PATENT SPECIFICATION

Application Date: Dec. 19, 1935. No. 35175/35. **464,708**

Complete Specification Left: Nov. 30, 1936.

Complete Specification Accepted: April 23, 1937.

PROVISIONAL SPECIFICATION

Improvements in or relating to Spring Forks for Motor-cycles

We, NORTON MOTORS LIMITED, a British Company, of Bracebridge Street, Birmingham, 6, and EDGAR MARTIN FRANKS, British Subject, of the Company's address, do hereby declare the nature of this invention to be as follows:—

This invention relates to improvements in spring forks for motor-cycles of the type in which a coiled compression spring is arranged between an abutment on the head and a second abutment on the forks which are connected to the head by links so that the spring alone or in conjunction with one or more auxiliary springs resiliently supports the load on the forks. Usually the ends of the spring are rigidly anchored to the abutments so that the compression and extension of the spring which take place as the forks move relative to the head are not truly axial movements of the spring and there is a tendency for the spring to be distorted so that some parts of the spring are more highly stressed than others and the spring is liable to fracture.

The object of our invention is to provide an improved method of mounting a compression spring in a spring fork whereby this difficulty is overcome and our invention consists in connecting the ends of the spring to abutments on the head and forks by means of ball-and-socket or similar joints which permit the spring to be compressed and extended in a truly axial direction at all times.

Preferably the axis or centre of each joint is set in some distance from the end of the spring and the end coils of the springs are rigidly anchored to the rocking part of the joint so that there is no tendency for the central parts of the spring to move laterally with respect to the axis of the spring as the spring is compressed under load.

In one preferred practical construction the spring is of barrel shape and the end coils at each end are engaged in a helical groove in a hollow sleeve or cap having a closed or domed inner end formed internally with a hemi-spherical socket part. The cap fits over an inwardly projecting stud which is rigidly secured in a lug on the steering head or forks, and this stud has an enlarged inner end of part-spherical form engaging the hemi-spherical socket in the cap. These two parts are retained in engagement by a tubular sleeve screw-threaded externally and screwed into an internal thread in the cap, the inner end of the sleeve having an annular part-spherical surface engaging with the outer side of the part-spherical head on the stud. The other end of the sleeve is coned or flared internally to allow the cap to rock freely on the stud. The stud is preferably drilled axially and a lubricator nipple is fitted in its outer end for lubricating the joint. As the end coils of the springs are engaged in a helical groove extending for the full length of the cap and the ball-and-socket joint is located at the inner end of the cap the axis of the joint is set in some distance from the end of the spring and the spring is held against any tendency to bow under load. When the groove in the cap to receive the spring coils is machined in the cap it is carried through to the outer end of the cap and an annular groove is machined at this end of the cap to receive a ring or washer which is held in place by swaging over the end of the cap and forms a stop for the outermost coil of the spring.

Dated the 18th day of December, 1935.
BARKER, BRETTELL & DUNCAN,
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COMPLETE SPECIFICATION

Improvements in or relating to Spring Forks for Motor-cycles

We, NORTON MOTORS LIMITED, a British Company, of Bracebridge Street, Birmingham, 6, and EDGAR MARTIN FRANKS, British Subject, of the Company's address, do hereby declare the nature of this invention, and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement:—

This invention relates to improvements

[Price 1/-]

in spring forks for motor cycles of the type in which a coiled compression spring is arranged between an abutment on the head and a second abutment on the forks which are connected to the head by links so that the spring alone or in conjunction with one or more auxiliary springs resiliently supports the load on the forks.

Usually the ends of the spring are rigidly anchored to the abutments or are secured to the inner ends of members connected at their outer ends by fork and eye or similar joints to the abutments, and the compression and extension of the spring which take place as the forks move relative to the head are not truly axial movements of the spring and there is a tendency for the spring to be distorted so that some parts of the spring are more highly stressed than others and the spring is liable to fracture.

The object of our invention is to provide an improved method of mounting a compression spring in a spring fork whereby this difficulty is overcome, and our invention consists in connecting the ends of the spring to abutments on the steering head and fork by means of universal or pivoted joints of which the axes are set in some distance from the ends of the spring so that there is no tendency for the central parts of the spring to move laterally with respect to the axis of the spring as the spring is compressed under load, and the spring will be compressed and extended in a truly axial direction at all times.

