

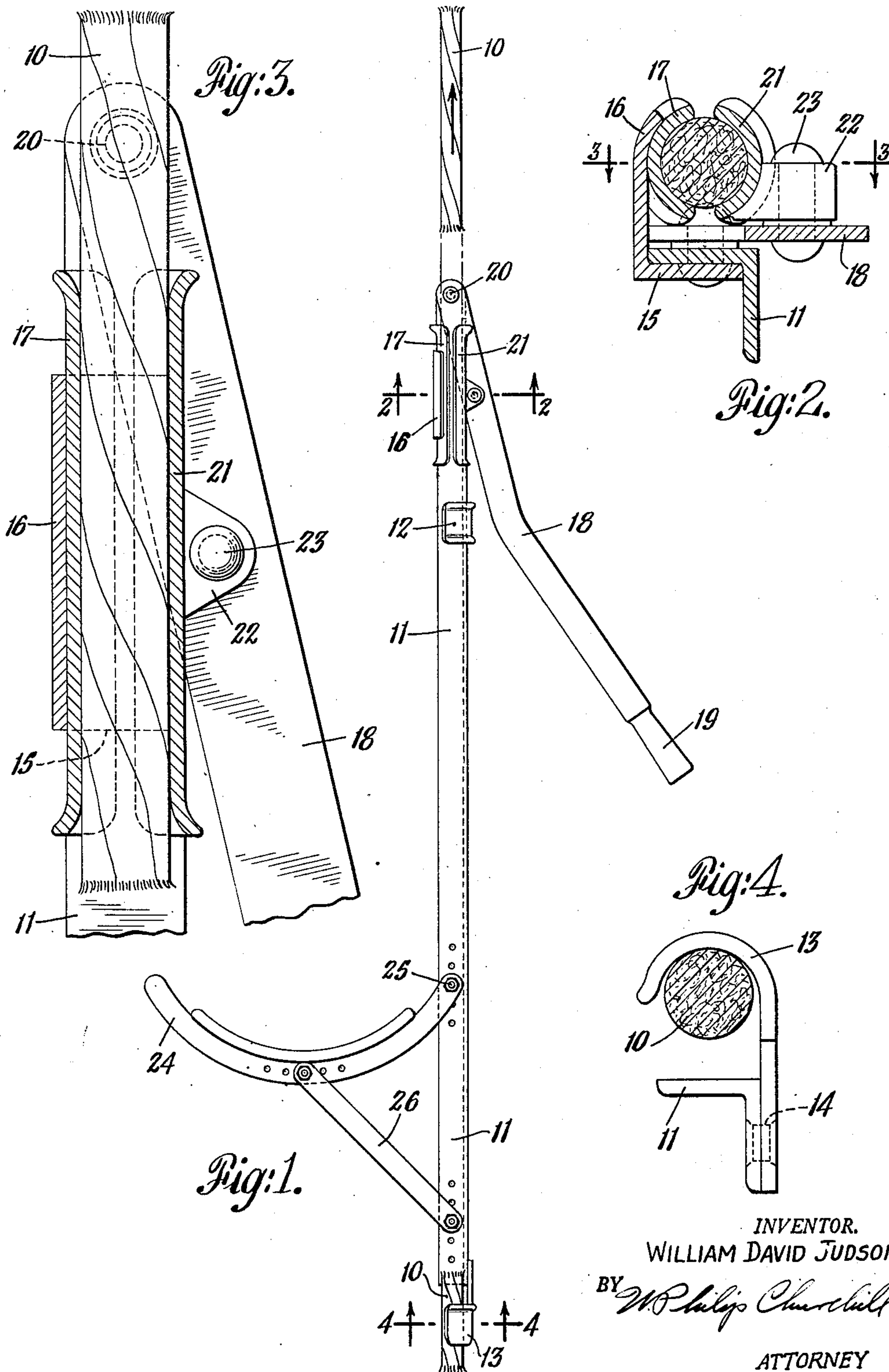
April 10, 1951

W. D. JUDSON
SKI TOW DEVICE

2,548,800

Filed June 26, 1947

3 Sheets-Sheet 1



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Fig. 5.

