

M. H. FISCHER.
GRIPPING DEVICE FOR RODS, TUBES, AND THE LIKE.
APPLICATION FILED DEC. 11, 1906.

1,031,637.

Patented July 2, 1912.

3 SHEETS—SHEET 1.

Fig. 1.

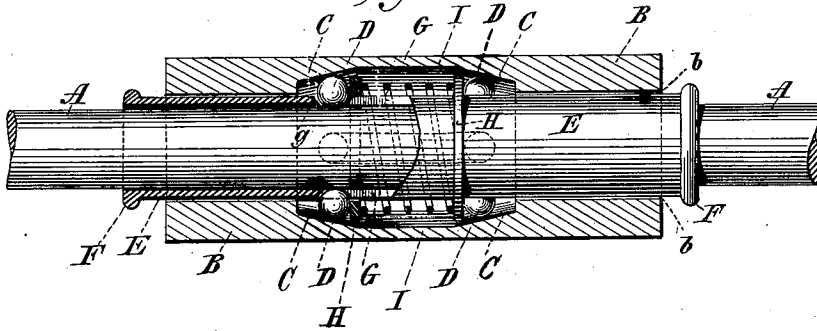


Fig. 2.

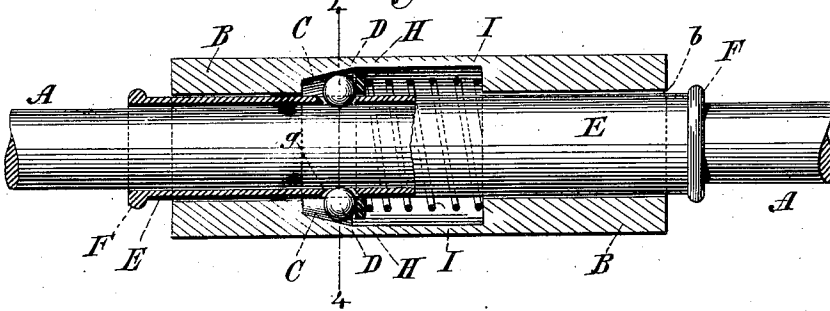


Fig. 3.

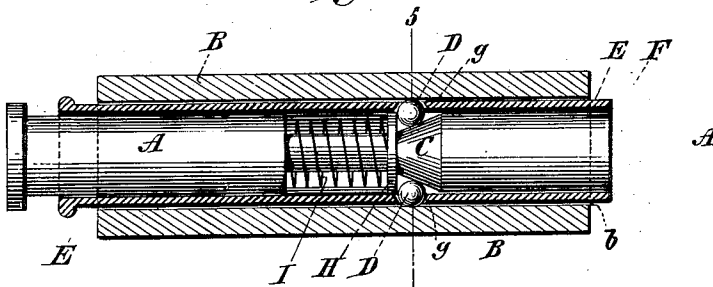


Fig. 4.

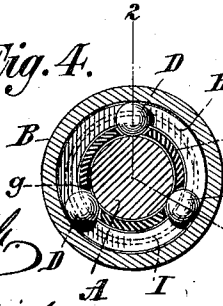
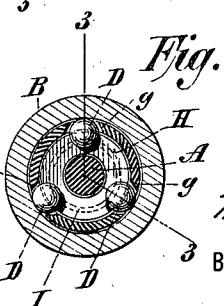


Fig. 5.



