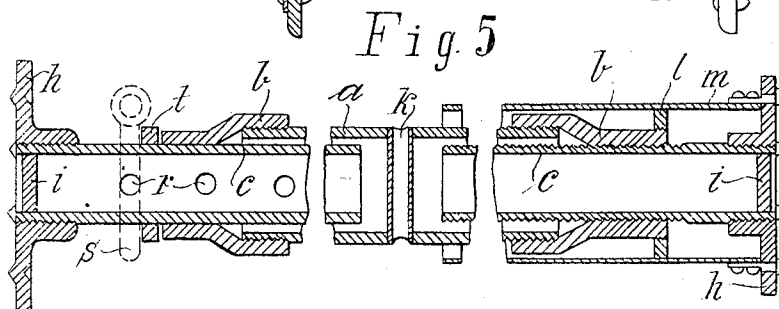
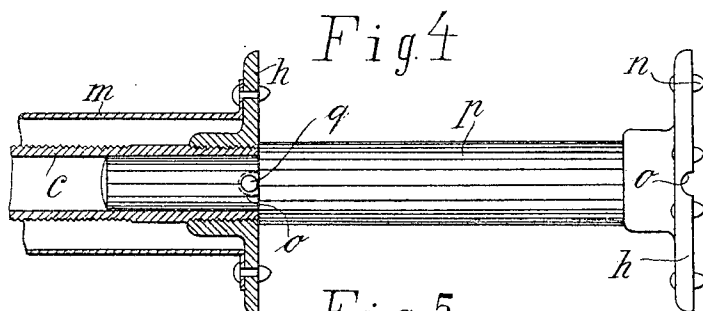
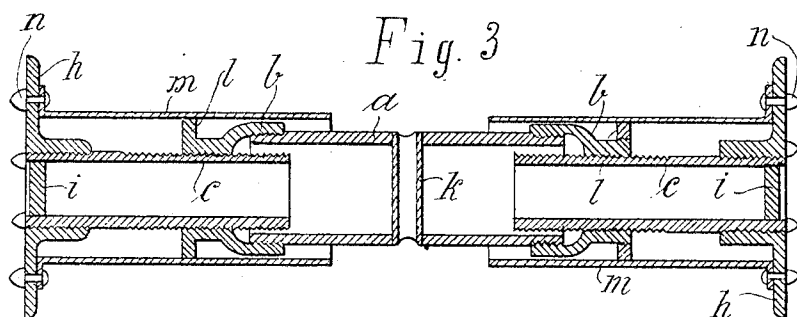
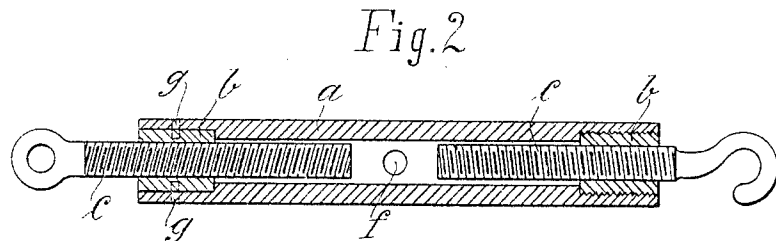
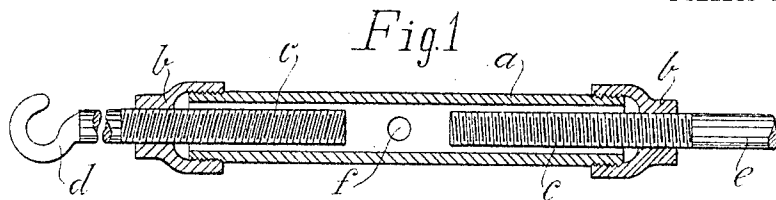


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APPARATUS FOR FORMING STAYS AND FOR CONNECTING STRUTS.

APPLICATION FILED NOV. 4, 1904.

2 SHEETS—SHEET 1.



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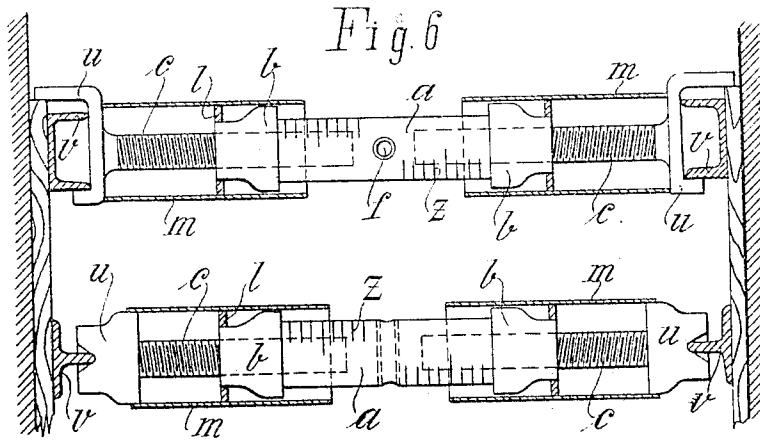