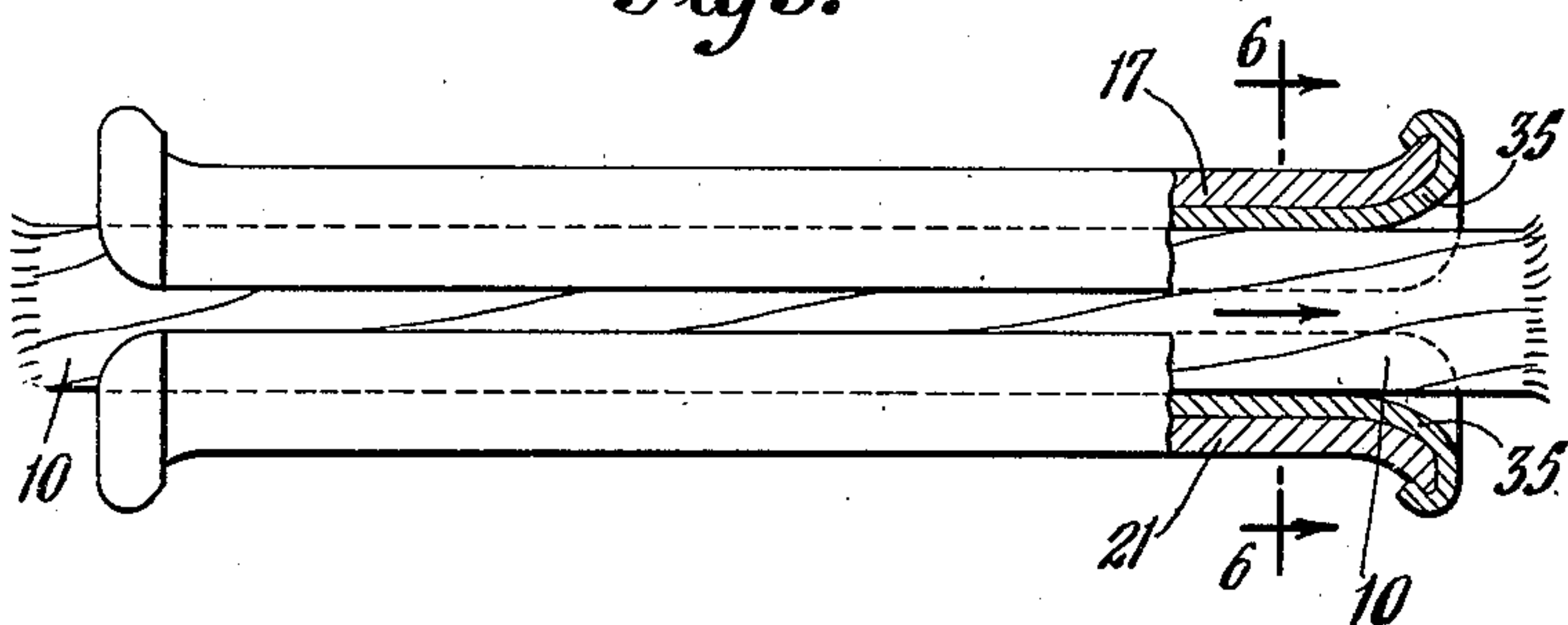


Fig. 6.

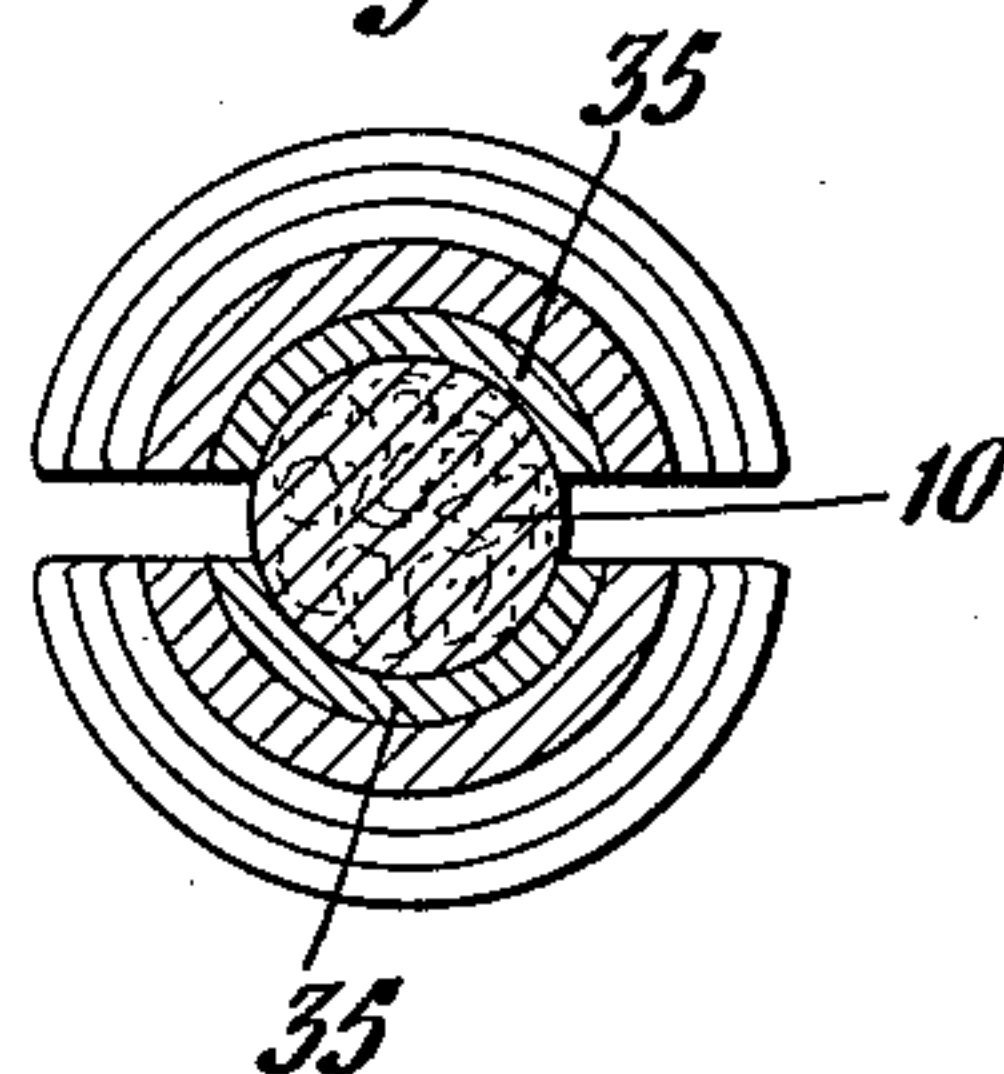


Fig. 7.