Two practical methods of mounting a compression spring in a motor cycle fork in accordance with our invention have been illustrated by way of example in the accompanying drawings in which:—

Figure 1 is a sectional side elevation of a complete form showing one method of mounting the main compression spring.

Figures 2 and 3 are two sections taken in planes at right angles to each other of one end of a spring showing an alternative method of mounting.

In the construction shown in Figure 1 *a* is the fork which is carried from the steering head *b* in the usual way by pairs of upper and lower links *c*, *d*, the forward pivots of the lower links carrying frictional shock absorbers *e*. The load on the fork is supported by a coiled compression spring *f* extending between an abutment on the upper end of the steering head and an abutment on the fork in front of the lower link pivot, and it is with the anchorages for the ends of the spring *f* that the invention is concerned.

The spring is of barrel shape with the end coils of less diameter than those in the middle, and the end coils at each end are engaged in a helical groove on the surface of a hollow cylindrical sleeve or cap *g* having a closed or domed inner end formed internally with a hemi-spherical socket part *h*. The cap *g* fits over a stud *j* having at its inner end an enlarged head *k* of part-spherical form engaging with the hemi-spherical socket in the cap. These two parts are preferably held in engagement by a sleeve or collar *l* which is screw-threaded externally and is screwed into the cap *g*, the inner end of the sleeve having an annular part-spherical surface *m* engaging with the outer side of the head *k* on the stud. The outer end of the sleeve *l* is coned or flared internally to allow the cap to rock freely on the stud which is drilled axially and fitted with a lubricator nipple *n* at its outer end for lubricating the joint.

The stud *j* at the upper end of the spring is rigidly secured in a lug *p* on the upper end of the steering head by means of a nut *q* screwed on to the end of the stud and drawing a tapered part of the stud into a tapered socket in the lug.

The stud *j* at the lower end of the spring is similarly secured in a lug *r* on the fork in front of the forward pivot of the lower links.

As the end coils of the spring are engaged in the helical groove in the cap *g* which extends for the full length of the cap and the ball-and-socket joint is located at the inner end of the cap, the axis of the joint is set in some distance from the end of the spring and the spring is held against any tendency to bow under load. The helical groove on the cap which receives the spring coils is carried through to the outer end of the cap and an annular groove is machined at this end of the cap to receive a ring or washer *s* which is held in place by swaging over the end of the cap and forms a stop for the outermost coil of the spring.

It is not essential that the ends of the spring should have a universal movement with respect to their anchorages as most of the distortion of the spring tends to take place in a vertical plane containing the axes of the steering head and the spring, and Figures 2 and 3 show a modified form of spring anchorage which allows the ends of the spring to rock in that plane with respect to their anchorages.

In this construction the end coils of the spring are engaged in a helical groove on the outer surface of a member *t*, a stop for the end coil being formed

by a nut *u* screwed on to the outer end of the member and backed by a lock-nut. The outer end of the member *t* is hollow, and extending through it is a stud *v* terminating at its inner end in an eye *w* which enters a transverse slot in the inner end of the member between upstanding lugs *x*. A pivot pin *y* passing through the lugs *x* and eye *w* pivotally connects the member *t* to the stud and is retained by spring rings *z* sprung into grooves in the ends of the pin.

Having now particularly described and ascertained the nature of our said invention, and in what manner the same is to be performed, we declare that what we claim is:—

1. A method of mounting a compression spring in a spring fork for motor cycles consisting in connecting the ends of the spring to abutments on the steering head and fork by means of universal or pivoted joints of which the axes are set in some distance from the ends of the spring.

2. A method of mounting an end of a compression spring in a spring fork for motor cycles consisting in engaging the end coils of the spring in a helical groove in a cap or like member of substantial length and connecting the cap or like member to a rigid anchorage on the steering head or fork by a ball-and-socket or pivoted joint of which the axis is set in some distance from the end of the spring.

3. A method of mounting an end of a compression spring in a spring fork as claimed in Claim 2 in which the cap with which the end coils of the springs are engaged has at its inner end a hemispherical socket part co-operating with a head of part-spherical form on the inner end of a stud over which the cap fits and which is rigidly secured to the steering head or fork, and the two parts may be held in engagement by a sleeve screwed into the outer end of the cap and having a part-spherical inner end co-operating with the outer side of the head on the stud.

