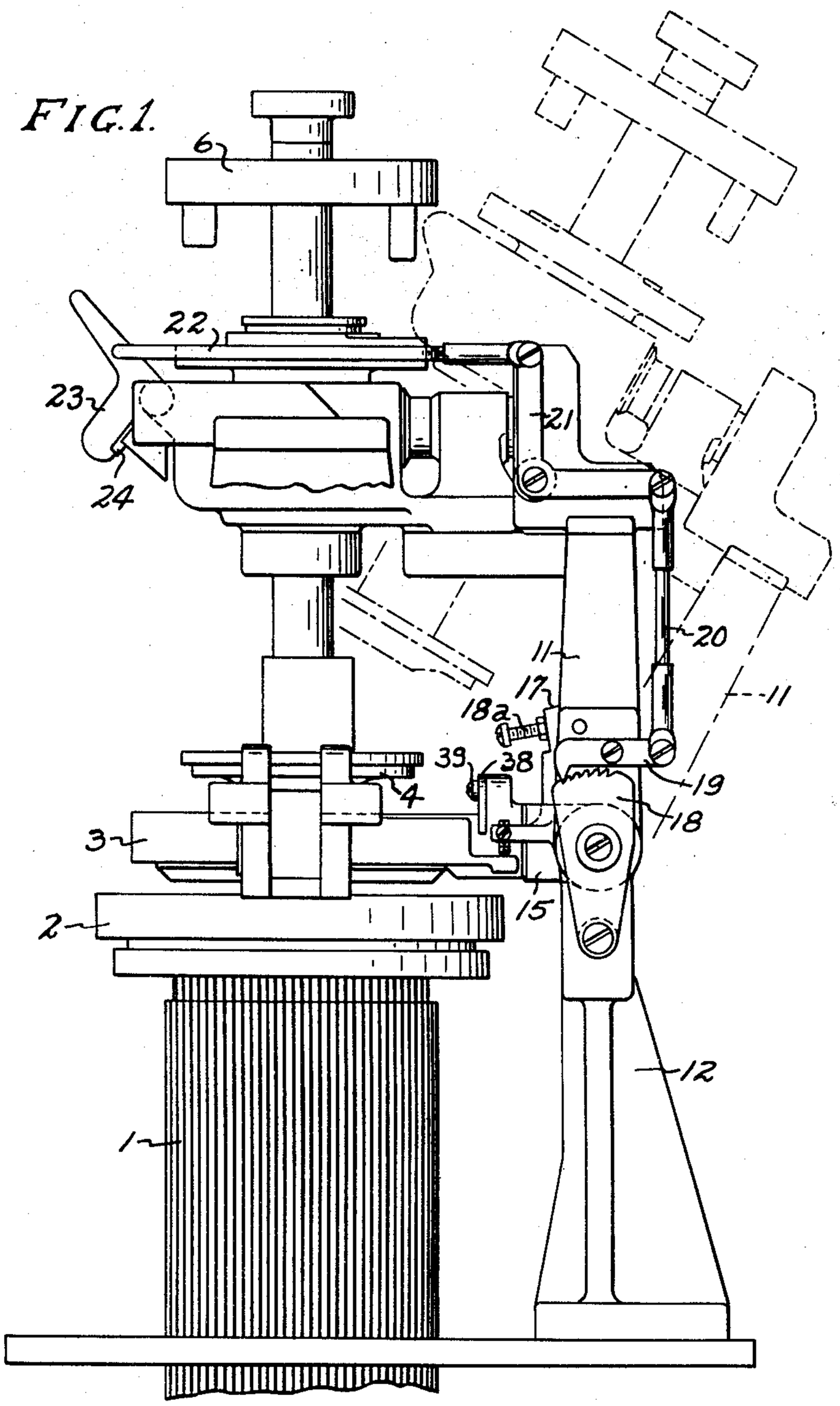
FIG. 1.



INVENTORS:
EUGENE ST. PIERRE,
JOSEPH WAWZONEK,
BY
ATT'Y.

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FIG. 6.