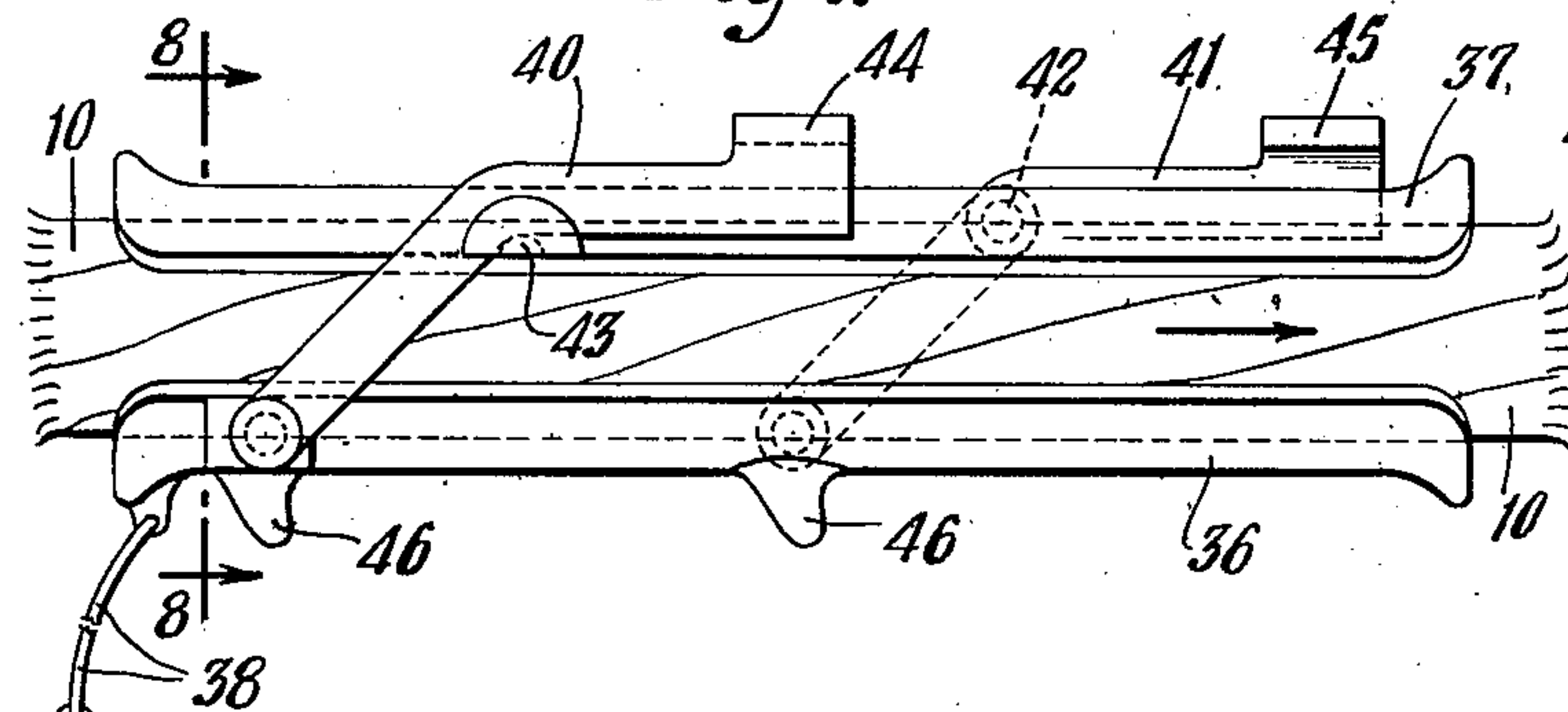


Fig. 8.

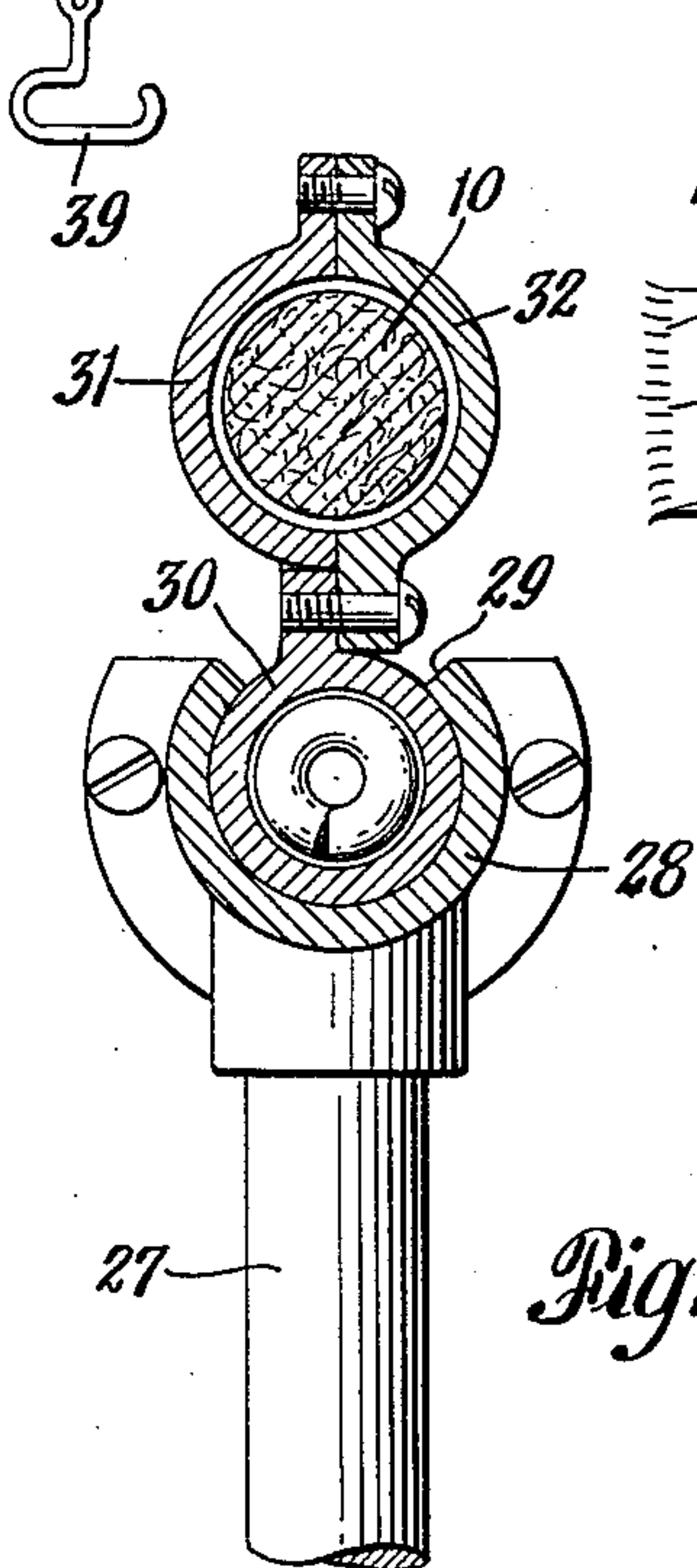
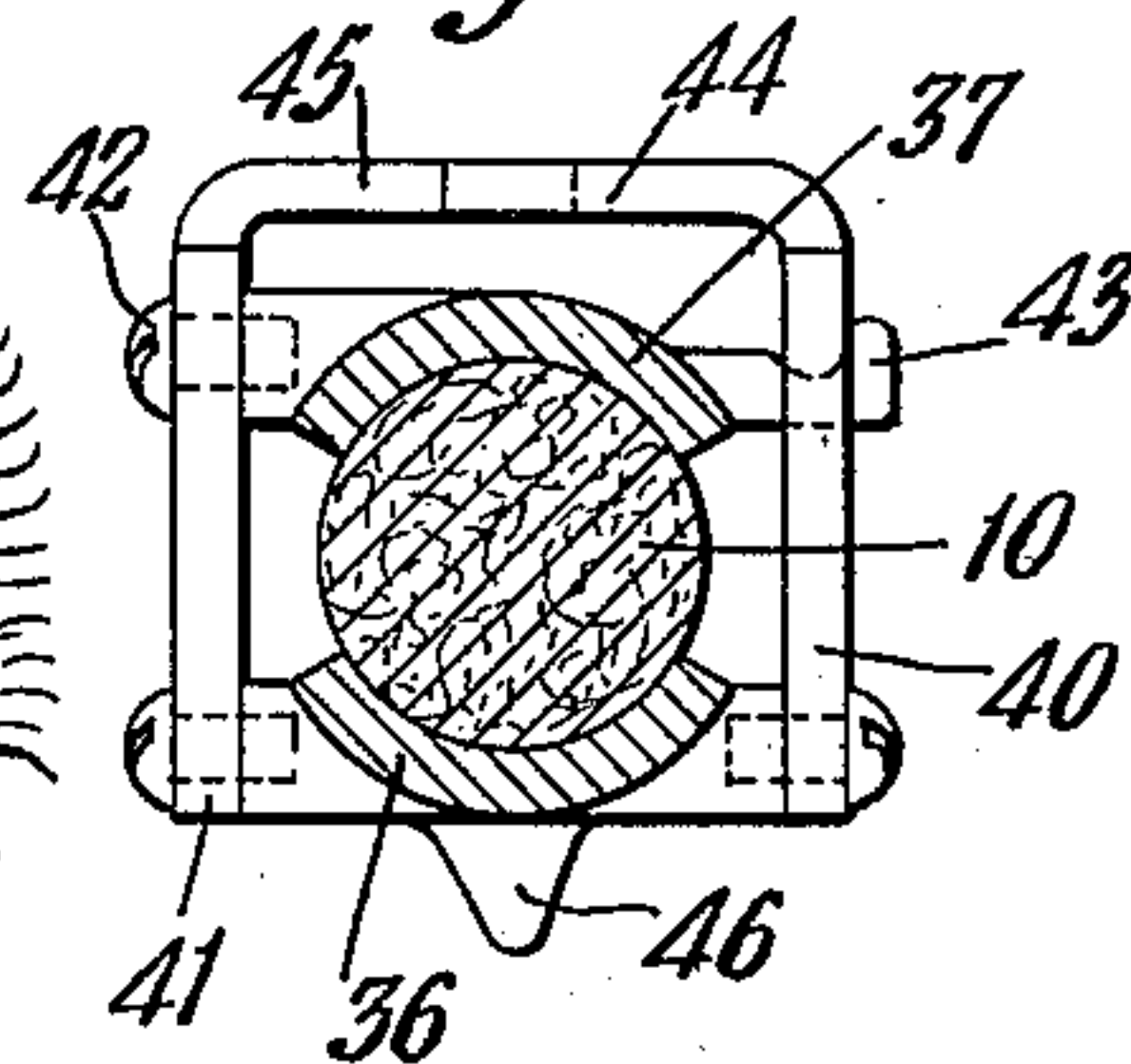


