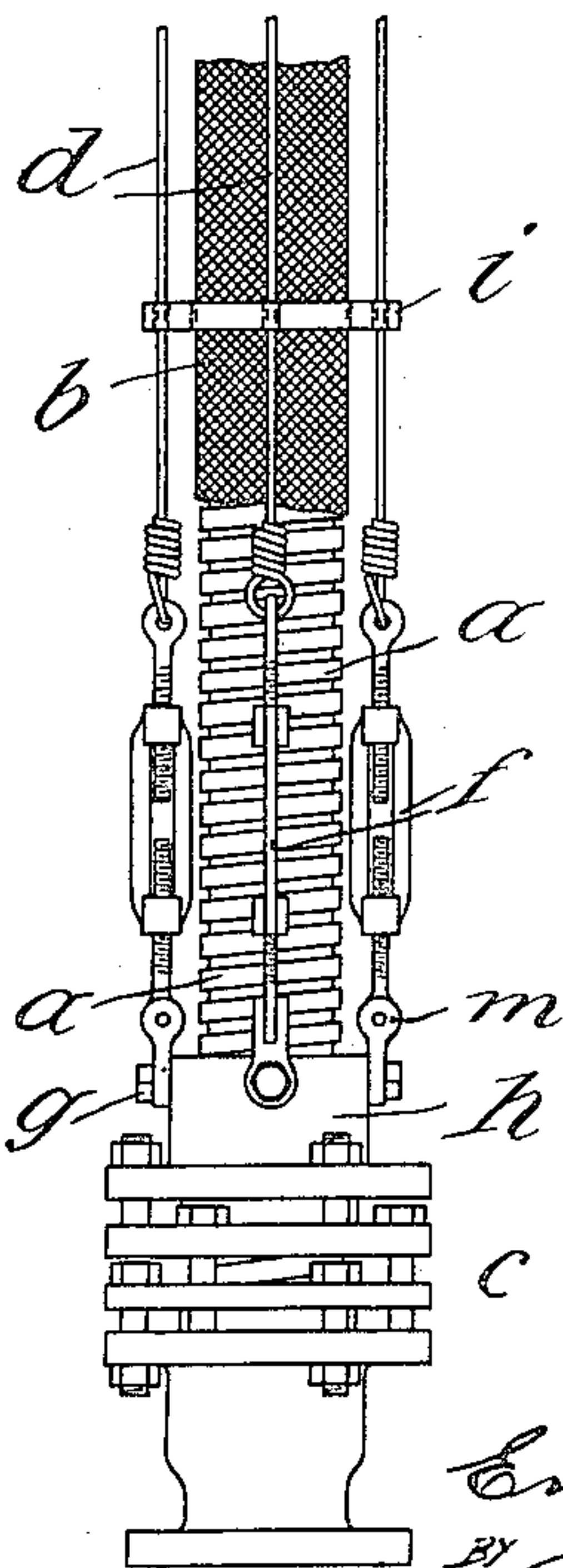
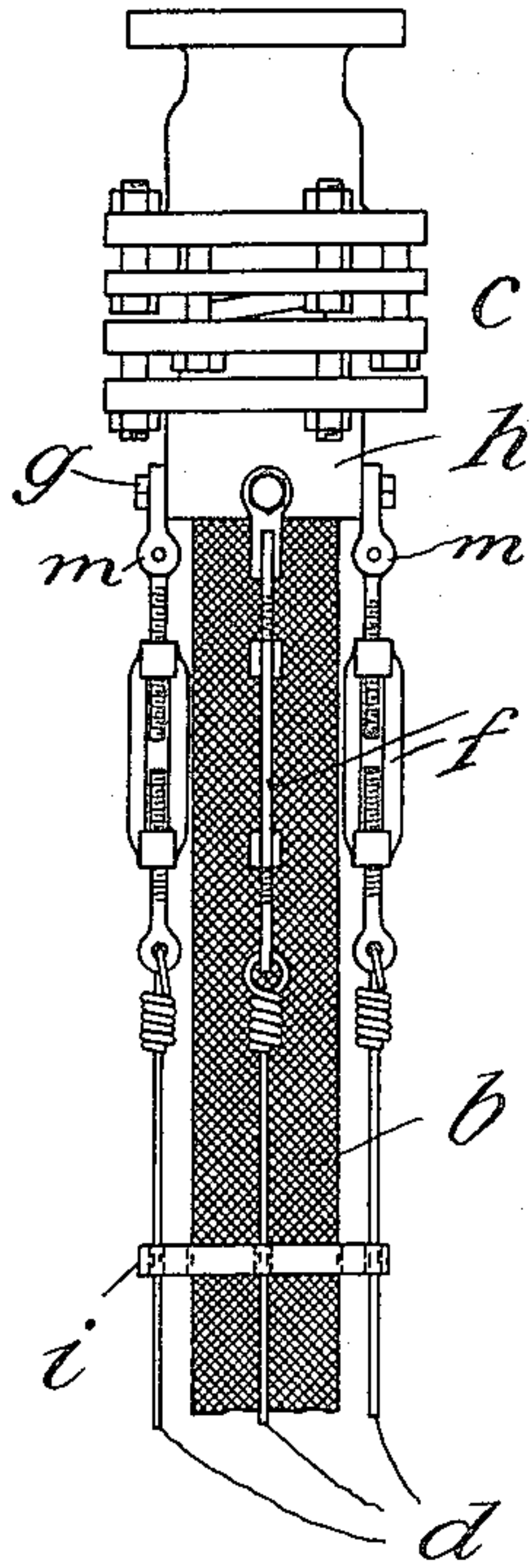