4. A method of mounting one end of a compression spring in a spring fork as claimed in Claim 2 in which the cap with which the end coils of the spring are engaged is transversely slotted at its inner end to receive an eye on the inner end of a stud over which the cap fits and which is rigidly secured to the steering head or fork, and the cap is pivotally connected to the stud by a pin passing through the cap and eye.

5. A spring fork for motor cycles having a compression spring mounted by the method claimed in any of the preceding claims.

6. The spring fork for motor cycles substantially as described with reference to the accompanying drawings.

Dated the 24th day of November, 1936.

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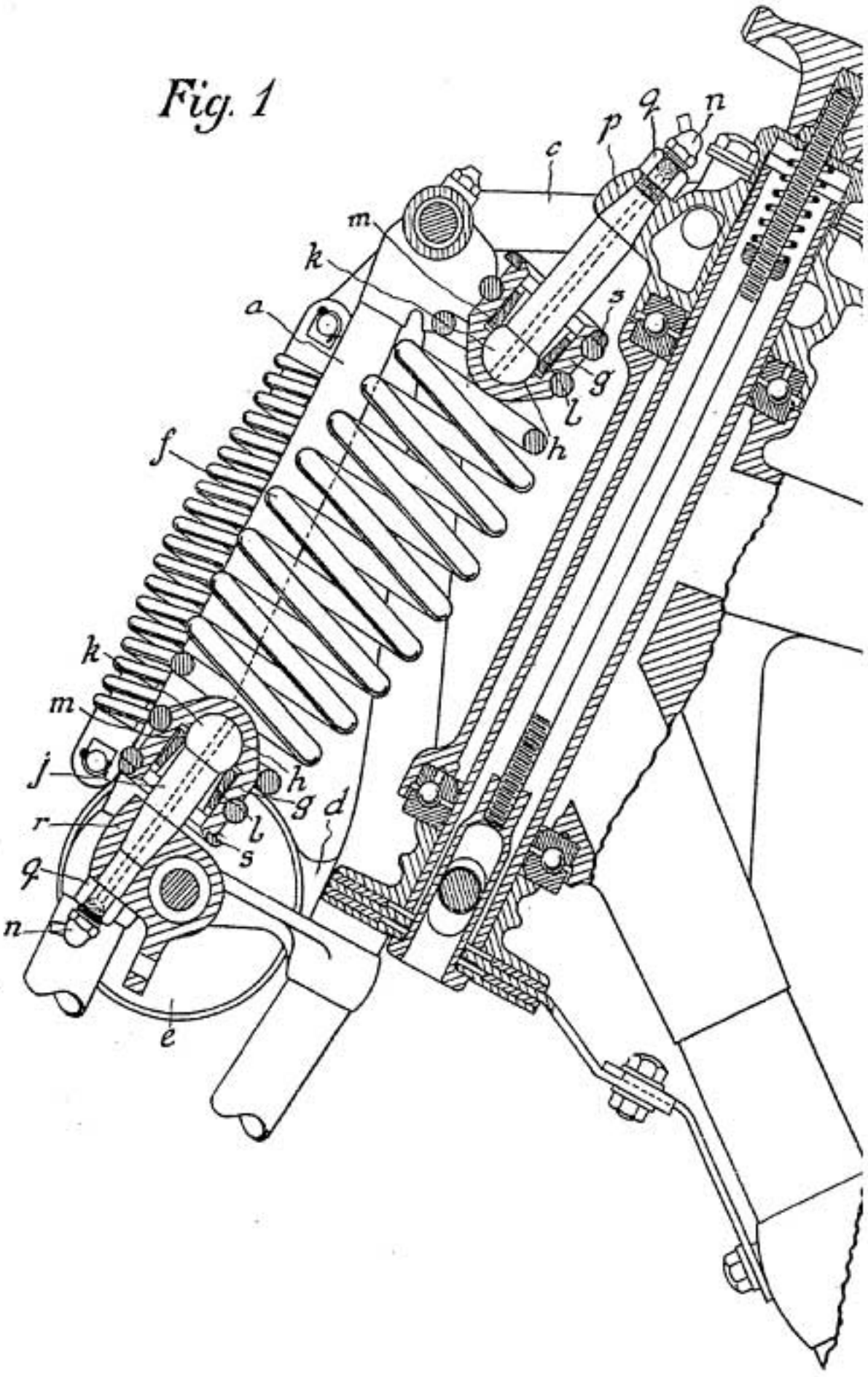
Fig. 1