Fig. 10.

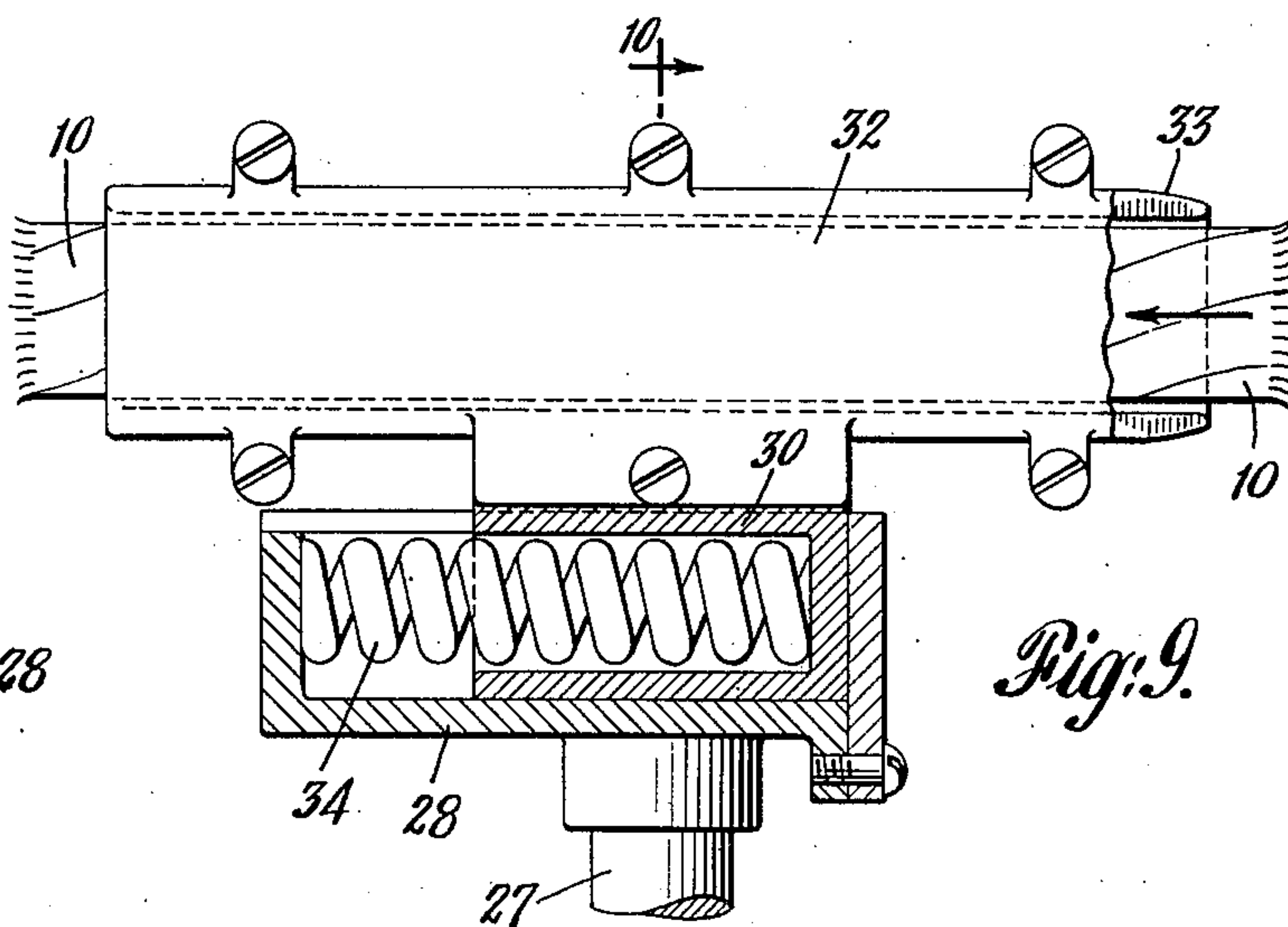


Fig. 9.

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Fig. 