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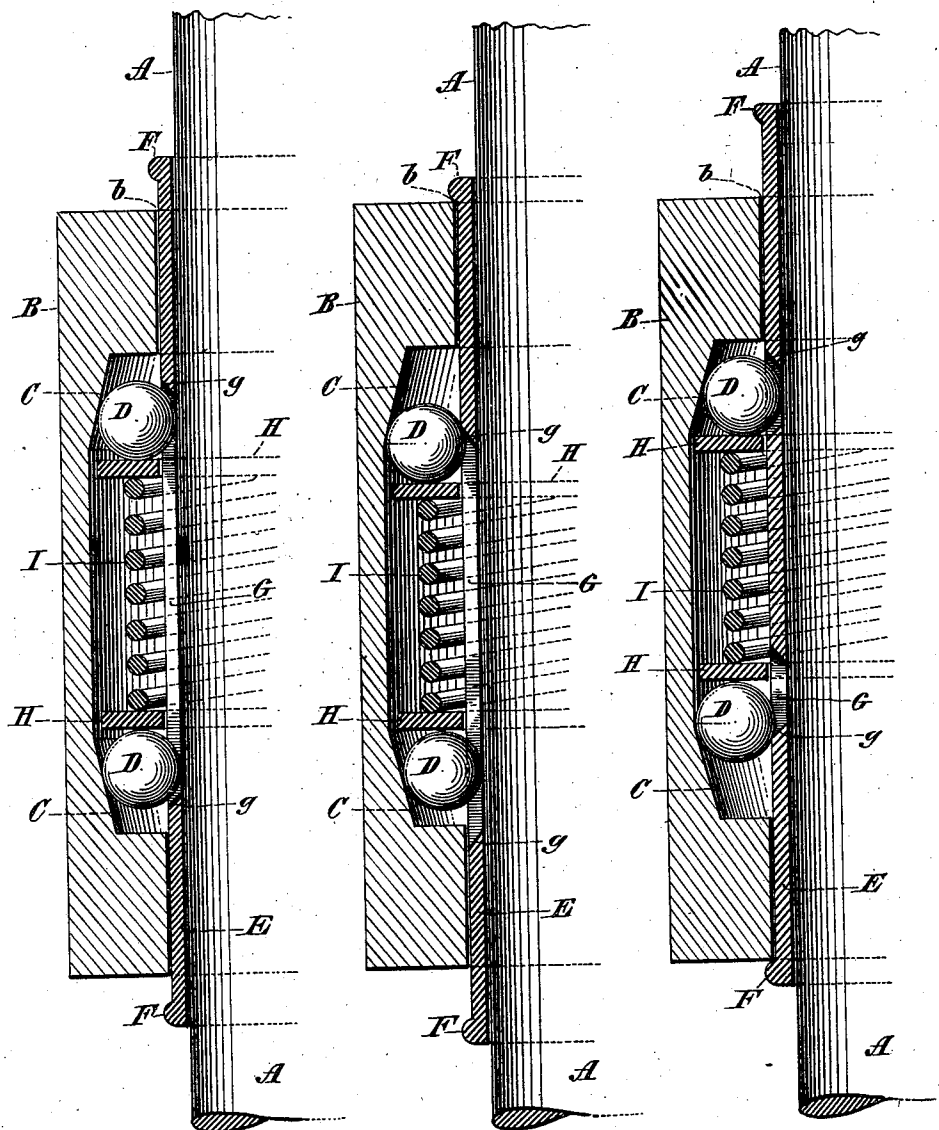
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3 SHEETS—SHEET 2.

Fig. 6.

Fig. 7.

Fig. 8.



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3 SHEETS-SHEET 3.

Fig: 9.

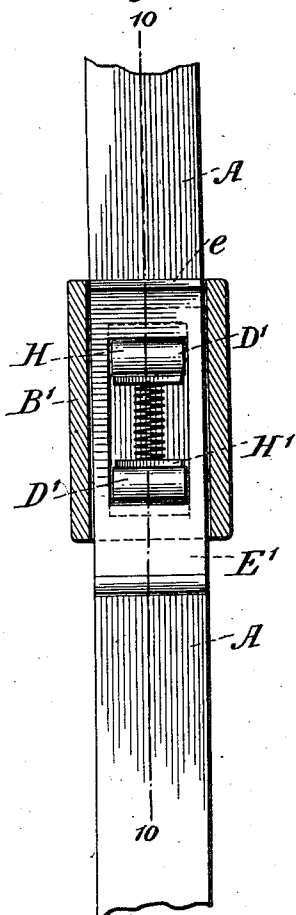


Fig: 10.

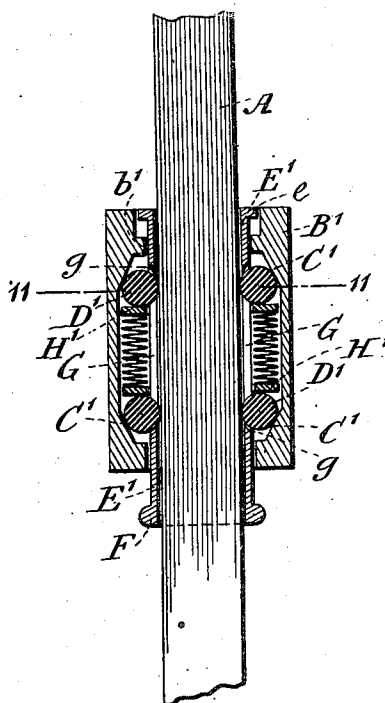


Fig: 12.