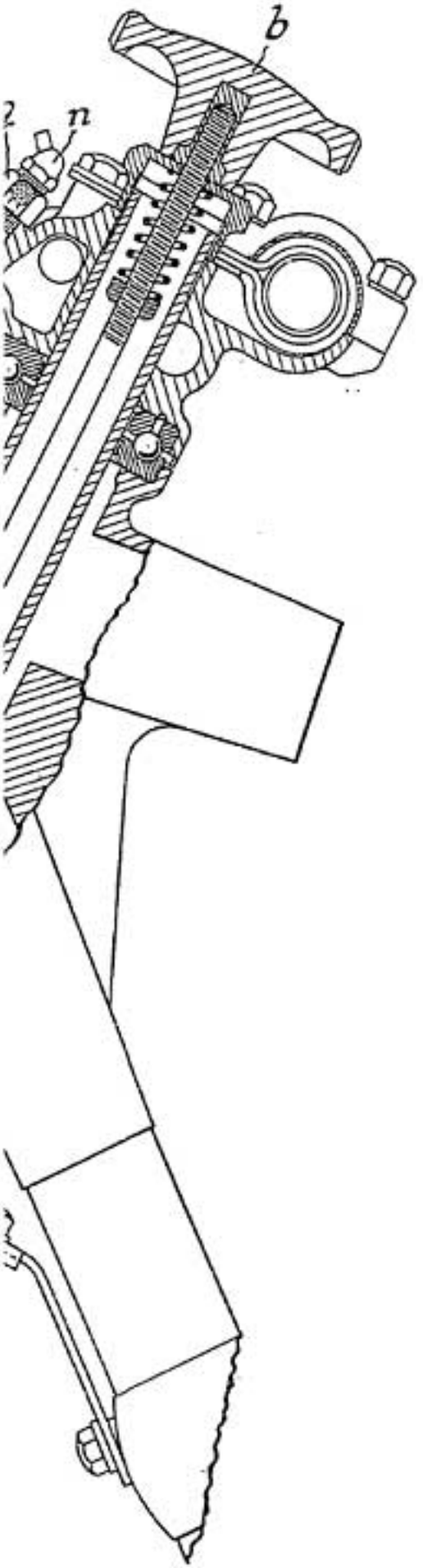


Fig. 2

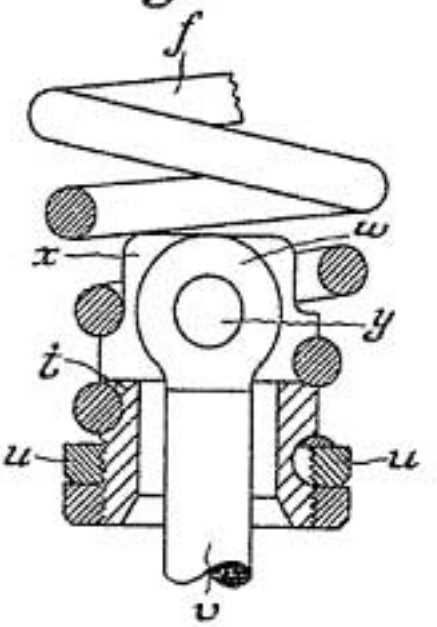


Fig. 3

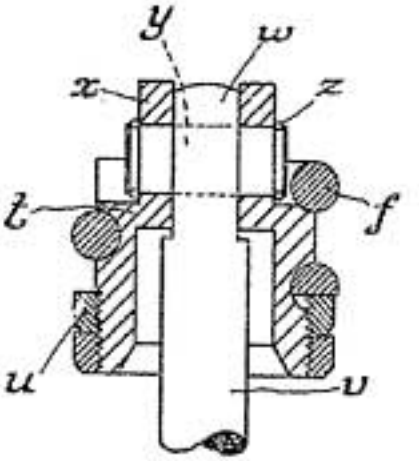