1a.

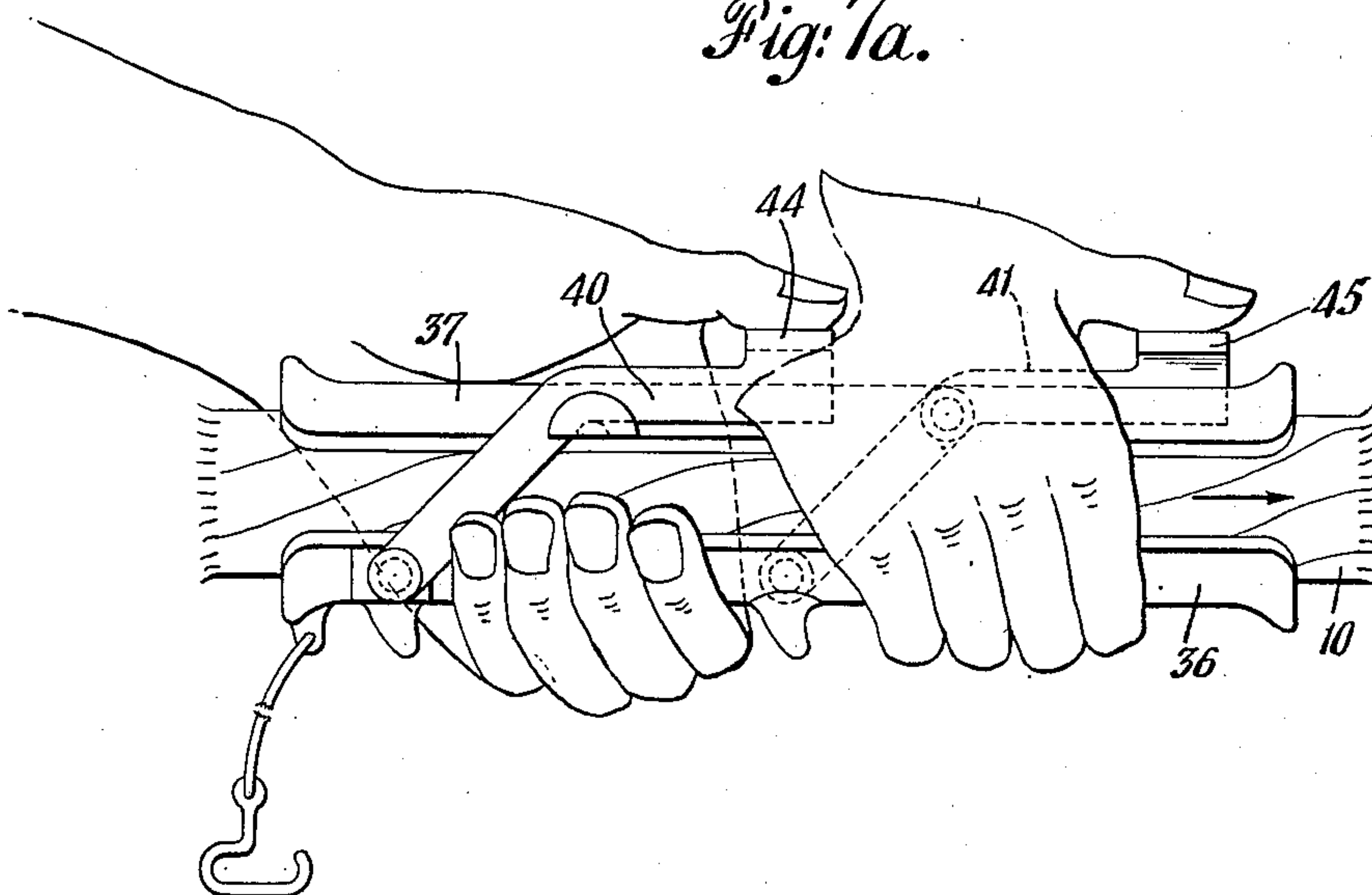
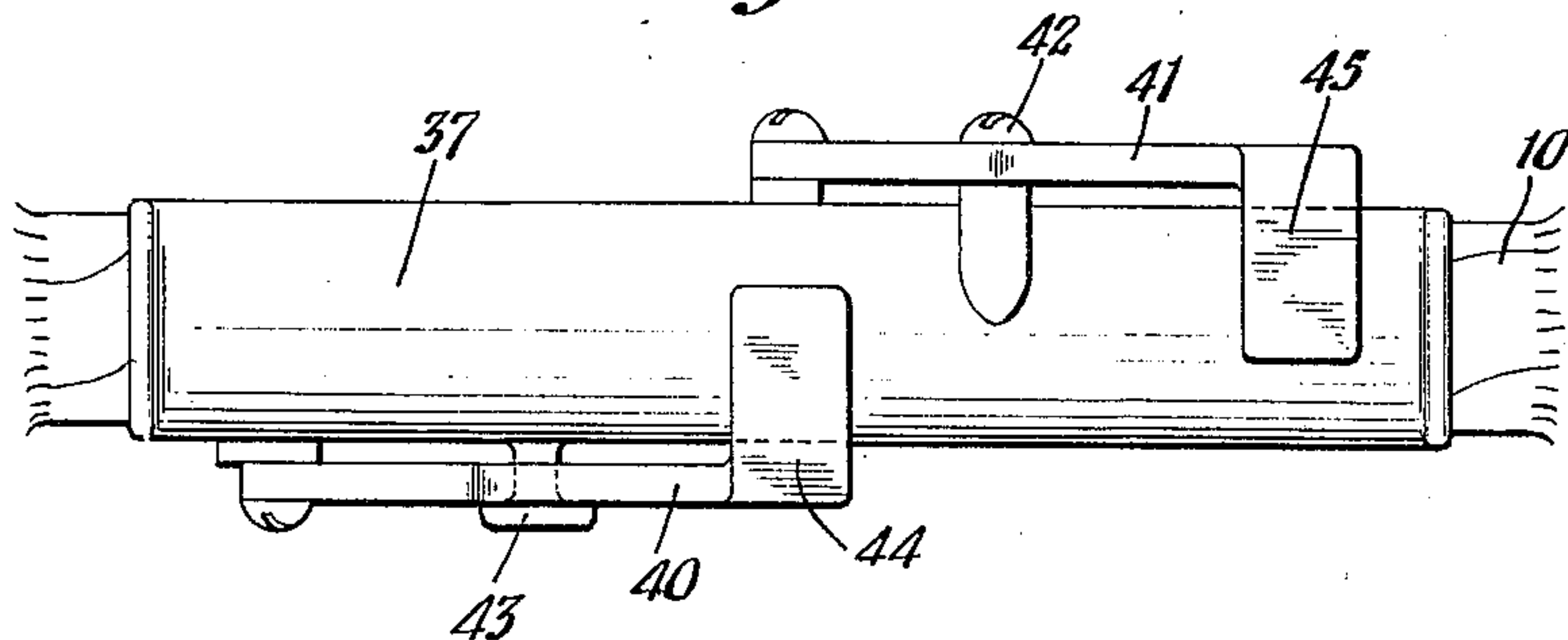


