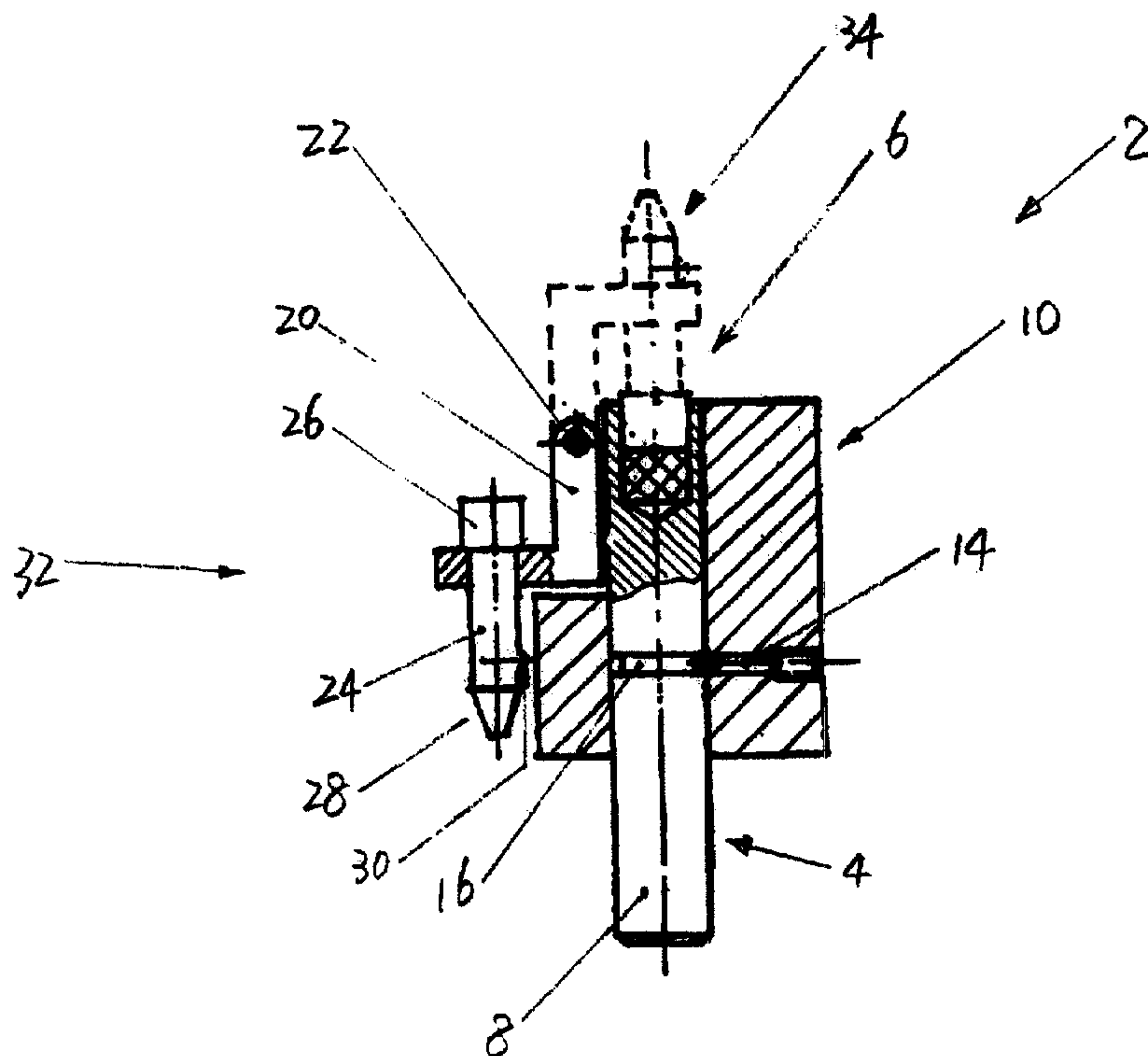




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(54) Titre : OUTIL MULTIPLE DE PERCEUSE  
(54) Title: DRILL MULTI TOOL



(57) Abrégé/Abstract:

A tool for a power drill allows fast and convenient loading and unloading of a screw bit, drill bit, or other implement. The user preferably loads the tool with the necessary implements which are then carried with the tool. Each received implement is movable from a storage position to an in use position in drive engagement with the power drill or power screw driver. The desired implements can rapidly be changed from one to the other, while the implements are retained on the tool.

ABSTRACT OF THE DISCLOSURE

A tool for a power drill allows fast and convenient loading and unloading of a screw bit, drill bit, or other implement. The user preferably loads the tool with the necessary implements which are then carried with the tool. Each received implement is movable from a storage position to an in use position in drive engagement with the power drill or power screw driver. The desired implements can rapidly be changed from one to the other, while the implements are retained on the tool.

TITLE: DRILL MULTI TOOLFIELD OF THE INVENTION

5           The present invention relates to a tool for  
receipt in a drill chuck of a power drill. The tool is  
designed to receive a plurality of rotary implements such  
as a drill bits or screw bits which can be moved from a  
storage position on the tool to an aligned position  
10 received in a drive shaft of the tool.

BACKGROUND OF THE INVENTION

Power drills and in particular power hand drills  
15 are extremely convenient and are commonly used as a power  
screwdriver. The chuck of the drill can be a keyless  
chuck to allow rapid securement and release of a screw  
bit or drill bit or a key drill chuck. Various power  
drills have included adjacent the hand grip a separate  
20 socket area for maintaining a screw bit when not in use.  
It is also known to provide a screw bit which is double  
with having a different screw bit at each end. It is  
also known to provide a magnetic screw bit holder which  
is separately received in the drill chuck. The holder  
25 has a socket at one end for releasably engaging a  
cooperating bit. The drill bit is typically slide  
inserted into the socket. This latter drill bit  
accessory reduces the time required to attach the desired  
drill bit to the drill or to replace drill bits.

30

This type of arrangement has proven quite popular  
and screw bits and drill bits have been sold in a kit  
form for easy insertion in the drill bit accessory.  
Although such systems are more convenient than separate  
35 securement of the drill bits or screw bits, the kit of  
the various bits is not always immediately available or  
requires the user to basically stop the task to allow  
selection and attachment of the next bit. This

attachment procedure is awkward and time consuming and is a particular problem when the replacement bit is not readily available or is dropped during replacement. There are many tasks which are completed by use of a power drill where the user is constantly alternating between two different bits such as a particular size drill bit and a particular screw bit or between two different types of screw bits, etc. Some workers faced with this problem have two different drills.

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The present invention provides a tool for a power drill which overcomes a number of these disadvantages.

15 SUMMARY OF THE INVENTION

A drill tool according to the present invention comprises an elongate drive shaft having an implement receiving socket at one end thereof and a drive end for engaging a drill chuck at an opposite end. The tool further includes an implement receiving collar about an intermediate portion of the drive shaft which allows rotation of the drive shaft without rotation of the implement receiving collar. The implement receiving collar has at least three implement carriers removable from a storage position to an in use position which aligns an implement received in the implement carrier with the implement receiving socket of the drive shaft for receipt therein.

30

Each implement receiving carrier in the storage position locates an implement received therein to one side of the drive shaft. Each implement receiving carrier in the in use position allows rotation of an implement received in the carrier and allows the implement to engage a drive shaft socket. The implement rotates with the drive shaft without rotation of the implement receiving carrier.

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According to an aspect of the invention, each implement receiving carrier is pivotally secured to the implement receiving collar and is pivotally moved between the storage position and the in use position.

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According to a further aspect of the invention, the tool includes a plurality of implements and each implement is receivable in any of the implement receiving carriers.

10

According to yet a further aspect of the invention, each implement includes a spring loaded cam means for releasable securement in any of the implement receiving carriers.

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In yet a further aspect of the invention, each implement received in any of the implement receiving carriers, is slidably displaceable within the implement receiving carrier.

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In yet a further aspect of the invention, each implement receiving carrier has a distal end with an implement receiving port and a pivot securement end opposite the distal end. The pivot securement end is pivotally attached to the implement receiving collar.

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In yet a further aspect of the invention, each implement receiving carrier has an elongate shank connecting the distal end and the pivot securement end and the distal end has an outwardly extending flange which includes the implement receiving port.

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In yet a further aspect of the invention, the outwardly extending flange in the in use position of the implement receiving carrier aligns the implement receiving port with the implement receiving socket of the drive shaft.

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In yet a further aspect of the invention, the outwardly extending flange of each implement receiving carrier in the storage position, positions the outwardly extending flange generally perpendicular to a side of said implement receiving carrier and immediately adjacent thereto.

#### BRIEF DESCRIPTION OF THE DRAWINGS

10 Preferred embodiments of the invention are shown in the drawings, wherein:

Figure 1 is a partial sectional view showing the drill tool;

Figure 2 is a top view of the drill tool;

15 Figure 3 is a partial sectional side view of a preferred form of the drill tool;

Figure 4 is a top view of the drill tool of Figure 3;

20 Figure 5 is a top view of the carrier of the drill tool with the arms removed;

Figure 6 is a partial sectional view through the carrier of the drill tool;

Figure 7 is an end view when viewed from the line B-B of Figure 6;

25 Figure 8 is a partial sectional view of the drive shaft of the drill tool;

Figure 9 is a partial top view of the drive shaft showing the recess for receiving parts of the lock mechanism;

30 Figures 10, 11, 12, 13 and 14 are partial sectional views showing various details of the lock mechanism and the receipt and withdrawal of a drill or screw bit;

Figure 15 is an end view of the typical bit;

35 Figure 16 is a side view of a bit;

Figure 17 is a side view of the implement carrier;

and

Figure 18 is a top view of the implement carrier.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

The drill tool 2 shown in Figure 1 can be used with any power drill or power screwdriver having a suitable means for revising and rotating of the elongate drive shaft 4. It is particularly suitable for use with battery powered hand drills having a keyless chuck. The drill tool allows different implements to be received in the drill tool to allow fast replacement of one implement with another implement. For example, a user may load the drill tool with a particular screw bit and a particular screw drill and can alternate between these two implements while both implements remain connected to the drill tool.