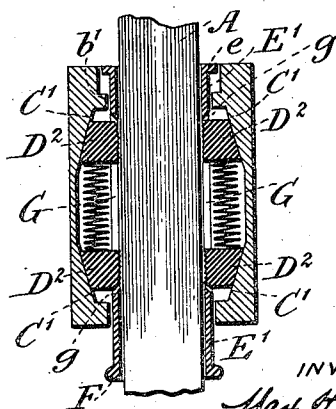
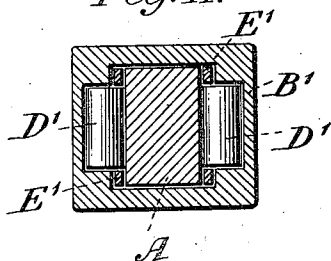


Fig: 11.



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UNITED STATES PATENT OFFICE.

MAX H. FISCHER, OF EAST ORANGE, NEW JERSEY.

GRIPPING DEVICE FOR RODS, TUBES, AND THE LIKE.

1,031,637.

Specification of Letters Patent.

Patented July 2, 1912.

Application filed December 11, 1906. Serial No. 347,270.

To all whom it may concern:

Be it known that I, MAX H. FISCHER, a citizen of the United States, residing at East Orange, in the county of Essex and State of New Jersey, have invented certain new and useful Improvements in Gripping Devices for Rods, Tubes, and the Like, of which the following is a specification.

My invention relates to gripping or clutching devices and especially to a device which is designed for automatically interlocking two parts at any suitable point of adjustment when the same are moved lengthwise relative to each other.

By my invention I produce a quick-acting gripping device which will so interlock in one direction only, or which may be constructed so as to interlock in either direction desired, and which will be comparatively simple, durable and cheap, and which can be easily and quickly manipulated from a suitable place, while permitting the gripping mechanism to be entirely inclosed, thus leaving no open space for the accumulation of dust and dirt.

Similar letters of reference refer to similar parts throughout the drawings.

In the accompanying drawings, Figure 1 is a longitudinal section of my improved device, the inclosing casing and operating stem being partially broken away; Fig. 2 is a similar section of a modified form showing the device gripping against movement in one direction only; Fig. 3 is a longitudinal section of another modified form; Fig. 4 is a cross-section on the line 4-4 Fig. 2; Fig. 5 is a cross-section on the line 5-5 Fig. 3; Fig. 6 is a partial section on an enlarged scale; Fig. 7 is another partial section on an enlarged scale; Fig. 8 is a modification on an enlarged scale; Fig. 9 is an elevation of another modification of my device, having the casing partly broken away; Fig. 10 is a section on the line 9-9 of Fig. 9; Fig. 11 is a cross-section on the line 11-11 of Fig. 10; and Fig. 12 is another modification.

In the drawings, A represents the rod or other member to be gripped.

B represents a casing, which is preferably in the form of a hollow cylinder and is provided with internal conical faces C, which taper toward the hole or bore *b*, which hole or bore preferably extends from end to end of the casing B, and is of the same size or diameter throughout its length. The conical

faces C are not essential, as one or more inclined faces will serve the purpose.

D indicates rolling grippers which ride upon the conical faces C and are interposed between the member to be gripped and said conical faces. The number and shape of the gripping devices may be varied, three balls or spheres riding on each of the inclined faces being preferred, as illustrated in the forms of the device shown in Figs. 1 to 8 inclusive.

E is an operating stem, preferably in the form of an intervening tube or tubular sleeve, which slides in the hole or bore *b* of the casing and preferably extends beyond both ends thereof. Each end of this intervening tube or sliding sleeve is provided with a knob or handle F which, besides its usual function, acts as a stop for limiting the sliding movement of the said operating stem with relation to the casing B. More than one knob is not desirable in some cases and the knob at either or both ends may be dispensed with, any suitable stop for limiting the movement of the stem being substituted. Said operating stem E is also provided with apertures G of such size and so placed that the grippers E will be permitted to impinge against the member to be gripped when the operating stem is in one position and that the endwise edges *g* of said apertures will slide in between the grippers and the member to be gripped, roll back said grippers out of gripping contact, and finally result in cutting off the said grippers when said operating stem is moved to its other position. The apertures shown in Figs. 1, 3, 6 and 7 are in the form of longitudinally disposed slots long enough to accommodate opposite grippers, while in Figs. 2 and 8 separate holes for each gripper are shown.

When more than one set of grippers, operating upon divergent or convergent conical faces are employed, as shown in Figs. 1, 6, 7 and 8, the endwise edges *g* of the apertures G will be so located as to permit the grippers riding upon one inclined or conical face to impinge or grip while simultaneously cutting off the grippers riding upon the opposite inclined or conical face. These apertures are preferably of a size sufficiently large to permit the grippers to protrude and freely to grip or impinge, but not sufficiently large to permit them to fall out.