Fig. 7

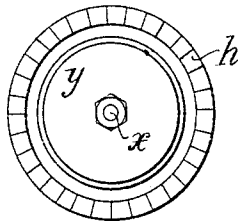


Fig. 8

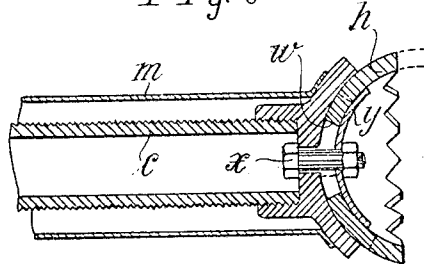


Fig. 9

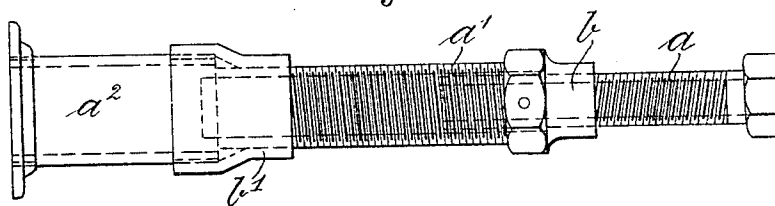
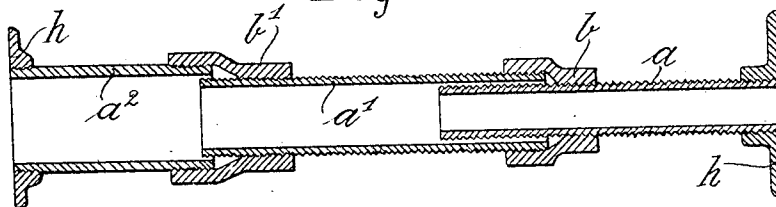


Fig. 10



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UNITED STATES PATENT OFFICE.

FRIEDRICH WILHELM WINTERHOFF, OF DÜSSELDORF, GERMANY.

APPARATUS FOR FORMING STAYS AND FOR CONNECTING STRUTS.

No. 804,696.

Specification of Letters Patent.

Patented Nov. 14, 1905.

Application filed November 4, 1904. Serial No. 231,369.

To all whom it may concern:

Be it known that I, FRIEDRICH WILHELM WINTERHOFF, engineer, a subject of the German Emperor, and a resident of 49 Kronprinzenstrasse, Düsseldorf-on-the-Rhine, Germany, have invented certain new and useful Improvements in Apparatus for Forming Stays and for Connecting Struts, of which the following is a specification.

The invention relates to struts which may be used for the purpose of adjusting the length of and of stretching wires, chains, wire ropes, tie-rods, and stays or of supporting props of trenches and the like; and its object is to provide means for securing the struts and their working mechanism against undue strain.

The improvement essentially comprises a tube-like member by which is inclosed the working mechanism and a special formation of the ends or heads of the struts.

The accompanying drawings show, by way of example, various suitable constructional forms of a strut embodying the invention.

Figures 1 and 2 are similar constructions of a strut for use with wires, chains, wire ropes, and the like in longitudinal section. Fig. 3 shows a strut adapted to support props of trenches in longitudinal section. Fig. 4 is a sectional view of the end of a strut of similar construction to Fig. 3, having a separate prolongation-piece attached to it. Fig. 5 is a modified constructional form of the strut shown in Fig. 3. Fig. 6 is a view of two struts having special iron pieces rigidly fixed to their heads. Figs. 7 and 8 are an end view and a longitudinal section, respectively, of a strut having special iron pieces movably and detachably fixed to their heads. Figs. 9 and 10 are a view and longitudinal section, respectively, of a strut used as a lifting-jack.

The construction shown in Figs. 1 and 2 is particularly applicable to struts for tie-rods or stays in iron structures, though it may be used as well for stretching chains, wires, ropes, and the like.

According to Fig. 1 the strut comprises one right and one left hand screw-threaded bolt *c*, of which one end terminates in a hook or eye *z*, while the other forms the end of a tie-rod *e*. Each of these bolts carries a likewise screw-threaded nut *b*, having an internally-screw-threaded flange, the two flanges being rigidly connected together by a tube *a*. For the purpose of effecting the actuation—that is, the rotation—of the tube *a*, a transverse hole *f* is

bored through its walls, in which a detachable pin may be inserted when it is desired to turn the tube *a*, upon which operation the nuts *b* turn also, thus drawing the bolts *c* either apart or together.