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The drill 2 shown in Figures 1 and 2 has an elongate drive shaft 4 with an implement receiving socket 6 and a drive end 8 for insertion in a drill chuck or for connection with a drive source. The implement receiving socket 6 can be hexagonal in cross section for receiving a similar shaped implement and allowing rotation thereof with rotation of the drive shaft. Preferably the implements are movable and slide into the receiving socket 6. Preferably the implements are held in the receiving socket by a magnetic attraction between the socket and the implement.

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The drill tool 2 includes an implement receiving collar 10 which allows free rotation of the elongate drive shaft 4 in the collar. Thus the collar 10 can be held stationary as the drive shaft 4 is rotating. It is held in position relative to the length of the drive shaft by means of a capture screw 14 which is received in the captured slot 16 of the drive shaft 4. Thus the implement receiving collar does not rotate with the rotation of the drive shaft and thus the series about implements which are disposed of the receiving collar 10 do not rotate with rotation of the drive shaft.

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The implement receiving collar 10 includes six  
implement receiving carriers 20. Each carrier 20 is  
secured by a pivot connection 22 to the collar. In  
5 Figures 1 and 2, one of these carriers includes an  
implement 24 which could be a screw bit, drill bit, drill  
socket, etc. Each implement includes a tool end 28 and a  
drive end 26 for engagement with the implement receiving  
socket 6. The implement 24 is slidably displaceable in  
10 the receiving carrier 20 and the implement is free to  
rotate about its longitudinal axis and within the port 21  
of the carrier 20.

To load an implement into the drive shaft, the  
15 appropriate carrier is rotated about a pivot point 22 to  
position the implement in line with the drive shaft and  
then the implement is moved downwardly and into  
engagement with the implement receiving socket 6. The  
carrier 20 has been rotated from a storage position to an  
20 operative position and remains attached to the particular  
implement. The implement 24 is basically captured on the  
carrier 20 by means of a spring loaded capture latch 30.  
In this case it is a spring loaded ball member which can  
be cammed inwardly to allow the implement to be inserted  
25 into the carrier or removed from the carrier. Thus the  
user can select and insert the particular implements he  
requires for a particular job and load them into the  
tool.

30 As shown in Figure 2, the implement receiving  
collar preferably has six implement receiving carriers  
although three or four carriers may be suitable for many  
applications. The tool allows quick engagement and  
release of a particular tool which is in securement with  
35 the drill tool. Thus the user can alternate between one  
or more implements that he has preloaded into the carrier  
for his particular application.

As shown in Figures 1 and 2, each of the implements has a drive end 26 which is oversized relative to the implement receiving port 21 of the pivoting carrier 20. This drive end acts as a stop shoulder retaining the implement in the carrier and the latch 30 forms the other stop position. The implement is slidable relative to the carrier between these two end positions and allows for release and engagement with the implement receiving socket 6.

10

The drill tool of Figures 1 and 2 is a simplified arrangement where the user merely engages the particular implement 24 once the carrier has been positioned in front of the drive shaft and forces the implement into engagement with the drive socket. The action is reversed for removal of the implement. Once removed from drive connection with the drive connection 4, the carrier can be rotated approximately 180 degrees to the storage position as shown in Figure 1.

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As can be appreciated, during actual use only one implement will be rotated to the drive position and the five other implement carriers and any associated implements will be in the storage position. The actual implement receiving collar 10 can be held by the user and will not rotate with the drive shaft.

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Figures 3 and 4 show a modified drill tool 2a which is similar to drill tool 2 but includes a movable spring loaded implement receiving collar 40 which can be used by the user to disengage an implement from the receiving socket 6. The elongate drive shaft 4 includes a stop collar 50 which cooperates with the stop shoulder 46 of the implement receiving collar 40. The collar also includes a fixed plug 44 which provides a stop face for the biasing spring 42. The biasing spring 42 acts on the plug 40 and urges the stop shoulder 46 and the collar 50 into engagement. The user is able to force the collar

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upwardly relative to the drive shaft 4 against the bias spring 42 and this will assist in disengaging an implement 24 as will be more fully explained.

5           The implement receiving socket 6 has been provided with a deeper socket which includes a captured spring 60 which is compressed when an implement is inserted in the socket. This provides a bias urging the implement out of the socket. A spring latch 62 is provided in one side of  
10 the implement receiving socket 6 and engages with the latch recess 64 of the implement 24. The loading of an implement is shown in Figures 11 and 12. In this case the implement 24 is forcing the ball 68 against a leaf spring 70 and allowing movement of the ball within  
15 chamber 72. The user inserting the implement 24 into the socket 6 causes the end of the implement to strike the ball 68 and move it rearwardly and outwardly into chamber 72 allowing the end of the implement to pass by the ball 68. Further movement of the implement will result in the  
20 implement bottoming out on the shoulder 74 and the ball 68 will move into the latch recess 64.

The leaf spring has moved the ball back against the angled stop shoulder 76. This stop shoulder is on  
25 the movable collar 40. Any attempt to disengage the implement 24 will cause the ball 68 to strike the angled shoulder 76 and lock the implement in place as the ball cannot move outwardly. Thus the ball 68 is free to move against the leaf spring 70 to allow insertion of the  
30 implement, however, the ball is restricted by the angled shoulder 76 to lock the implement in the drive socket. The ball also serves to maintain the bias spring 62 compressed due to the insertion of the implement in the drive socket.

35

Figure 13 shows the ball 68 locking the implement in the drive socket in the drive position.

To release the implement 24, the carrier 40 is moved forwardly against the spring bias 42. This movement positions the ball 68 in the chamber 72 such that it can move outwardly as the angled wall 76 has been moved forwardly. The spring 62 urges the implement 24 past the ball 68 which is now free to move outwardly. Thus the sliding movement of the collar 40 forwardly allows release of the latch 62 and allows the bias spring 60 to force the implement 24 out of the drive socket. Basically, the implement 24 is ejected from the drive shaft. The collar can then be released and returned to the position of Figure 3 due to the spring bias. The implement can then be pivoted within its carrier 20 and moved to the storage position as shown in Figure 3.

15

Figure 5 is a top view of the collar.

Figure 6 is a sectional view through the collar 40.

20

Figure 7 is an end view of the collar in the direction of line B-B in Figure 6. The collar includes a channel 82 which allows the slide insertion of the collar over the drive shaft 4 as shown in Figures 8 and 9. The drive shaft 4 includes the recess 85 for receiving the ball 68. The leaf spring 70 can be attached by means of the small port 87 provided in the drive shaft which receives a screw or recess or other form of attachment. As can be seen, the socket for receiving the implement has a first chamber 89 for receiving the drive end of the implement and a deeper chamber 91 for receiving the ejection spring 62.

30

To assemble the tool, the ball is placed within the chamber 85 and behind a leaf spring such that the ball is partially inserted into the chamber 89. The collar 40 is then aligned with the drive shaft and the channel 82 in the collar is aligned with the ball such

35

that the collar can slide over the drive shaft until the flange 50 of the drive shaft strikes the stop shoulder 46 of the collar. Once so inserted, the bias spring 42 can be inserted on the drive shaft and the plug 44 can be  
5 attached to the collar. The ejection spring 62 would have been previously inserted and is retained in the chamber 91 but is partially exposed in the chamber 89.

The above arrangement provides a simple structure  
10 where the user can merely push the caller 40 forwardly and eject any implement which is in drive engagement with the socket 6. The collar can then be released and will return to the position of Figure 3. The ejected  
15 implement can then be stored by rotating of the carrier to the storage position to position of the implement 24 at one side of the collar 40.

Figures 17 and 18 show details of the carrier 20. The carrier 20 includes a pivot position 101 at one end  
20 of the arm 103. An outwardly extending flange 105 is angled generally at a perpendicular direction to the member 103. The outwardly extending flange 105 includes the circular implement receiving port 21 which allows  
rotation of the implement in the carrier arm.

25

The drill tool allows a user to select various implements necessary for a particular task to be loaded into the tool. Each implement is movable from a storage position to an operative position while remaining  
30 captured in the tool. This arrangement keeps all necessary implements readily available and the user can quickly change from one implement to a different implement. Problems associated with dropping implements or difficulty in locating and loading implements quickly  
35 are overcome.

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Although various preferred embodiments of the present invention have been described herein in detail, it will be appreciated by those skilled in the art, that variations may be made thereto without departing from the spirit of the invention or the scope of the appended  
5 claims.

THE EMBODIMENTS OF THE INVENTION IN WHICH AN EXCLUSIVE PROPERTY OR PRIVILEGE IS CLAIMED ARE DEFINED AS FOLLOWS:

1. A tool for receipt in a drill chuck, said tool comprising an elongate drive shaft having an implement receiving socket at one end thereof and a drive end for engaging a drill chuck at an opposite end, said tool further including an implement receiving collar about an intermediate portion of said drive shaft which allows rotation of said drive shaft without rotation of said implement receiving collar, said implement receiving collar having at least 3 implement carriers movable from a storage position to an in use position which aligns an implement received in said implement carrier with said implement receiving socket of said drive shaft for receipt therein, each implement receiving carrier in said storage position locating an implement received therein to one side of said drive shaft and each implement receiving carrier in said in use position allowing rotation of an implement received therein and in engagement with said drive shaft socket to rotate with said drive shaft without rotation of said implement receiving carrier.
2. A tool as claimed in claim 1 wherein each implement receiving carrier is pivotally secured to said implement receiving collar and is pivotally moved between said storage position and said in use position.
3. A tool as claimed in claim 2 including a plurality of implements each of which is receivable in any of said implement receiving carriers.
4. A tool as claimed in claim 3 wherein each implement includes a spring loaded cam means for releasable securement in any of said implement receiving carriers.