Fig. 11.



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2,548,800

SKI TOW DEVICE

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Application June 26, 1947, Serial No. 757,205

15 Claims. (Cl. 104—216)

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This invention relates to rope tow devices, and more particularly to manually operable gripping devices for use as part of a ski tow system.

Various types of ski tows have been used and they range from complex tramways in which the skier is carried in a chair or car to the simplest device composed essentially of a continuous length of rope passing around large sheaves at the upper and lower ends of the tow with a suitable prime mover to keep the rope moving. In the simpler forms of ski tows, the rope usually follows rather closely the contour of the ground and the skier simply holds onto the rope with his hands and is pulled up the hill while still on his skis.

In practically all forms of tows, it is desirable to have the rope kept moving without interruption, and of course it is also desirable to make it as easy and comfortable as possible for the skier to be pulled up the hill.

One object of this invention is the provision of attachments which can be applied to a simple tow rope and operated manually by the skier, to make it easier for him to be pulled up the hill without having to hold on to the rope by hand.

A further object of this invention is the provision of such a device which utilizes friction clutch plates easily controllable by the skier and providing a smooth gradual start when the skier begins his ascent and a quick and easy release when the skier reaches the top of the tow.

These and other objects of the invention will be more clearly understood by reference to the following description of certain embodiments of my invention illustrated in the drawings, in which

Figure 1 is a plan view of one form of towing device embodying my invention;

Figure 2 is a transverse sectional view on a larger scale through the friction clutch plates and taken approximately on the line 2—2 of Figure 1;

Figure 3 is a horizontal sectional view through the clutch plates, taken approximately on the line 3—3 of Figure 2;

Figure 4 is a transverse sectional view, taken approximately on the line 4—4 of Figure 1;

Figure 5 is a plan view, partly in section, showing the use of adapters on the clutch plates to accommodate a smaller size of tow rope;

Figure 6 is a transverse sectional view of these plates and adapters, taken approximately on the line 6—6 of Figure 5;

Figure 7 is a side elevational view of a modified form of manually operable clutch plates embodying my invention;

Figure 7a is a view similar to Fig. 7 but showing the manner in which the device is gripped by the skier;

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Figure 8 is a transverse sectional view of these modified plates, taken on the line 8—8 of Figure 7;

Figure 9 is a safety release wedge for use at the upper terminus of a tow to ensure release of the friction clutch plates from the rope;

Figure 10 is a transverse sectional view of this safety release wedge, taken approximately on the line 10—10 of Figure 9; and

Figure 11 is a plan view of the manually operable clutch plates shown in Figures 7, 7a and 8.

Referring particularly to the form of my invention illustrated in Figures 1 to 4, numeral 10 indicates a tow rope continuously moving in the direction of the arrow, which in this case would be uphill. It is understood, of course, that this rope customarily would be in endless form passing around large sheaves, pulleys or other devices at the top and bottom of the tow, so that one portion of the rope would be continuously moving down hill while the other portion is continuously moving uphill.

The towing device of my invention may consist of a frame 11, for example, a long piece of angle iron, which is supported on the rope 10 by means of spaced hooks 12 and 13. The hooks 12 and 13 may be of any suitable width, length and curvature but are preferably fixed to the angle iron 11 by suitable means such as the rivets 14. The forward portion of the frame member 11 has fixed thereto an L-shaped frame member 15 with an upwardly extending portion 16, to the inner surface of which is riveted, welded or otherwise secured a friction clutch plate 17. At its forward end the frame member 11 has pivotally secured thereto a lever 18, which is provided at its free end with a handle 19 and may be bent to any suitable shape for most convenient use as described below. Bolt 20 may be used to provide the pivotal connection between frame 11 and the lever 18.