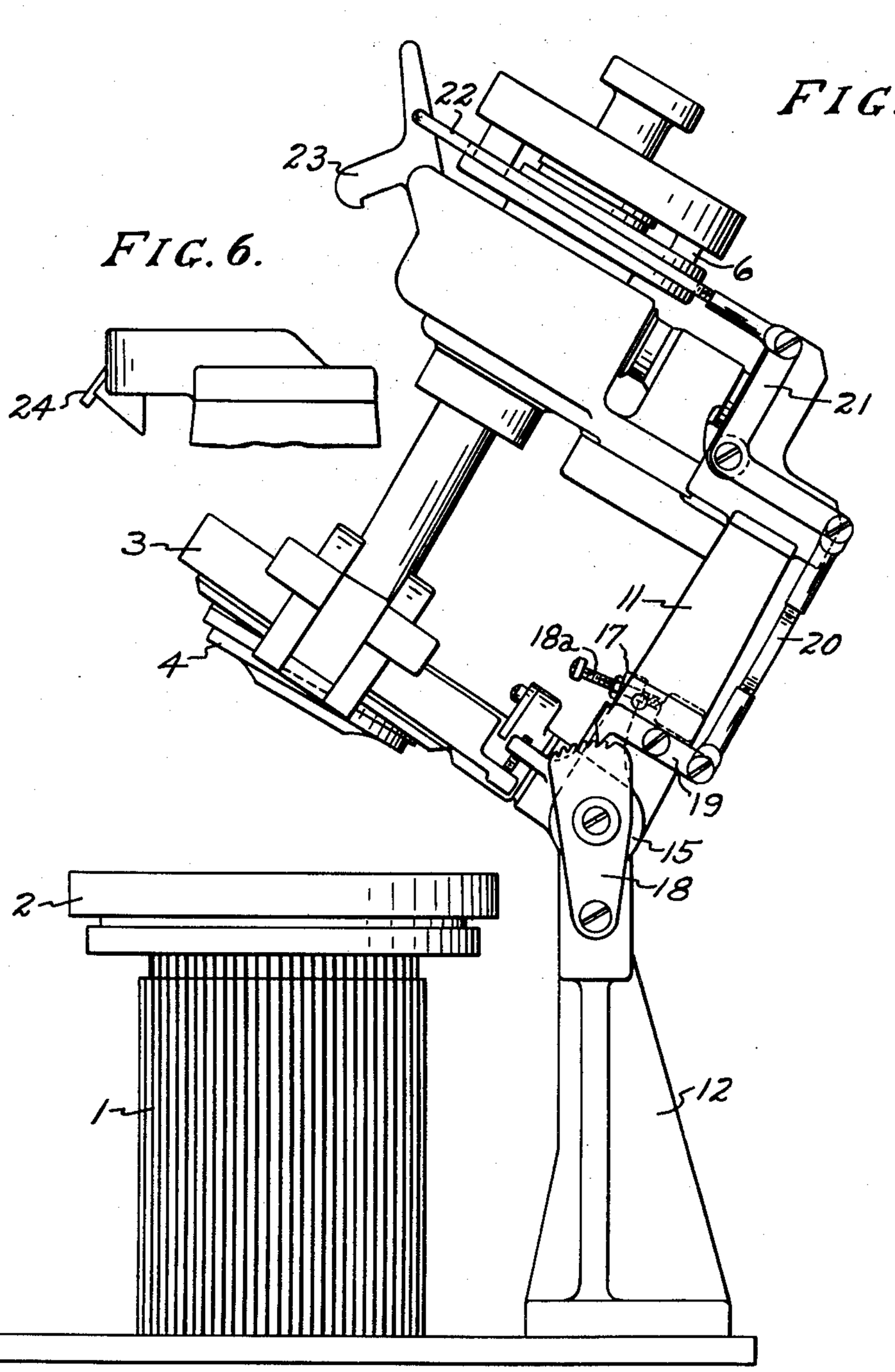

FIG. 2.

INVENTORS:
EUGENE ST. PIERRE,
JOSEPH WAWZONEK,
BY
ATT'Y.