5. A tool as claimed in claim 4 wherein each implement received in any of said implement receiving carriers is slidably displaceable within the implement receiving carrier.
6. A tool as claimed in claim 5 wherein each implement receiving carrier has a distal end with an implement receiving port and a pivot securement end opposite said distal end, said pivot securement end being attached to said implement receiving collar.
7. A tool as claimed in claim 6 wherein each implement receiving carrier has an elongate shank connecting said distal end and said pivot securement end and said distal end has an outwardly extending flange which includes said implement receiving port.
8. A tool as claimed in claim 7 wherein outwardly extending flange in said in use position of said implement receiving carrier aligns said implement receiving port with said implement receiving socket of said drive shaft.
9. A tool as claimed in claim 8 wherein said outwardly extending flange of each implement receiving carrier in said storage position thereof positions said outwardly extending flange generally perpendicular to a side of said implement receiving collar and immediately adjacent thereto.
10. A tool as claimed in claim 1 wherein said implement receiving collar is longitudinally slidable on said elongate drive shaft between an implement retaining position and an implement release position, said implement receiving collar including an associated spring bias member for urging said implement receiving collar to said implement retaining position.

11. A tool as claimed in claim 10 including a spring biased latch which is received in a side port of said drive shaft to partially protrude into said implement receiving socket and rotates with said drive shaft, said implement receiving collar cooperating with said implement receiving socket to retain said latch partially protruding into said implement receiving socket when said implement receiving collar is in said implement retaining position.

12. A tool as claimed in claim 11 wherein each implement includes a retaining groove at one end thereof for receiving said spring biased latch to releasably lock the implement when received in said drive shaft socket.

13. A tool as claimed in claim 12 wherein each implement inserted in said drive shaft socket cams said spring biased latch outwardly against the bias of said spring bias latch and locks said implement against withdrawal from said socket while said implement receiving collar is in said implement retaining position.

14. A tool as claimed in claim 13 wherein said implement receiving collar in said implement release position provides a cavity allowing said spring biased latch to move outwardly.

15. A tool as claimed in claim 14 wherein said spring biased latch is a leaf spring and a ball latch.

16. A tool as claimed in claim 14 wherein said spring latch is a leaf spring with one end engaging said drive shaft and an opposite end engaging a rotatable ball which protrudes into said implement receiving socket and is retained in said side port.

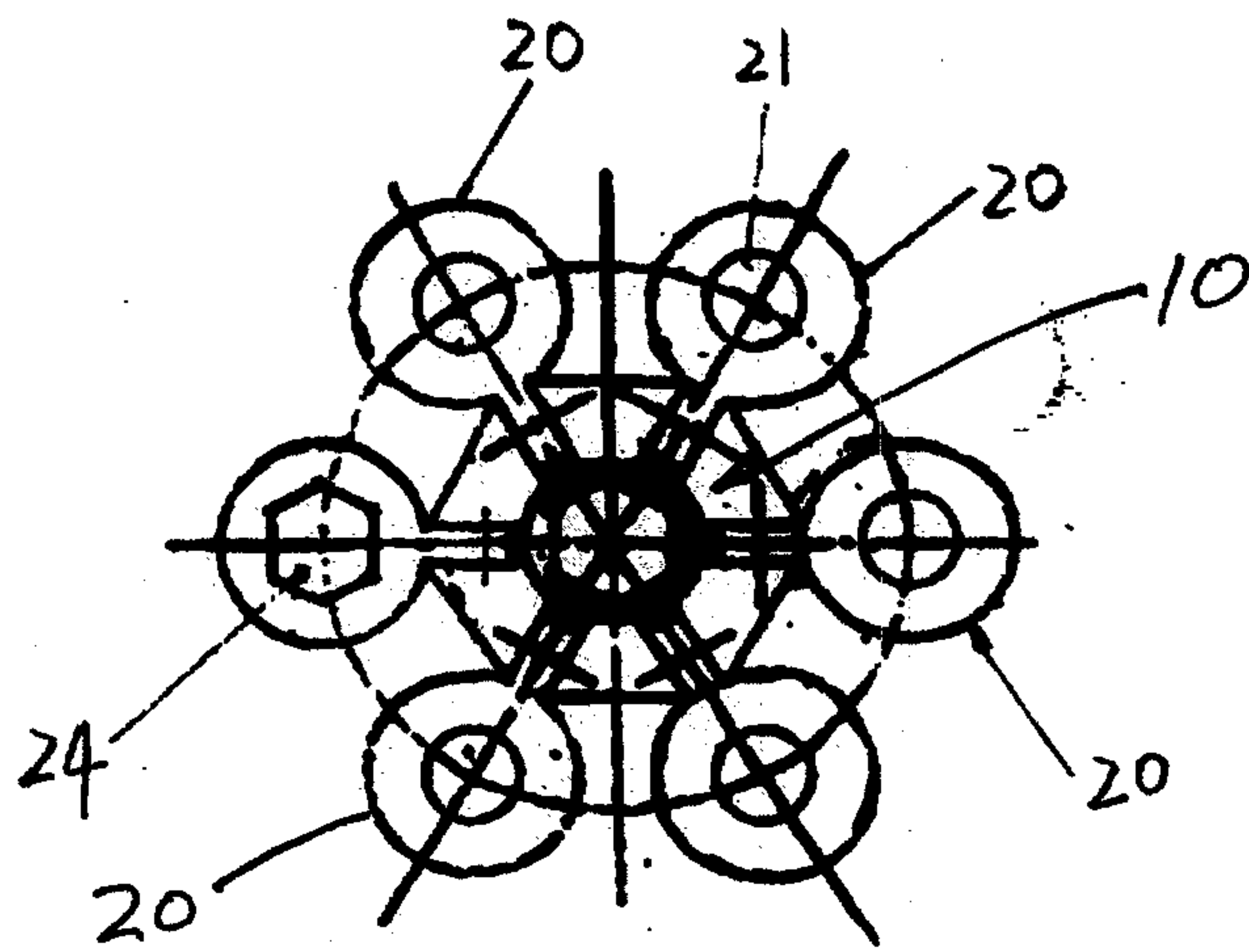
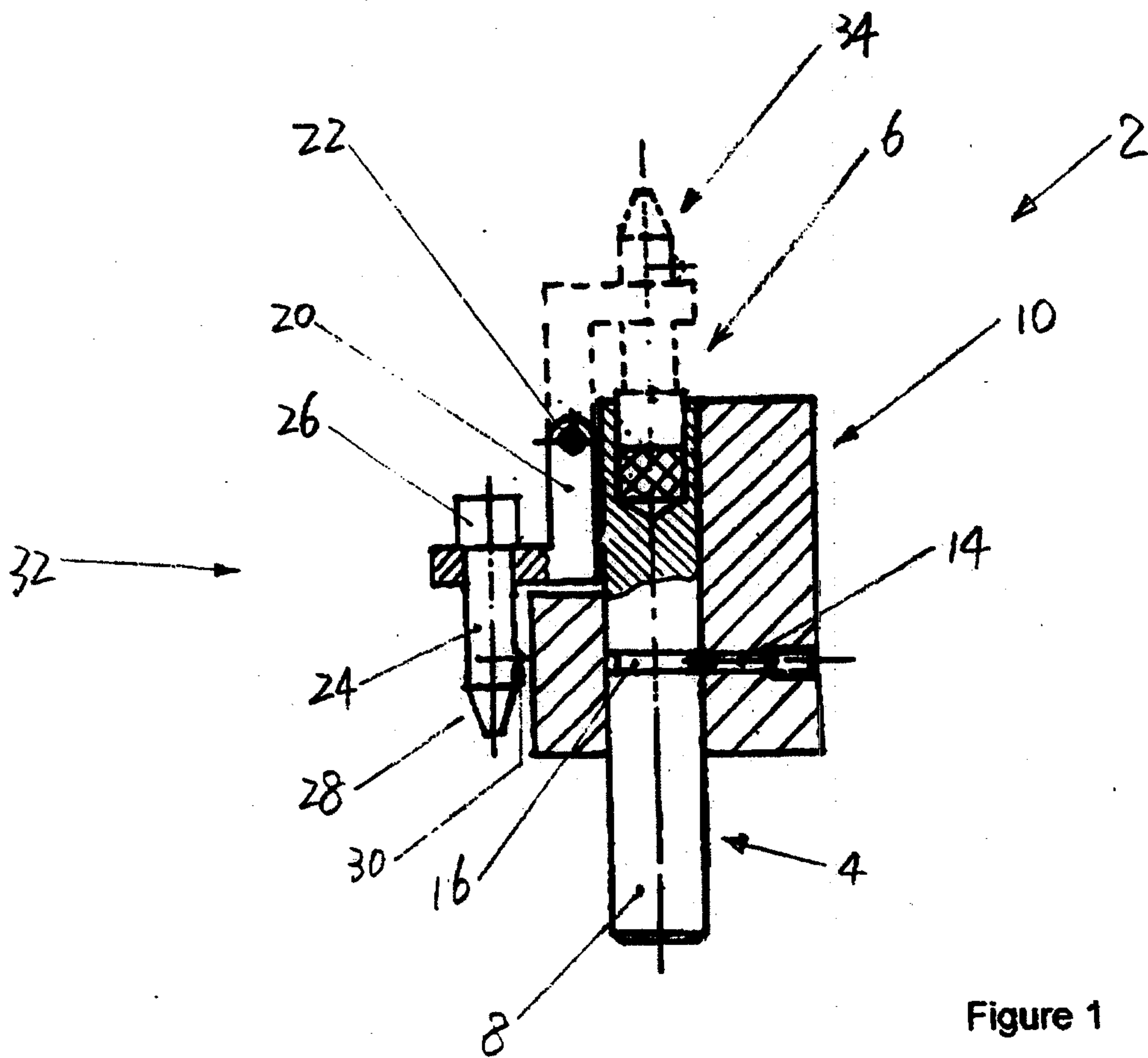