Opposite the clutch plate 17 there is pivotally attached to the lever 18 another clutch plate 21. For example, clutch plate 21 may have a central lug or ear 22 fixed to it and the bolt or rivet 23 may provide the pivotal connection between lever 18 and the lug 22. The clutch plates 17 and 21 are preferably somewhat flared outwardly at both their forward and rearward ends. This permits the rope to slide freely through the clutch plates while they do not frictionally engage the rope, and also the flared forward sections of the plates provide for automatic disengagement, as described below.

Near its rear portion, frame 11 is provided with a curved bar 24 which projects laterally from the

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frame 11 and has one end secured to the frame as by means of the bolt 25. To hold the bar 24 in proper position, brace 26, bolted to the supporting bar and also to the frame 11, may be provided. These members may be made adjustable in any suitable fashion to accommodate persons of different size and to hold them at different angles. The bar 24 when properly adjusted provides a back rest or propelling member to support the body of the skier and propel him up the hill.

In the operation of this device, the lever 18 is opened wide so that the clutch plates 17 and 21 can be placed around the rope and the hooks 12 and 13 are hooked over the rope. As long as the lever 18 is held out at a substantial angle to the rope, the rope will slide freely through the hooks 12 and 13 and between the clutch plates 17 and 21, allowing the skier time to arrange himself in position with the bar 24 against his back. When the skier is ready to be towed up the hill, he simply grasps the handle 19 of the lever 18 and pulls it in toward the rope. By reason of the substantial mechanical advantage of this lever, the clutch plates 17 and 21 are squeezed together on the rope and as more and more pressure is applied, the skier begins to move with the rope. Due to the frictional nature of the engagement of clutch plates on the rope, however, the skier starts slowly without shock or any sudden wrenching, and at all times has the towing device under his individual control. If the skier ahead of him falls, or if he himself is in any danger of falling, handle 19 may be moved outwardly loosening the grip of the device on the rope and allowing the skier to wait or adjust his position as necessary before continuing. If desired, the lever 18 may be provided with a spring causing it to release the clutching plates automatically upon manual release of the handle 19 by the skier. Ordinarily, however, this is not necessary.

The hook 13 preferably has a tapered back end to prevent one skier from overrunning another when using the tow. Thus, if one skier approaches too close to the person ahead of him on the tow, the flared forward portions of the clutch plates 17 and 21 engage the tapered back end of the hook 13 and thus the clutch plates of the overrunning skier are released from the rope, stopping his forward progress and preventing an accident.

A similar safety device may be employed at the upper terminus of the ski tow. At this point, the rope may pass through a device such as illustrated in Figures 9 and 10. Essentially, this device consists of a fixed pedestal 27, carrying at its upper end a housing 28 provided with an open slot 29 at its top. Mounted for reciprocation in the housing is a base 30 supporting a pair of sleeve members 31 and 32 bolted together to surround the rope 10. The forward ends of the members 31 and 32 extend a sufficient distance from the pedestal 27 and are tapered as shown at 33 to engage and release the friction clutch plates 21 and 21 of a towing device approaching the upper terminus. The sleeve members provide between them a sufficiently large opening for the rope to pass through freely. A coil spring 34 may be mounted between the base 30 and the housing 28 to permit limited movement of the members 31 and 32 and thus absorb some of the shock if a skier unwittingly approaches the safety wedge without releasing the clutch plates of his towing device.

When the towing device arrives at the upper terminus of the ski tow, it can be disengaged from

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the rope by opening the clutch plates 17 and 21 and removing the hooks 12 and 13 from the rope. The device can then be returned readily to the lower terminus by simply hooking the hooks 12 and 13 over the rope on the down hill side, or suitable snaphooks or other removable fittings may be used for this purpose.

In order to provide for adjustability of the device to different sizes of rope, which may be used in different tows, adapter plates such as illustrated in Figures 5 and 6 may be used. In this case, both or either of the clutch plates 17 and 21 may be fitted with internal liner or adapter plates 35 suitably arranged to fit over the inner surfaces of the clutch plates 17 and 21, thereby reducing the diameter of the passage between them. These adapter plates 35 may be held in place in any suitable manner by means of bolts, snap fittings, or may be simply peened over the ends of the clutch plates as shown in the drawings.

A modified form of lever operated friction clutch plates is illustrated in Figures 7 and 8. This device consists simply of a pair of clutch plates 36 and 37 flared at their leading and trailing ends as previously described and having a chain, rod, rope or other towing member 38 attached at one end of the plates and preferably provided with suitable hook 39 which the skier can engage in his belt or clothing.

The frictional engagement of these clutch plates with the rope is secured by means of two levers 40 and 41, each of which is pivotally mounted on the lower clutch plate 36, the lever 40 being pivotally mounted on the near side of the plate 36 as seen in the drawings, and the lever 41 being pivotally mounted on the far side of the clutch plate 36. The lever 41, in order to hold the parts in assembled relationship, may also be pivotally attached to the plate 37 by the pin 42. Lever 40 preferably is arranged to bear on a lug 43 protruding from the side of the plate 37. These levers have forward extensions provided with laterally extending arms 44 and 45, respectively.

Thus, downward pressure against the extensions 44 and 45 causes the clutch plates 36 and 37 to engage the tow rope 10. The bottom clutch plate 36 may be formed with suitable protuberances 46 and otherwise shaped to fit the heels of the hands of a skier. Thus, the skier can operate this device by placing both hands around the clutch plates 36 and 37 so that his thumbs are in a position to press down the extensions 44 and 45 of the levers 40 and 41.

This hand gripping arrangement is very similar to the embodiment of my invention previously described because in each case levers of substantial mechanical advantage are used to make it easier for the skier to apply a gripping pressure on the rope. Such devices take hold of the tow rope smoothly and gradually instead of suddenly, thus making it easier for the skier to keep his balance at the start of the tow. At the same time, if a skier being towed falls or has trouble managing his skis, it is easy for those behind him to release their grip or pressure on the towing device and permit the rope to slide through the clutch plates more or less so as to prevent overrunning the skier ahead.