E. WITZENMANN.  
METALLIC SPIRAL HOSE.  
APPLICATION FILED OCT. 22, 1904.

993,934.

Patented May 30, 1911.



WITNESSES

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# UNITED STATES PATENT OFFICE.

EMIL WITZENMANN, OF PFORZHEIM, GERMANY.

## METALLIC SPIRAL HOSE.

993,934.

Specification of Letters Patent.

Patented May 30, 1911.

Application filed October 22, 1904. Serial No. 229,614.

*To all whom it may concern:*

Be it known that I, EMIL WITZENMANN, a subject of the Grand Duke of Baden, residing at 48 Holzgartenstrasse, Pforzheim, Germany, have invented certain new and useful Improvements in Metallic Spiral Hose, of which the following is a specification.

As is well known, it is chiefly in the direction of the longitudinal axis of the hose, that metallic spiral hose is most disadvantageously influenced by the internal pressure. As far as radial pressure is concerned, such hose is exceedingly resistant, since the radial pressure is exerted in the direction of the length of the metallic band. The pressure acting in the direction of the longitudinal axis of the hose, on the other hand, immediately it has reached a certain degree, either bends the engaging turned up edges, thus pulling the hose apart, or causes breaking off of one of the engaging edges of the spiral. For the purpose of overcoming these defects, even in the case of high pressures, various means have been devised; for instance a strong outside hose-covering has been employed, or strong wire-, or plaited-work armor provided. These means, however, have not proved reliable, as such outer covering or armor, no matter how strong, admit of a certain amount of extension, so that the hose gets broken, or otherwise injured, in spite of it.

According to my invention the extension of the hose in the direction of its length is limited by means of the connecting-pieces, applied in well-known manner to both ends of the hose, being connected by wires, bands, ropes, bars, rods, or the like, so that the said terminal connecting-pieces cannot separate from each other beyond a certain extent, that is to say, the spiral winding of the hose cannot be drawn upon in the direction of the longitudinal axis of the hose beyond a certain limit.

In the accompanying drawing the figure shows a part elevation of one form of construction of the new hose.

*a* is the actual hose, which may be protected by a plaited or like cover *b*. At each end of the hose *a* a connecting-piece *c*, in itself of well-known construction, is applied and connected by means of several wires *d*, (or in place of the latter by bands,

ropes, bars, rods, or the like), with the twin terminal connecting-piece applied to the opposite end of the hose.

In the construction here shown by way of example, the wires *d* are connected by means of screw-shackles *f* with jointed members *m* secured to the part *h* of the terminal connecting-piece by bolts *g*. In this manner the wires, ropes, or the like can be extended or stretched to the desired extent.

In the figure wires *d* are shown passing through perforated collars or rings *i*, pushed over the hose at certain distances apart, for the purpose of preventing the hose, stretched by the internal pressure, being bent or broken through between the wires *d*. Naturally the collars *i* may be replaced by wire or wire-rope, or the like being wound around the hose, which method proves particularly advantageous in the case of rigid rods being employed instead of wires *d*.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent is:—

1. A pipe conduit comprising a flexible pipe made of wound metal, a cover therefor, connecting pieces at the ends of said flexible pipe, a plurality of wires running parallel with the walls of said pipe and secured at the ends to said connecting pieces for preventing endwise movement of the pipe, and guiding rings located at intervals around said pipe and having eyes therein through which the wires pass.

2. A pipe conduit comprising a flexible pipe made of wound metal, a cover therefor, connecting pieces at the ends of said flexible pipe, a plurality of screw shackles connected to said connecting pieces, a plurality of wires running parallel with the walls of said pipe and secured at the ends to said screw shackles for preventing endwise movement of the pipe, and guiding rings located at intervals around said pipe and having eyes therein through which the wires pass.

In witness whereof I have hereunto signed name this ninth day of Sept., 1904. in the presence of two subscribing witnesses.

EMIL WITZENMANN.

Witnesses:

AD. EITERMANN,  
WM. HAHN.