Oct. 31, 1950 E. ST. PIERRE ET AL 2,527,688

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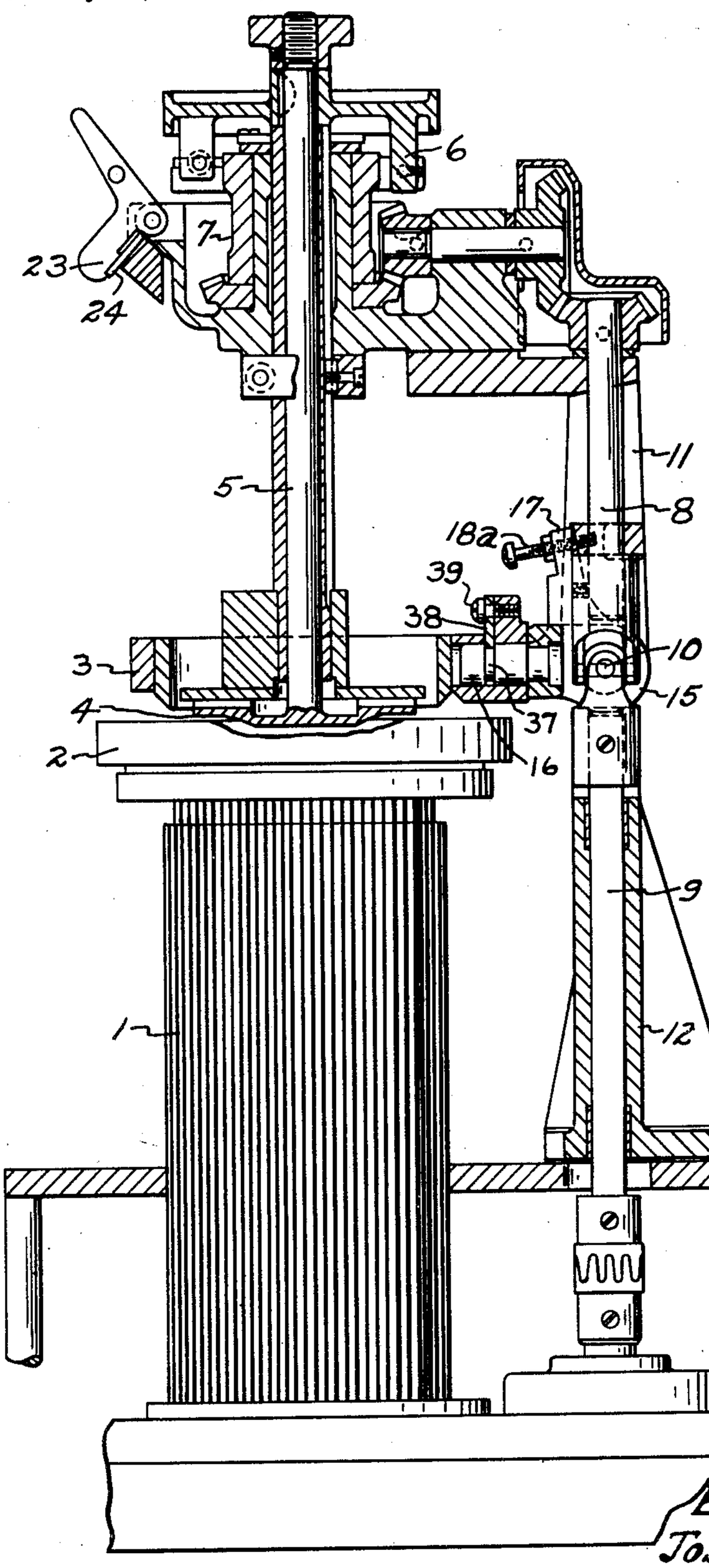

FIG. 3.

INVENTORS:
EUGENE ST. PIERRE,
JOSEPH WAWZONEK,
BY
ATT'Y.