Figure 6

A - A

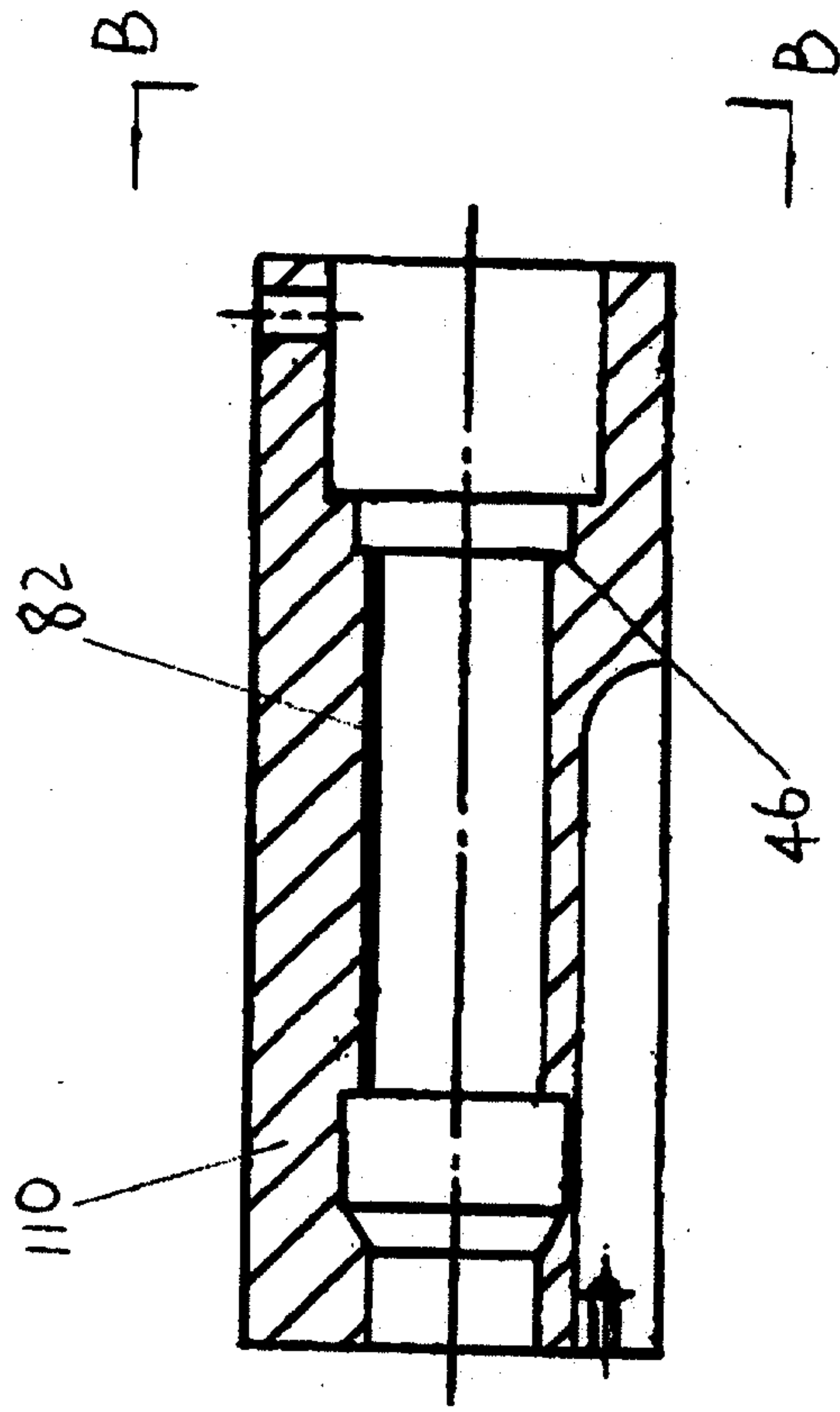


Figure 5

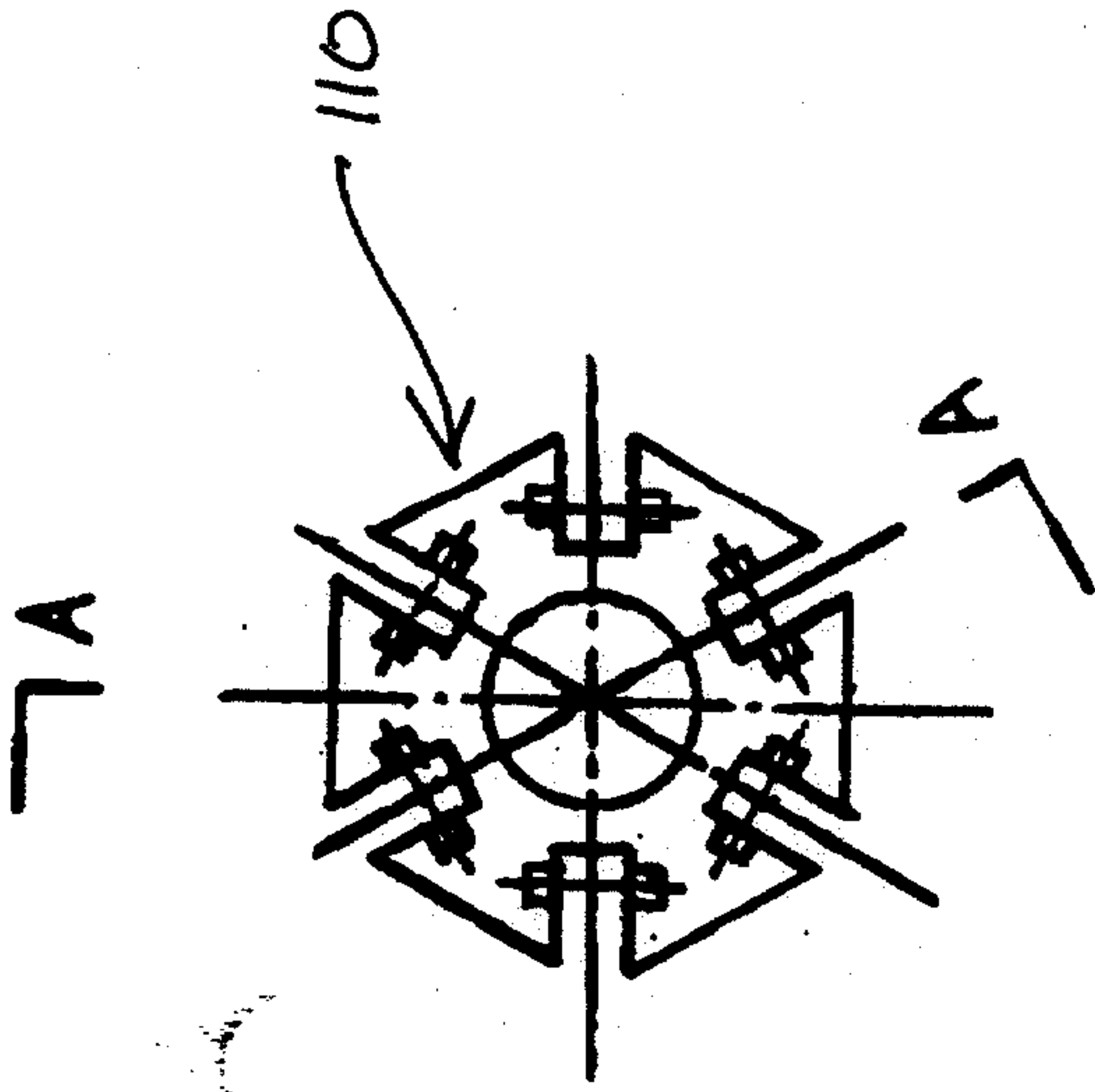


Figure 7