H indicates spring-pressed washers or

plungers which abut against the rolling grippers at one side and normally force said grippers toward the narrow end of the conical faces C. These washers, however, are not essential as the spring or springs may be made to abut against the grippers directly. Any suitable spring may be employed for this purpose, the spiral spring J being shown arranged around the operating stem.

The operation of the device is as follows: Assuming the parts to be in the positions shown in Figs. 1 and 6, the member A is locked against movement in either direction. When the knob at one end is pulled, or the knob at the other end is pushed, the edges *g* at one end of the apertures G slide in between the rolling grippers and the member A, rolls said grippers back into the wider space on the conical face, finally cutting off contact between the grippers at one end of the device and the member A, whereupon the member A may be moved in the direction opposite to that in which the operating stem is pushed or pulled, while it remains interlocked against movement in the other direction. Thus in Fig. 7 the operating stem is shown as pushed or pulled downward and the member A released against upward movement but locked against downward movement. To move the member A in the opposite direction, it is only necessary to again manipulate the operating stem to the position shown in Fig. 8, when the member A may be freely moved downward but not upward.

Fig. 2 shows a modification of the device interlocking against movement in one direction only. The operation is substantially the same as that described above.

In Fig. 3 another modification is shown in which the conical faces on which the rolling grippers ride are formed in the member A instead of in the outer member and is designed to grip the inside of a tube or other hollow member. When it is desired to withdraw the tube, the knob F is engaged and pulled, whereupon the tube may be withdrawn.

Figs. 9, 10 and 11 show a slight modification of the device in which the member to be gripped and the casing are rectangular in cross-section. In said figures, the casing B¹ is provided with inclined faces C¹, between which and the member to be gripped are interposed rollers D¹ instead of balls, and the intervening member is a plate E¹. Knobs are provided at only one end of this modification, a shoulder *e* reciprocating in a recess *b*¹ formed in the bore of the casing acting as a stop to limit the relative movement of the plate to the casing in one direction. H¹ indicate spring-pressed plungers, which abut against the rollers and normally force them toward the narrow end

of the inclined faces. The other parts of the device are substantially identical and the operation is the same as that of the device shown in Figs. 1, 6, 7 and 8.

Fig. 12 illustrates another modification in which the wedges D² are substituted for the balls or rollers of the other constructions.

What I claim and desire to secure by Letters Patent, is:

1. The combination of two members, one being tubular and the other extending within the same, one of said members being movable longitudinally with respect to the other, and the relatively non-movable member having an inclined surface, a gripping device for engaging the inclined surface and an opposing surface on the movable member; a spring for normally pressing the gripping device into contact with said surfaces and a sleeve movable longitudinally of the non-movable member and having a beveled edge adapted upon longitudinal movement to intervene between the gripping device and the movable member, whereby the gripping device is moved laterally and longitudinally at the beginning of movement of the same to release the movable member.
2. The combination with a tubular member of another member arranged within the same—one member being movable longitudinally with regard to the other, an inclined surface arranged near each end of one of said members, a gripping device arranged intermediate each inclined face and the surface of the other member, means adapted normally to maintain each of said gripping devices in engagement with said last mentioned member to prevent movement thereof in either direction, and operating means adapted upon alternate movement in opposite directions alternately to release each of the gripping devices to permit movement of the movable member alternately in one direction but not in the other.
3. The combination of two members, one being tubular and the other extending within the same—one member being movable longitudinally with respect to the other, and the relatively non-movable member being provided with oppositely inclined surfaces, a gripping device arranged intermediate each inclined surface and the surface of the other member; means adapted normally to maintain each of said gripping devices in engagement with the movable member to prevent movement in either direction, and operating means consisting of a sleeve movable longitudinally of said members, having a beveled-edge elongated aperture contiguous to each of the gripping devices the edge of such apertures being adapted upon movement in opposite directions alternately to intervene between the gripping

devices and the movable member whereby the gripping device on one incline will be removed out of contact with the movable member while the gripping device on the opposite incline remains in gripping contact.

4. The combination with a tubular member, of another member arranged within the same,—one member being movable longitudinally with regard to the other, an inclined surface near each end of one of said members, a plurality of gripping devices arranged intermediate each inclined face and the surface of the other member and substantially encircling the inner member, means adapted normally to maintain each

set of said gripping devices in engagement with the movable member to prevent movement thereof, and operating means adapted on movement in opposite directions alternately to remove and maintain one set of gripping devices out of contact with the movable member but to leave the other set of gripping devices in gripping engagement therewith.

In witness whereof, I have signed my name to the foregoing specification in the presence of two subscribing witnesses.

MAX H. FISCHER.

Witnesses:

H. R. BAUER,
JOS. F. O'BRIEN.