Oct. 31, 1950 E. ST. PIERRE ET AL 2,527,688

CARRIER RING AND DIAL ASSEMBLY

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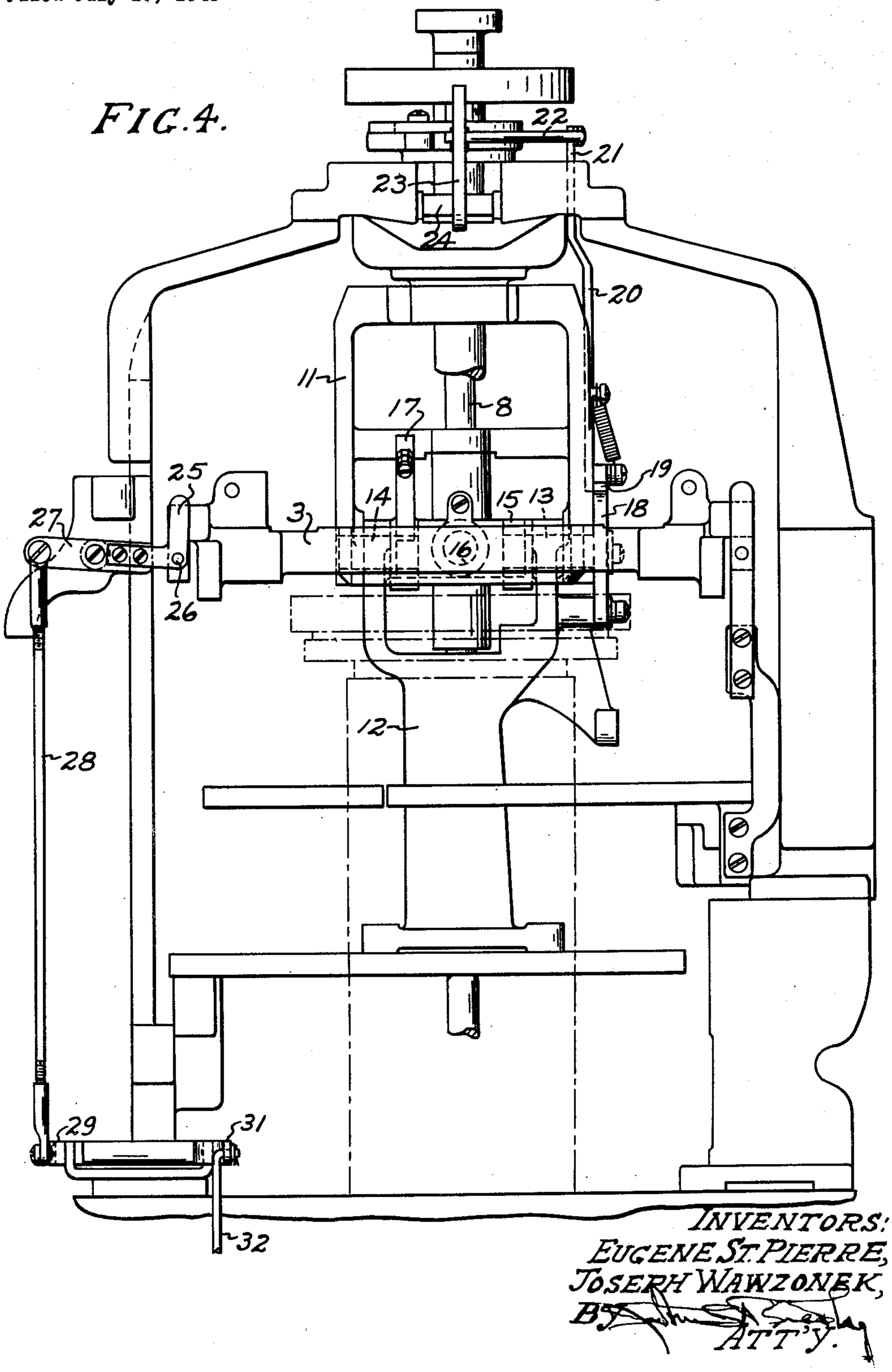
FIG. 4.



INVENTORS:
EUGENE ST. PIERRE,
JOSEPH WAWZONEK,
BY
ATT'Y.