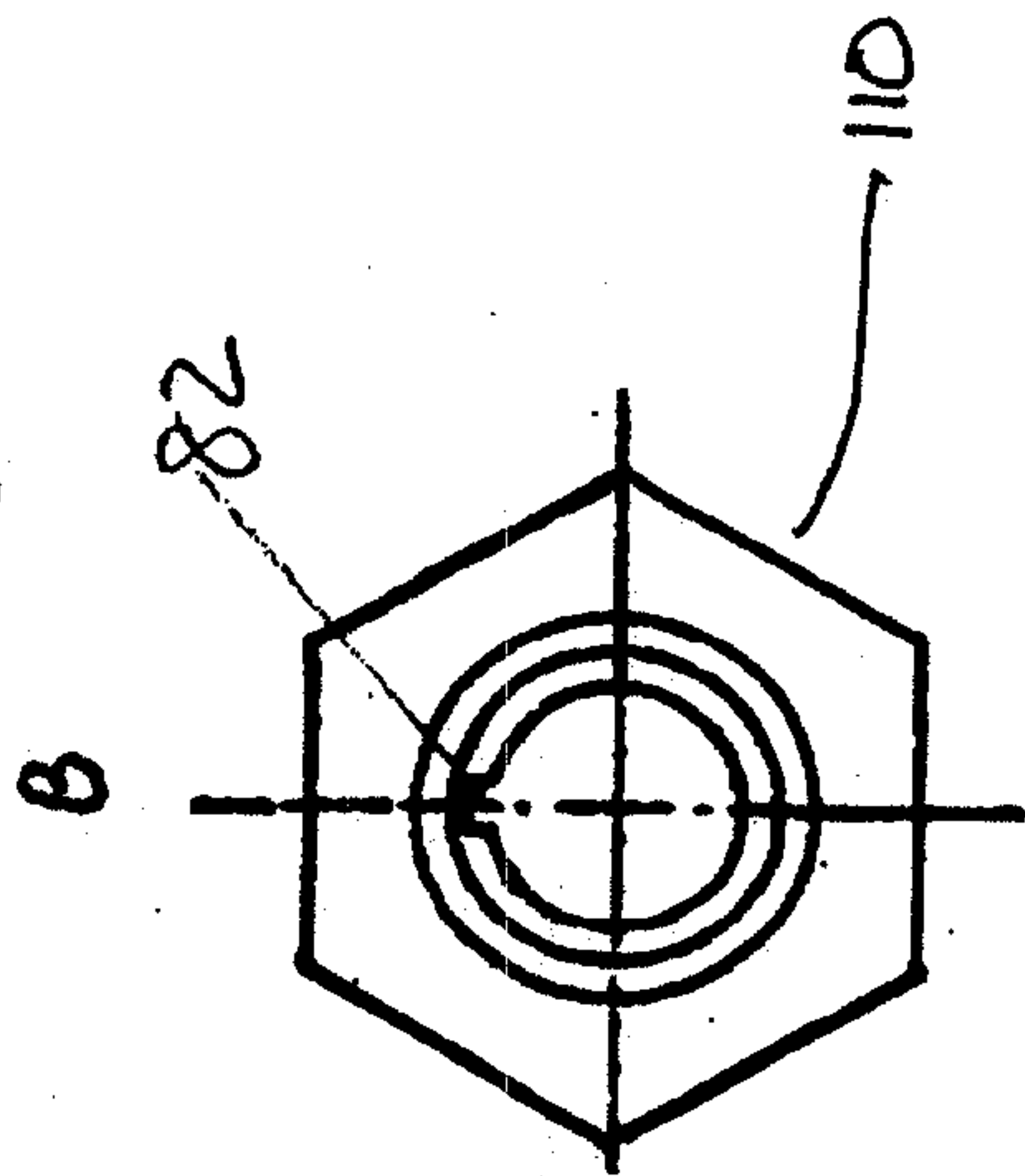


Figure 8

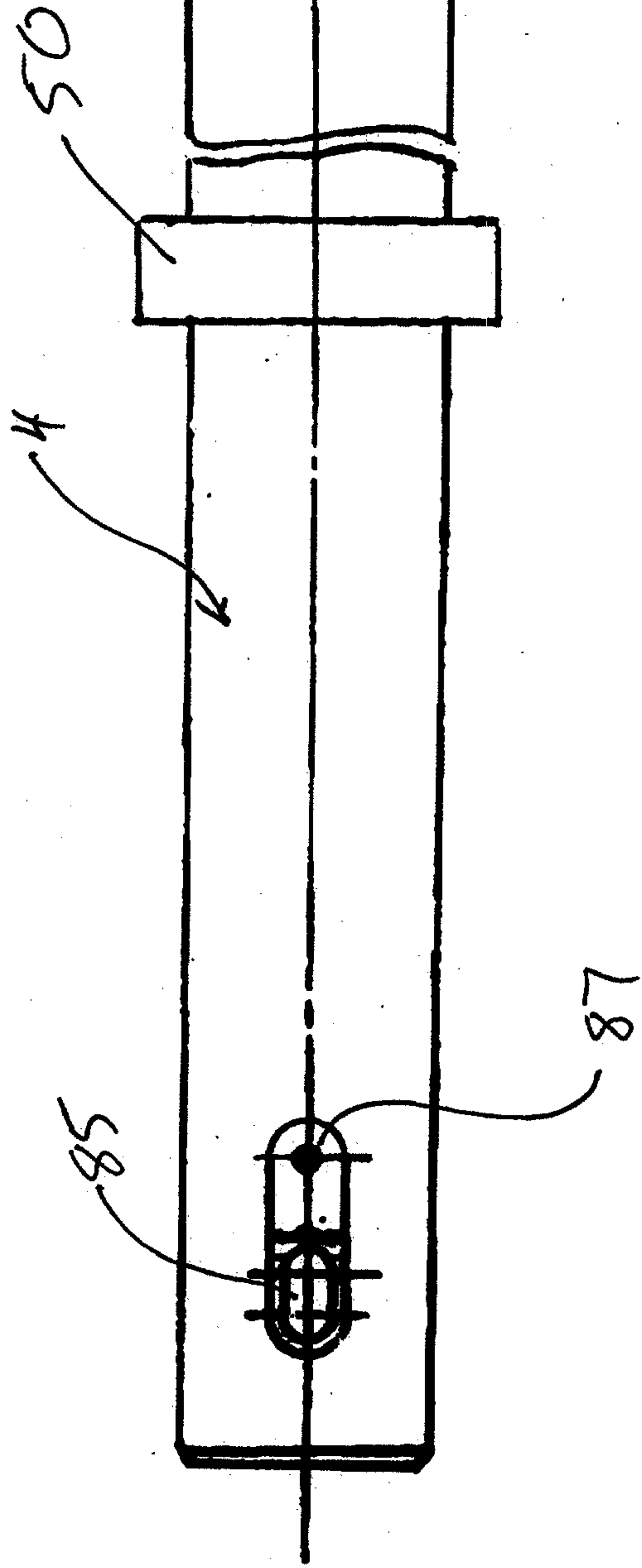
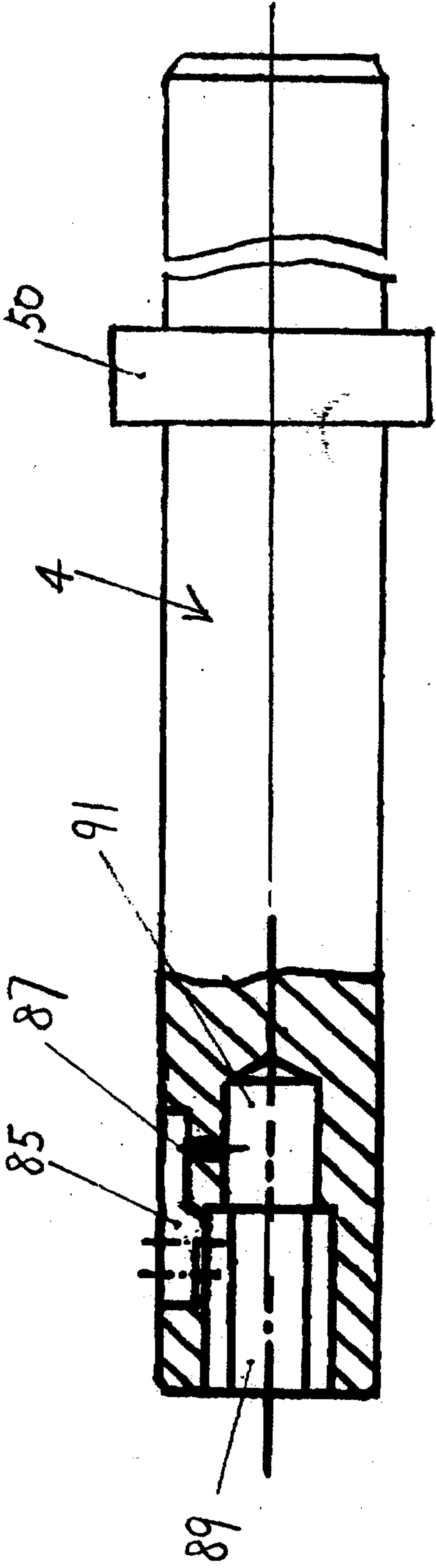