The device illustrated in Figures 7 and 8 may likewise be disengaged from the rope at the upper terminus of the tow by simply lifting the extensions 44 and 45 to release the clutch plates from the rope. The device may then be suitably

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hooked over the return or down hill portion of the tow rope to return the device to the foot of the hill for use by the next skier.

A particular advantage of the towing devices constructed according to my invention is that they may be readily applied to existing ski tows and are adapted for use on the simpler, less expensive forms of ski tows. At the same time, they provide the skier with an easy means of making the ascent which is under his individual control at all times. Also, of course, they greatly simplify for the skier the procedure of being towed uphill and are far less tiring and troublesome than gripping the rope by hand.

The terms and expressions which I have employed are used as terms of description and not of limitation, and I have no intention, in the use of such terms and expressions, of excluding any equivalents of the features shown and described or portions thereof, but recognize that various modifications are possible within the scope of the invention claimed.

It is claimed:

1. In a rope tow device, a plurality of friction members arranged to engage and disengage a towing rope, a lever connected to said members and operated entirely by hand to force said members to engage said rope with a pressure depending entirely upon the manual pressure applied to said lever, and means attached to at least one of said members adjacent the rear portion thereof and near its point of engagement with the rope for pulling a person in the direction said rope is moving.

2. In a ski tow device, a pair of friction clutch plates arranged to squeeze the tow rope therebetween, a lever connected to the plates to provide a substantial mechanical advantage for forcing the plates to squeeze said rope and positioned for manual operation by a person being towed so that the pressure of the plates on the rope is determined entirely by said person, and means attached to a rear portion of only one of the plates at a point adjacent the rope for towing said person when the plates engage the rope.

3. In a ski tow device, a pair of friction clutch plates arranged to squeeze the tow rope therebetween, a lever connected directly to said plates for forcing them toward each other and having a handle portion positioned for manual operation by a person being towed, and a back rest bar attached to the other of said plates for towing said person when the plates engage the rope.

4. In a ski tow device, a pair of friction clutch plates arranged to be clamped on a tow rope, a lever connected to the plates to provide a substantial mechanical advantage and positioned for manual operation by a person being towed to cause said plates to engage the rope, and a pulling member attached to at least one of said plates adjacent the rope and entirely independently of said lever for connecting them to the person to be towed, said plates being released automatically from clamping position upon manual release of said lever.

5. In a ski tow device, a frame arranged to be supported on a towing rope, a friction clutch plate secured thereto, a cooperating friction clutch plate, a hand operated lever pivotally secured to the frame and associated with said cooperating clutch plate for forcing said plates together to squeeze the tow rope therebetween, and a member secured to said frame for propelling a skier in the direction said frame moves.

6. In a ski tow device, a frame arranged to be

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supported on a towing rope, a friction clutch plate secured thereto, a cooperating friction clutch plate, a hand operated lever pivotally secured to the frame and associated with said cooperating clutch plate for forcing said plates together to squeeze the tow rope therebetween only to the extent of manual pressure applied to said lever, and a member secured to said frame for propelling a skier in the direction said frame moves, said frame and plates being completely removable from the rope.

7. In a ski tow device, a pair of cooperating friction clutch plates for engaging a tow rope therebetween, a pair of hand operated levers pivotally secured to one of said plates and acting on the other plate for causing said plates to squeeze said rope, and a pulling member attached to one of said plates to connect the device to the clothing of a skier.

8. In a ski tow device, a pair of friction clutch plates arranged to be clamped on a tow rope, a lever pivotally connected to said plates to provide a substantial mechanical advantage and having a handle portion positioned for manual operation by a person being towed to cause said plates to engage and disengage the rope, and means attached to at least one of the plates entirely separate from said lever for towing said person when the plates engage the rope, said device being completely removable from the tow rope upon release of said plates.

9. In a ski tow device, a pair of friction clutch plates arranged to be clamped on a tow rope, a lever connected to said plates to provide a substantial mechanical advantage and having a handle portion positioned for manual operation by a person being towed to cause said plates to engage and disengage the rope, and means attached to at least one of the plates entirely independently of said lever for towing said person when the plates engage the rope, said plates having flared forward ends to spread and thereby release said plates upon striking a tapered obstruction.

10. In a ski tow device, a pair of friction clutch plates arranged to be clamped on a tow rope, a lever connected to said plates to provide a substantial mechanical advantage and having a handle portion positioned for manual operation by a person being towed to cause said plates to engage and disengage the rope, and means attached to at least one of the plates for towing said person when the plates engage the rope, said plates having adapter plates secured to their inner surfaces for adjusting the main friction plates to a smaller size tow rope.

11. A portable gripping device for engagement with a ski tow rope which comprises opposed friction plates having concave surfaces between which the rope is squeezed, at least one manually operated lever connected to both of said plates to enable the plates to be forced together with a substantial mechanical advantage, and means for towing a person attached to the device in such a manner that the drag of the person's weight is transmitted to the device at its rearward portion near where the plates engage the rope.

12. A portable gripping device for engagement with a ski tow rope which comprises a pair of friction plates arranged to squeeze the tow rope therebetween, a manually operable lever having one end pivotally connected to one plate and having an intermediate portion bearing on the other plate to force the plates together on the rope, and means for towing a person attached to the rear portion of said one plate.

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13. A portable gripping device for engagement with a ski tow rope which comprises a pair of friction plates arranged to squeeze the tow rope therebetween, a pair of levers pivotally connected at one end to one plate with intermediate portions bearing on the other plate so that manual pressure on the free ends of the levers squeezes the plates against the rope, and a pulling means attached to the rear of one of said plates.

14. A gripping device as defined in claim 13 in which the two levers are on opposite sides of the plates.

15. A portable gripping device for engagement with a ski tow rope which comprises opposed friction plates having concave surfaces between which the rope is squeezed, a frame member attached to one plate and extending along the rope, a hand lever pivotally attached to the frame and having an intermediate portion bearing against the other plate so that manual pressure on the

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lever squeezes the plates on the rope, and means attached to the frame rearwardly of said plates for propelling a skier.

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