Oct. 31, 1950 E. ST. PIERRE ET AL 2,527,688

CARRIER RING AND DIAL ASSEMBLY

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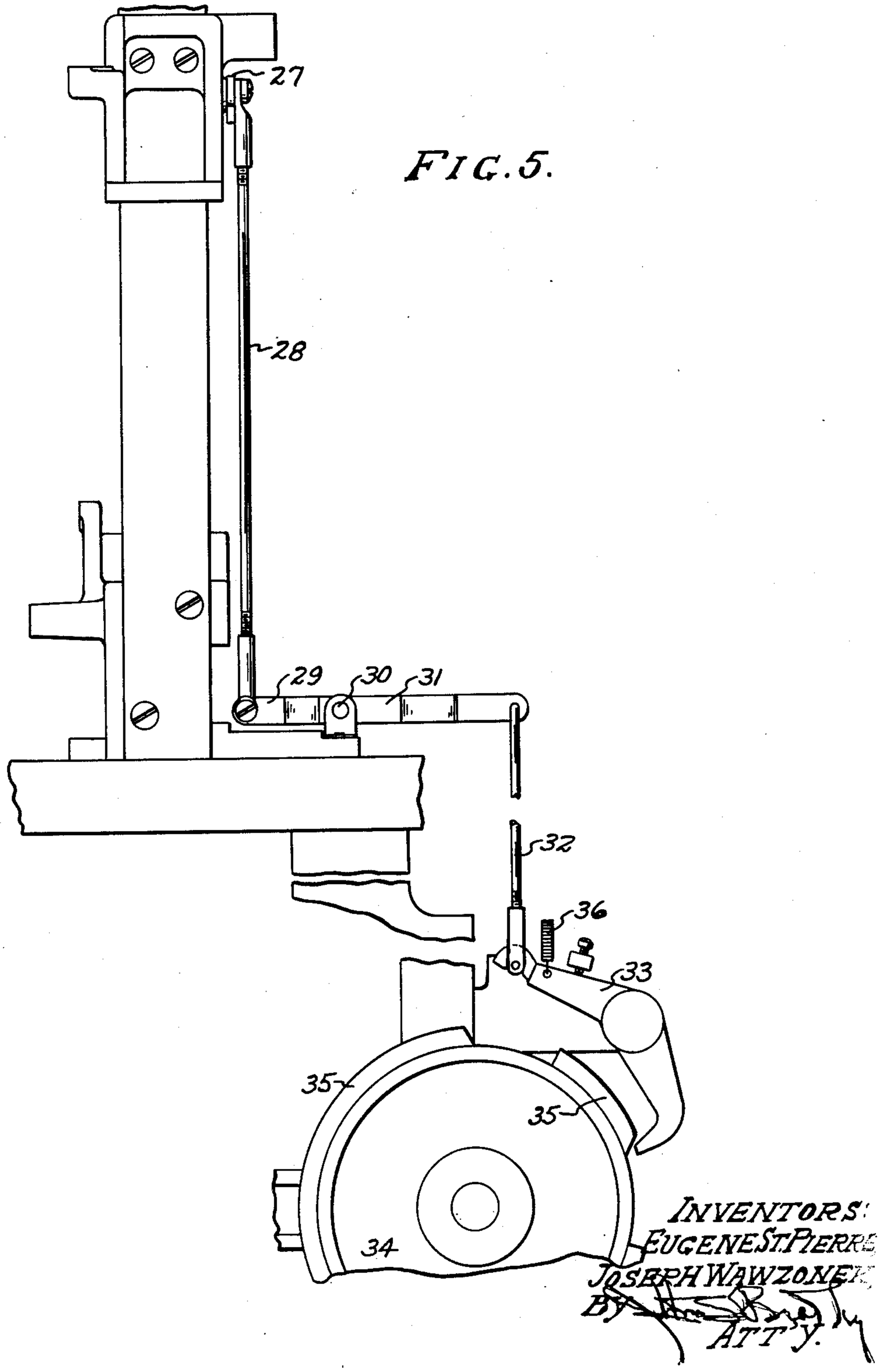

FIG. 5.

INVENTORS:
EUGENE ST. PIERRE
JOSEPH WAWZONEK
BY
ATTY.