Figure 9

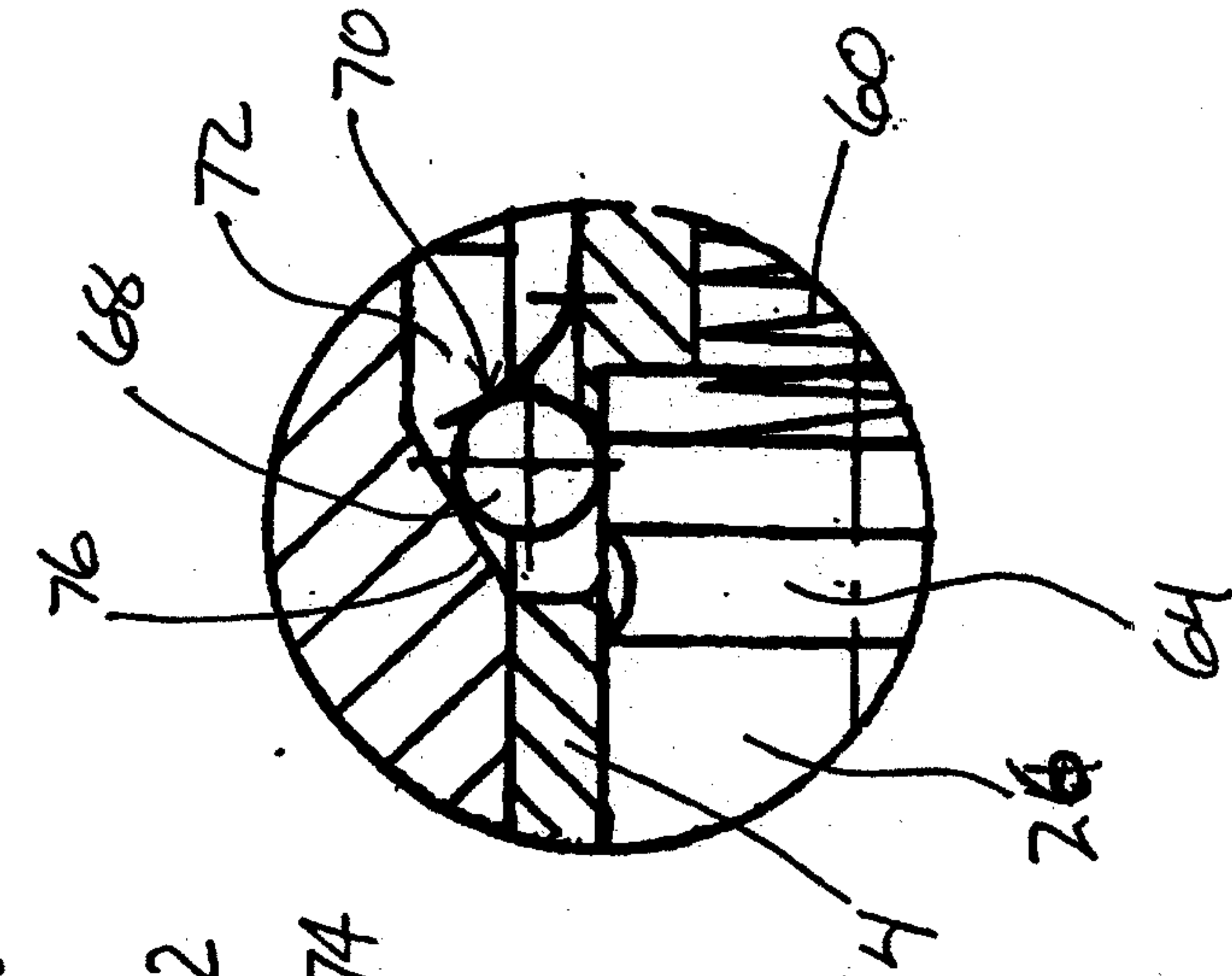


Figure 10

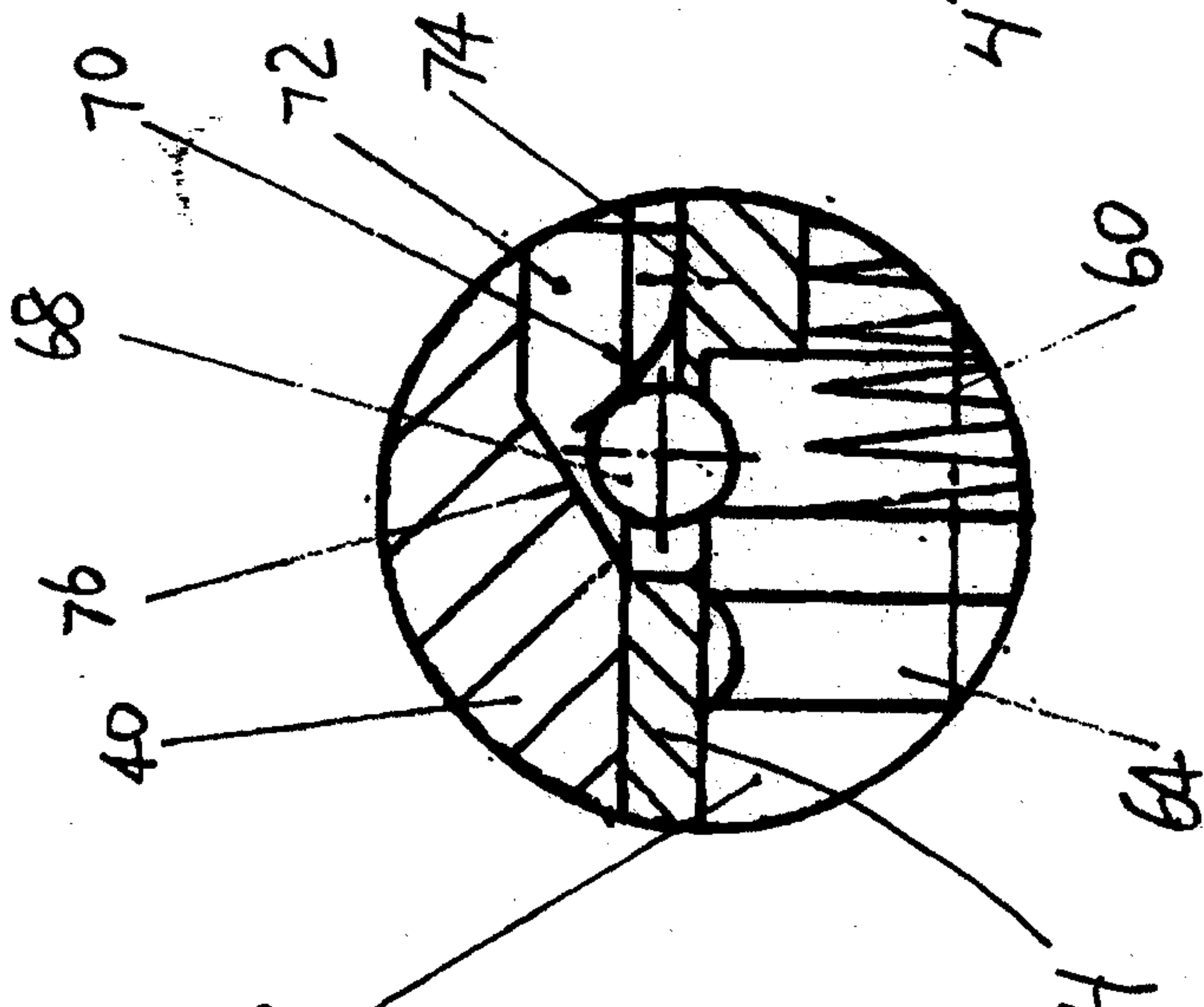


Figure 11

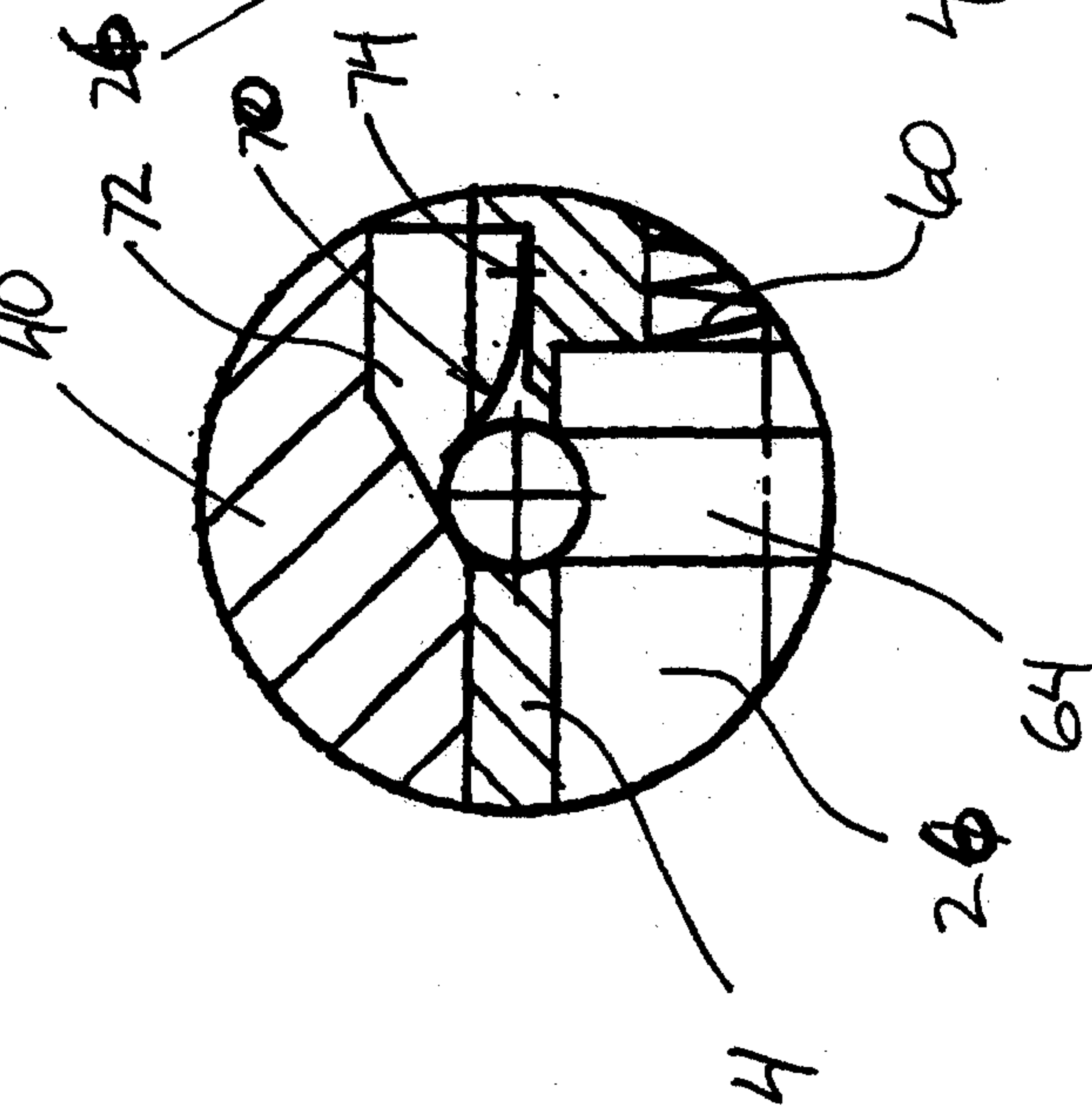