In Fig. 2 a modification in the arrangement of the nuts *b* is shown. Instead of being rigidly screwed upon the ends of the tube *a* the nuts screw in the bore of it or are simply fitted in and secured by mean of pins *g* to the tube *a*.

The construction shown in Figs. 3 to 8 may be preferably employed for struts serving as a support for props of trenches and the like.

The strut shown in Fig. 3 comprises the same arrangement of the tube *a* and nuts *b* as the construction shown in Fig. 1. In the nuts *b* screw right and left hand externally-screw-threaded tubes *c*, which at their opposite ends to their attachment are closed by stoppers *i* or the like to prevent earth or gravel from entering the interior of the tube *a* and tubes *c* and provided with rigidly-fixed flanges *h*, which abut against the props of the trenches and are prevented from slipping by pointed pins *n* or the like. To preserve the outer portions of the nuts *b* and tubes *c* from dirt and rust, a cylindrical guide *m* is attached to each flange *h*, which serves as a guard for the working mechanism and in which the nuts *b* are adapted to slide to and fro in plunger-like fashion through the medium of shoulders *l*, projecting from the nuts *b*. In order to actuate the working mechanism that is to turn the tube *a*, the latter instead of being simply perforated by a transverse hole, as at *f* in Fig. 1, carries in the middle a transversely-inserted pipe *k* for the purpose of preventing dirt and gravel from entering the interior of the tube *a*.

For the purpose of supporting props of very wide dimension with the strut shown in Fig. 3 prolonged pieces *p*, carrying also flanges *h*, with pointed pins *n*, may be employed, in which case the stopper *i* is dispensed with for allowing the piece *p* to be inserted in the hole formerly closed by the stopper. To prevent the prolongation-piece *p* from turning, projections *q* are provided for catching in corresponding notches *o*, disposed in the flange *h*, this construction being shown in Fig. 4.

Preferably, as shown in Fig. 5, only one tube *c* may be designed to screw into its nut *b*, while the other is slidably inserted in its nut *b*, in which case the latter serves as an ordinary guide, while its tube is provided with

transverse holes r , in one of which a bolt s may be inserted, abutting when the strut is used against an intermediary ring t .

Fig. 6 shows two struts for mounting special iron bars v on walls. For this purpose the flanges h are dispensed with and replaced by correspondingly-figured iron heads u , which catch into or over the iron bars, thus preventing them from slipping.

If necessary, flanges h may be constructed, as shown in Fig. 8, movably, so as to fit in walls of any inclination, this being accomplished by giving the flange hemispheric shape and adapting it to slide with its outer contours along a fixed correspondingly-shaped head, the head being provided for this purpose with a notch w , through which is inserted a screw-bolt x , attaching the loose flange to the fixed head through the medium of a counter-disk y .

The employment of the strut as a lifting-jack is shown in Figs. 9 and 10. As soon as the jack comes under load the two oppositely-screw-threaded tubes a and a' are, upon the nut b being turned, screwed apart or together, respectively, the tube a screwing into the nut b , which is rigidly fixed to the tube a' , while the latter screws into the nut b' , which is rigidly fixed to the base-tube a'' , the two ends of the struts terminating each in a fixed flange h .

Having thus fully described my invention, what I desire to secure by Letters Patent is—

1. In an apparatus of the character de-

scribed, the combination of a tube, a pair of oppositely-threaded nuts detachably secured on the ends of said tube, and a pair of oppositely-threaded bolts projecting into said tube and having their threads in engagement with the threads of the nuts.

2. In an apparatus of the character described, the combination of a tube, a pair of oppositely-threaded nuts each provided with a flange screwed into the exterior of the ends of said tube, and a pair of oppositely-threaded bolts projecting into said tube and having their threads in engagement with the threads of the nuts.

3. In an apparatus of the character described, the combination of a tube, a pair of oppositely-threaded nuts each provided with a flange screwed into the exterior of the ends of said tube, said nuts being provided with shoulders at their ends opposite the flanges, a pair of oppositely-threaded bolts projecting into said tube and having their threads in engagement with the threads of the nuts, and cylindrical guides connected to said bolts for sliding engagement with the shoulders of the nuts.

In witness whereof I have hereunto set my hand in presence of two subscribing witnesses.

FRIEDRICH WILHELM WINTERHOFF.

Witnesses:

PETER LIEBER,

WILLIAM ESSENWEIN.