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CARRIER RING AND DIAL ASSEMBLY

Eugene St. Pierre, Pawtucket, and Joseph Wawzonek, Central Falls, R. I., assignors to Hemphill Company, Central Falls, R. I., a corporation of Massachusetts

Application July 15, 1948, Serial No. 38,844

6 Claims. (Cl. 66—28)

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This invention relates to an improvement in knitting machines of the circular, independent needle, type and, in particular, to cylinder and dial machines. As is well known, it is often desirable to raise the dial of such a machine without disturbing other parts. This may be accomplished by designing the dial mechanism so that the dial can be raised vertically. This is a common arrangement and in itself forms no part of this invention. It is also desirable to be able to swing the dial upward and backward so as to open up as far as possible the carrier ring and the upper end of the needle cylinder. Also, it is often necessary to raise the carrier ring to give access to the upper part of the cylinder and associated mechanisms either with the dial or independent thereof if the dial has already been displaced. Furthermore, it is desirable that the carrier ring upon which the thread carriers are mounted should move up and down in harmony with the knitting cams as the stitches are lengthened or shortened. In addition, it is sometimes desirable to be able to raise one of the sides of the carrier ring independently of the other to a greater extent than can be readily accomplished by the usual stitch regulating mechanism. These things are among the general subject matters of this invention. The form shown in the drawing is adapted for use on circular, independent needle, knitting machines of the Banner type but, of course, the invention is not limited to use on this type of machine.

One form of the invention is shown in the drawing of which:

Fig. 1 is a side elevation showing the dial and carrier ring and their supports and also showing in dotted line the dial mechanism swung upwardly and backwardly;

Fig. 2 is a similar side elevation showing both the dial and carrier ring swung upwardly and backwardly;

Fig. 3 is a side elevation partly in section generally similar to Fig. 1 but showing operating mechanism in greater detail;

Fig. 4 is a front elevation showing primarily the carrier ring and part of the mechanism whereby one side of it can be raised independently of the usual stitch length regulating mechanism;

Fig. 5 is a side elevation of the rest of the mechanism for controlling the carrier ring not shown in Fig. 4; and

Fig. 6 is a fragmentary view showing the latch plate of the latch arrangement by which the dial assembly is locked in operation position.

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As shown in Figs. 1 and 3, the cylinder 1, sinker head 2 and carrier ring 3 are in their normal positions. In Fig. 1 dial 4 is also in the normal position assumed when it is moved vertically into inoperative position and is shown mounted upon the usual shaft 5 terminating in the usual driving connection 6 which engages with the usual driving gear assembly 7 (Fig. 3). As best shown in Fig. 3, the dial may be driven through the series of gears and shafts shown, two of which shafts 8 and 9 are connected by universal joint 10.

The dial assembly is supported upon a yoke 11 which in turn is pivotally mounted on a fixed bracket 12 carrying opposed pivot pins 13 and 14, the horizontal common axis of which is in alignment with universal joint 10. Also, similarly mounted on pivot pins 13 and 14 is yoke 15, one part of which forms the support for carrier ring pivot pin 16 and another part of which is in the form of an arm 17 which carries an adjusting screw 18*a*, the end of which is engageable with dial bracket 11 so that the free upward swing of pivot pin 16 can be limited as desired. Also, affixed to the end of pivot pin 13 is a ratchet 18, the teeth of which are engageable by a pawl 19 pivoted on bracket 11 which pawl is connected by suitable rods and levers such as 20 and 21 and 22 to latch 23 which is engageable with latch plate 24 upon the housing of the dial mechanism.

Carrier ring 3 is swingably mounted upon pivot pin 16 as best shown in Figs. 3 and 4 so that it can tilt laterally and so that one side of the carrier ring, shown as the auxiliary side in the drawing, can be raised or lowered, as desired, by mechanism for the purpose. The side referred to can be raised without affecting the height of the other side of the carrier ring not only because the carrier ring can pivot upon pin 16 but because pivot pin 16 can swing up within the limit permitted by screw 18*a*. The compound motion thus produced in the carrier ring tends to raise the front of the carrier ring slightly as well as its side but this is immaterial as will be made clear hereafter.

The side of the carrier ring referred to, the auxiliary or left side in Fig. 4 of the drawing, is held in position not only by pivot pin 16, as already described, but by a latch in the form of a spring 25 engageable with a pin 26 affixed to the carrier ring 3. Spring 25 is attached to a pivoted arm 27 which connects through rod 28, lever 29, pin 30, lever 31 and rod 32 to rocker 33.

Rocker 33 is normally urged towards a drum 34 provided with cams 35 by a spring 38. Con-

sequently, as drum **34** is turned, as desired, rocker **33** will ride on the surface of the drum or the surface of each cam as required and the auxiliary side of carrier ring **3** will be raised by the amount determined by the height of cam **35** whenever rocker **33** rides upon one of these cams.