Figure 12

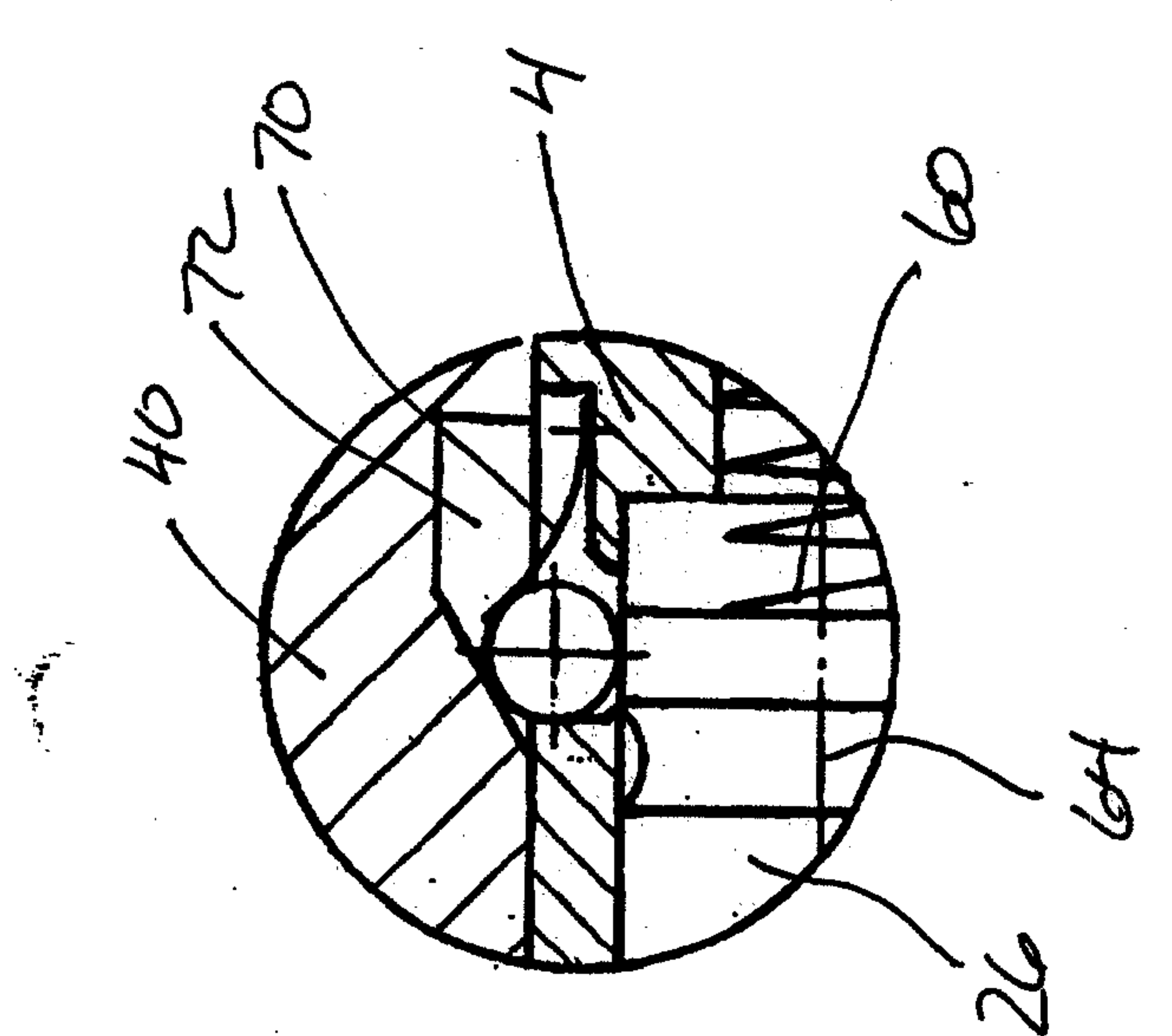


Figure 13

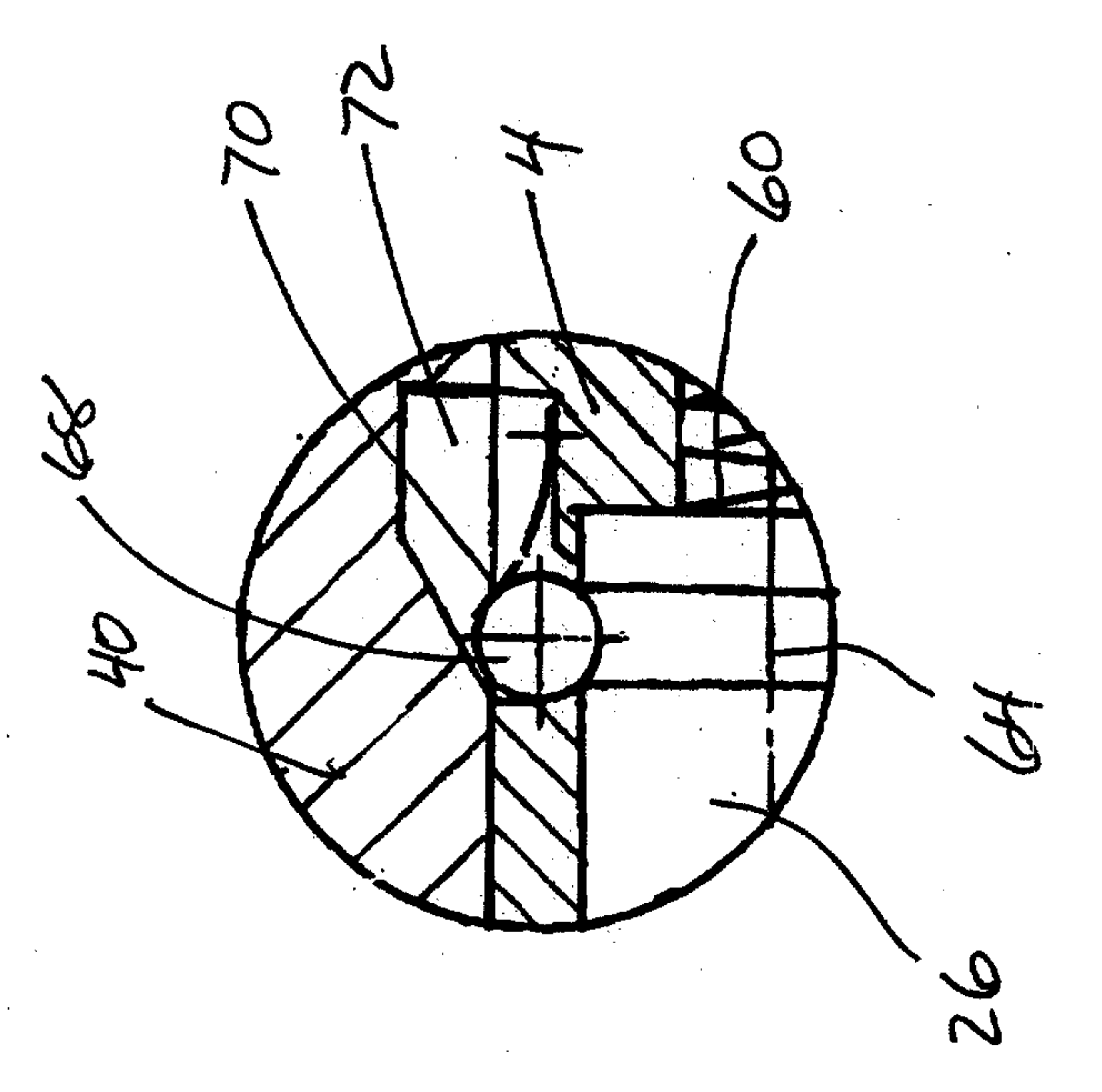


Figure 14

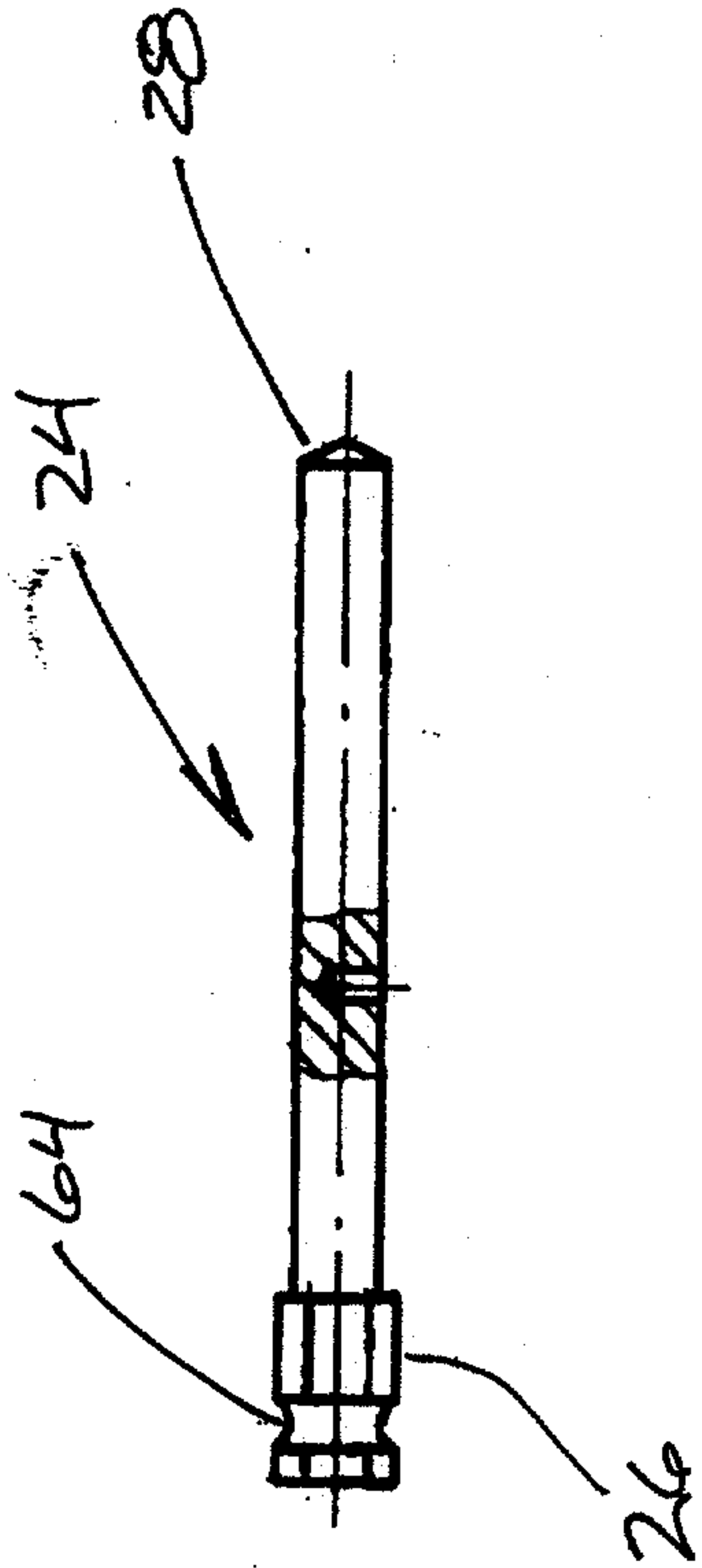


Figure 16