The need of the carrier ring adjustment provided by the device just described is illustrated by certain types of split foot knitting machines in which the level of the auxiliary knitting cams is greater than the level of the knitting cams at the main side. In consequence, the carrier ring which carries the auxiliary yarn feeds must be higher than normal when split knitting is going on, as in the high splice and foot, to insure that the auxiliary yarn or yarns will be fed to the hooks of the needle and not below their latches. If the method of knitting described and claimed in Patent #2,360,668 is being performed at the auxiliary side feeding below the latches is very likely to occur unless the carrier ring is manipulated as described.

In view of the fact that the dial assembly and the carrier ring are mounted upon pivots having a common axis which passes through the center of the universal joint **10** of the dial drive, it will be evident that the dial in addition to being raised vertically as heretofore described can be swung up and back as indicated in Fig. 1, the carrier ring remaining in its normal position, and can be held in any desired upswung position by ratchet and pawl **18** and **19**, latch **23** having been first released. To lower the dial again all that is necessary is to operate latch **23** which, through the connections already described, will disengage pawl **19** from ratchet **18**.

Carrier ring **3** can also be raised independently when the dial is down to the extent permitted by screw **18***a* thus giving limited access to the needle cylinder when the dial is in operating position.

When the dial is raised as shown either in full or dotted line in Fig. 1, carrier ring **3** can be independently raised or, if desired, both the dial and carrier ring can be raised together by releasing latch **23** and lifting carrier ring **3** which, after screw **18***a* has contacted with bracket **11**, will also cause the dial to swing upward.

Carrier ring **3** which, as already stated, can rock upon its supporting pivot pin **16** may also be removed from the machine with ease. As best seen in Fig. 3, pivot pin **16** is provided with an annular channel **37** adapted to receive a key **38** attached to carrier ring **3** by screw **39**. Removal of screw **39** will release key **38** which can then be withdrawn from channel **37** and the carrier ring removed.

We claim:

1. In a circular, independent needle, knitting machine having a needle cylinder, the combination of a carrier ring and a dial and a pivot about which said ring and dial are swingable, together and separately, upwardly and away from the needle cylinder.

2. In a circular, independent needle, knitting machine having a needle cylinder, a dial assembly, a support therefor, a pivot in said support around which said assembly may be moved away from the needle cylinder, a drive for said dial which includes a universal joint the center of which intersects the major axis of the said pivot in the dial assembly support, whereby the pivoting of said assembly may be accomplished without breaking the driving connection to said dial.

3. In an independent needle, circular knitting machine having a needle cylinder, a multiple direction pivot unit, a carrier ring mounted on said pivot unit for movement away from the needle cylinder, a holding member operative on said ring at one side of said pivot unit for holding a part of the ring in fixed position, and a tilting member operative on said ring at the other side of said pivot unit for tilting said ring through said pivot unit without moving said part of the ring from its fixed position.

4. In an independent needle, circular knitting machine, a needle cylinder and a carrier ring having an operative position above said cylinder, a support for said carrier ring, said support comprising a pivot above and outside of said cylinder whereby said ring may be swung up and away from said cylinder, and another pivot inwardly from and at a right angle to said outside pivot whereby said ring may be tilted.

5. In an independent needle, circular knitting machine, a needle cylinder and a carrier ring having an operative position over said cylinder, a support for said carrier ring, said support comprising a pivot above and outside of said cylinder whereby said ring may be swung up and away from said cylinder, and another pivot inwardly from and at a right angle to said outside pivot whereby said ring, from its operative position, may be tilted transversely to said cylinder, a holding member operative on said ring at one side of said support, for holding a part of the ring in fixed position, and a tilting member operative on said ring at the other side of said support, for tilting said ring through said pivots without moving said part of the ring from its fixed position.

6. In a circular, independent needle, knitting machine having a needle cylinder, the combination of a carrier ring and dial as claimed in claim 1 in which said dial is also vertically movable independently of its other movement or of the movement of the carrier ring.

EUGENE ST. PIERRE.
JOSEPH WAWZONEK.

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