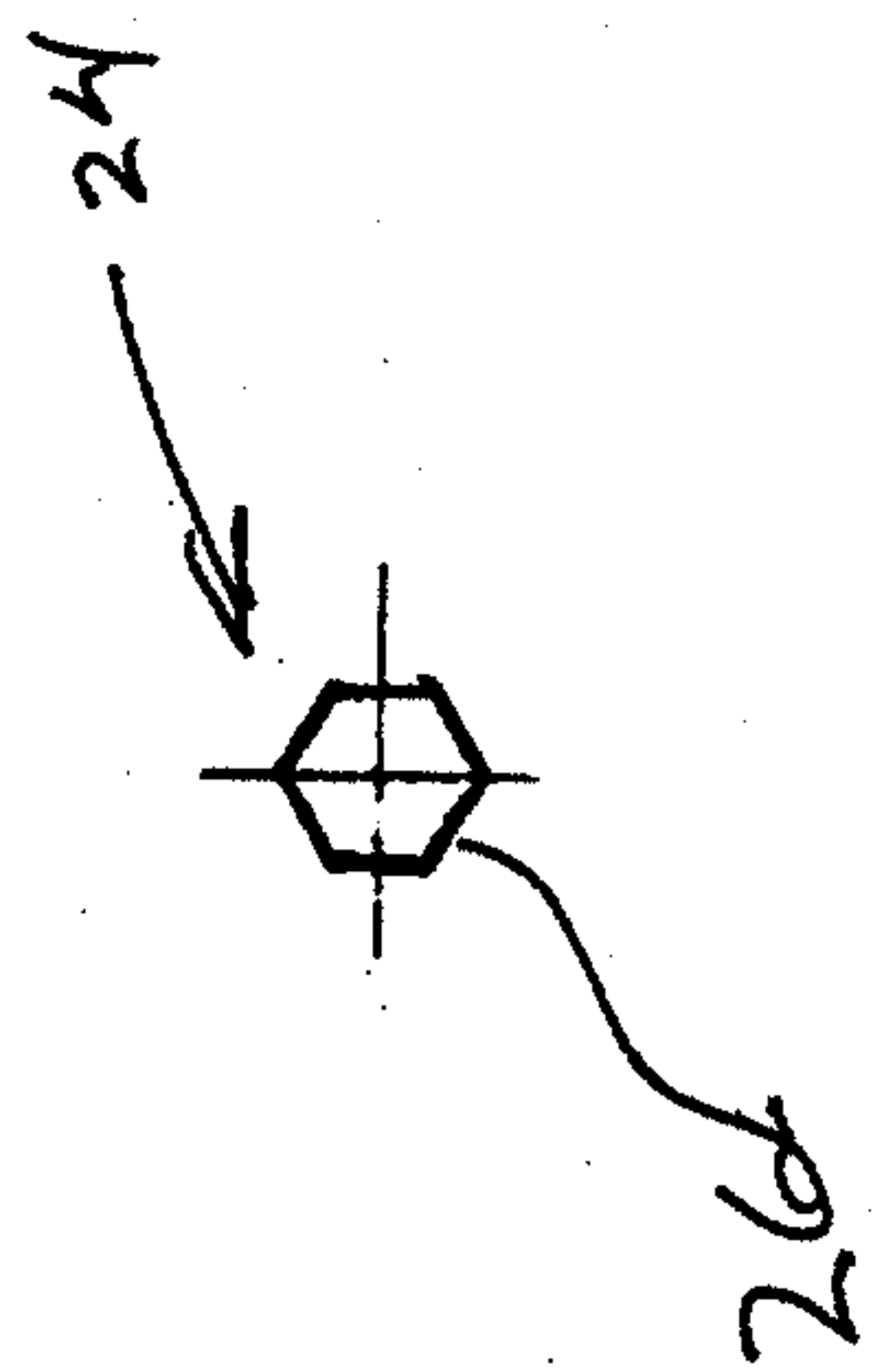


Figure 15

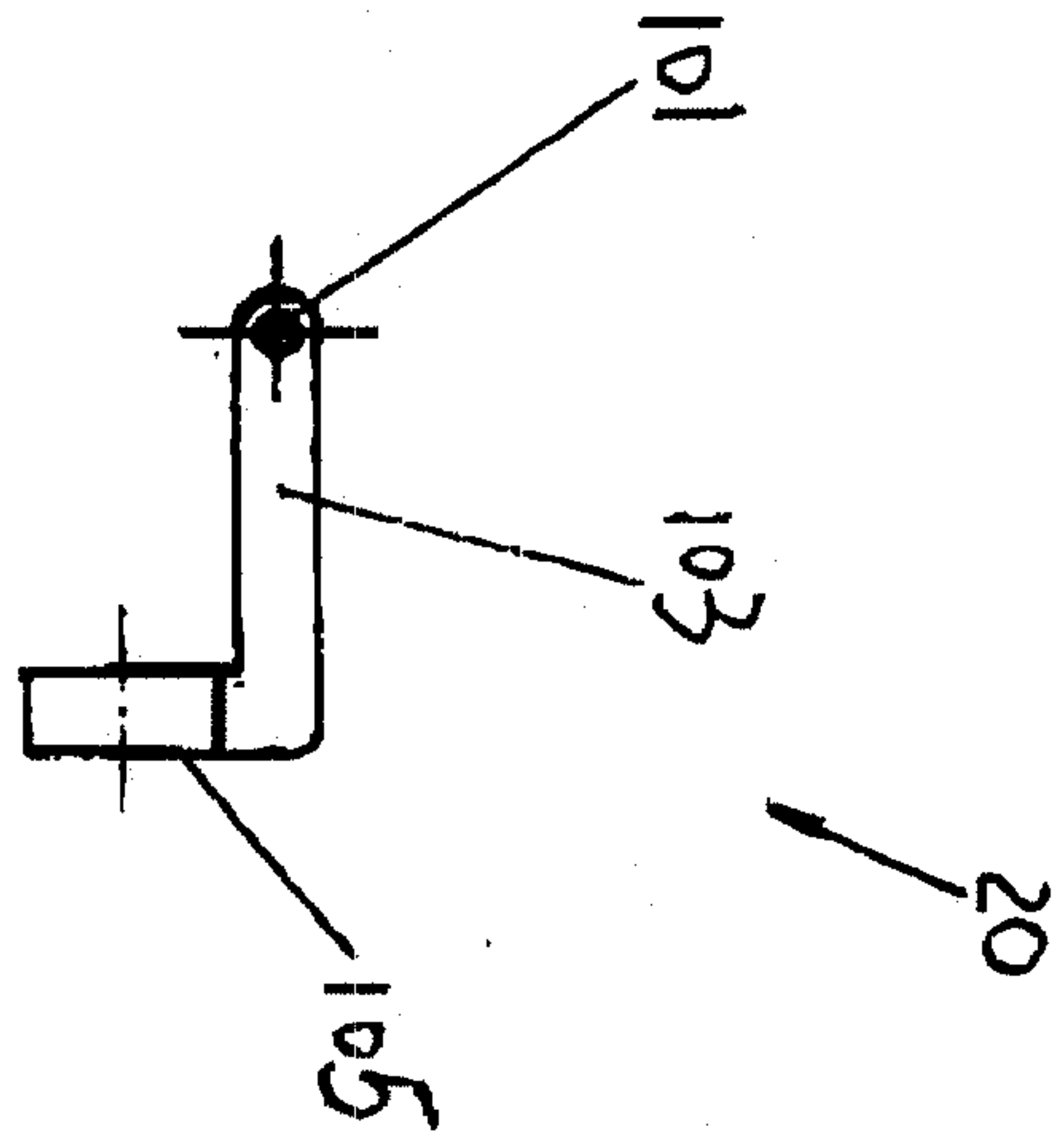


Figure 17

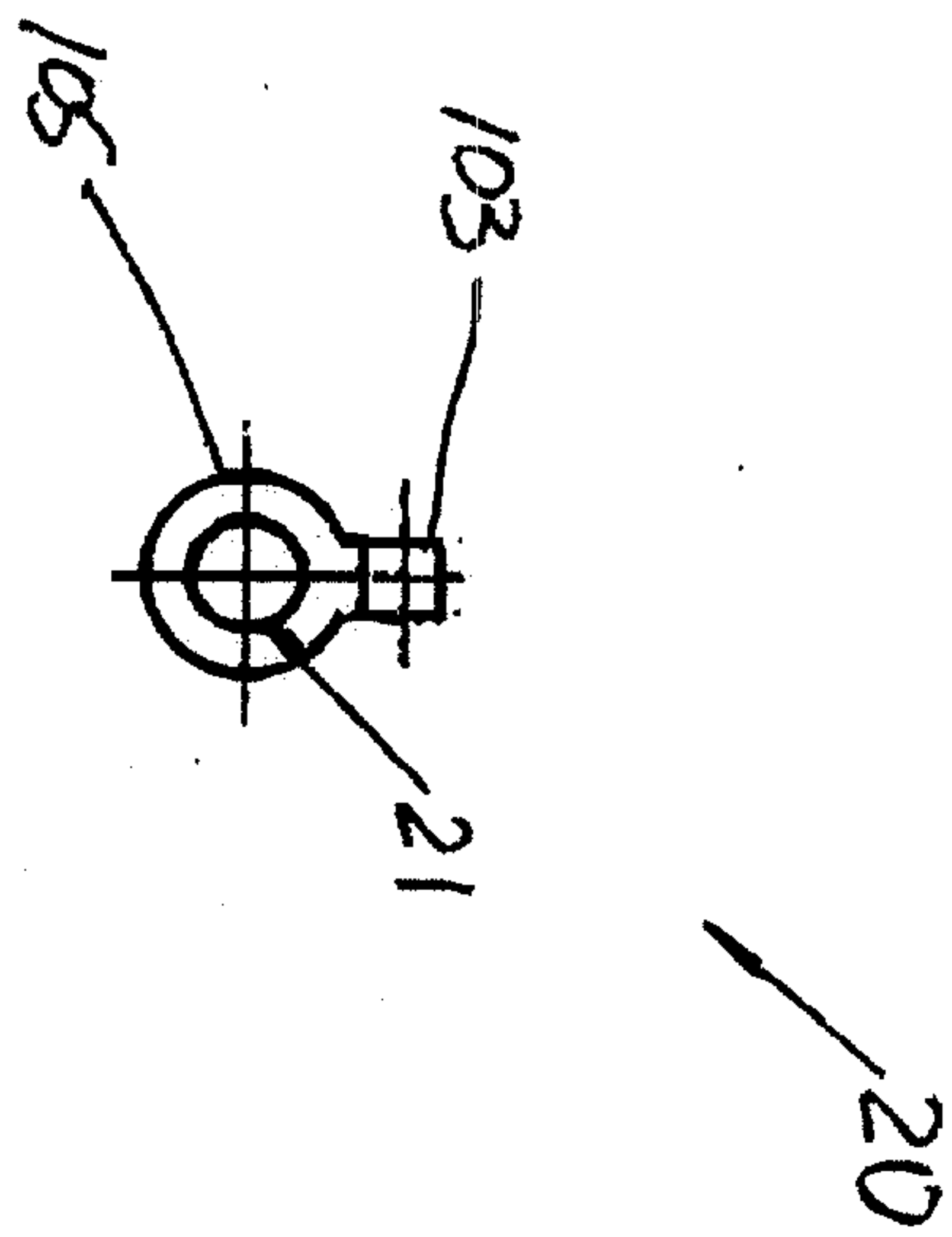


Figure 18