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Fig. 1

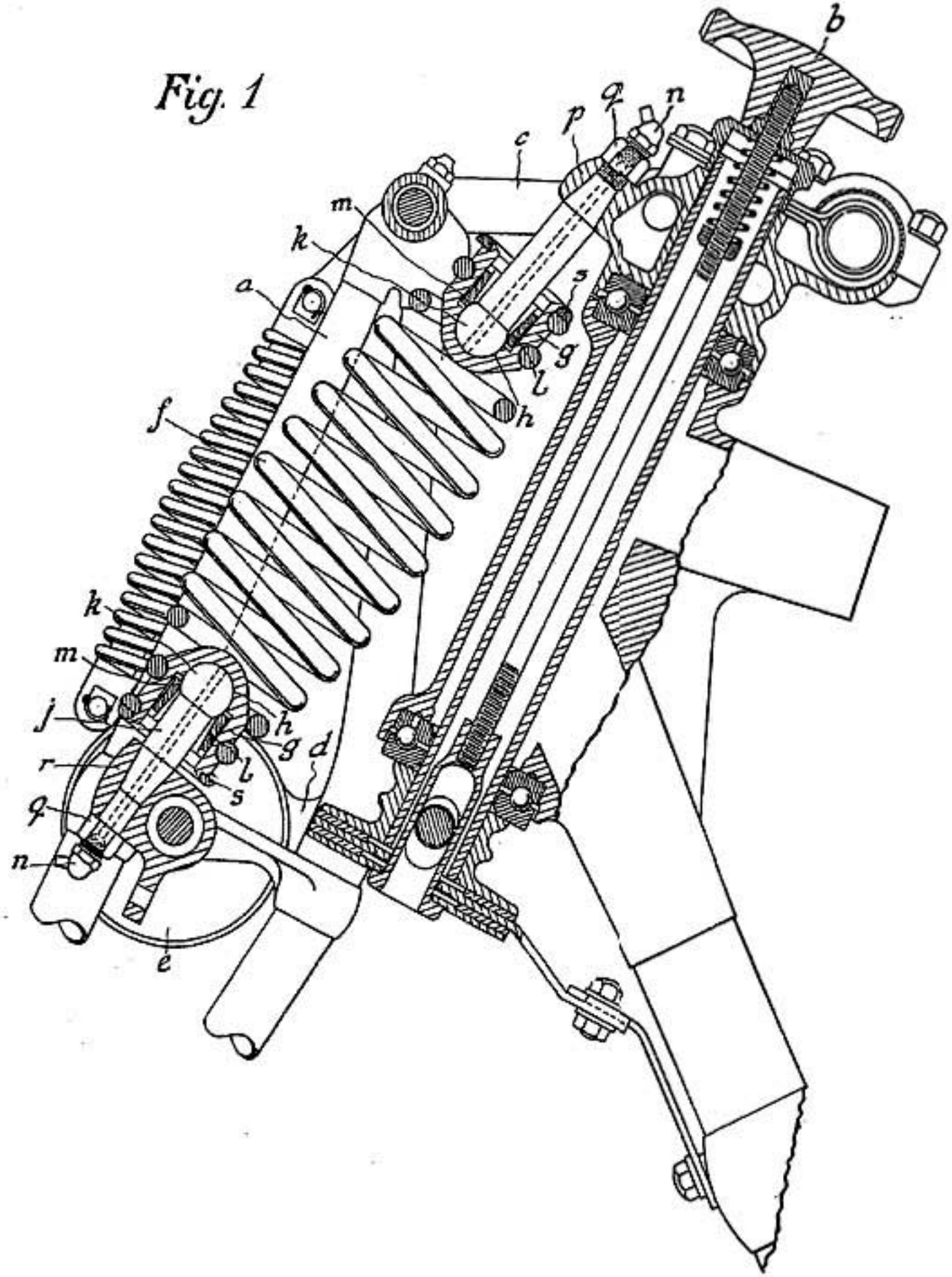


Fig. 2

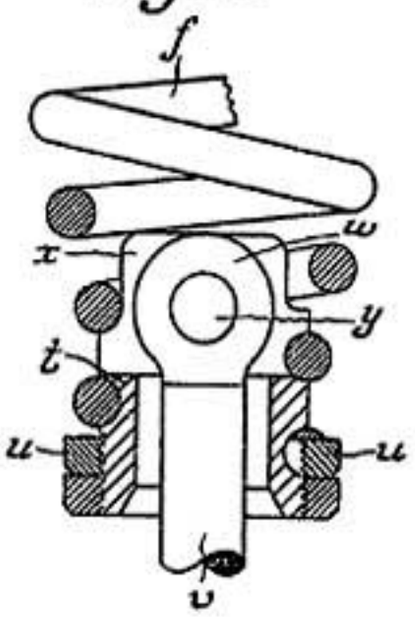
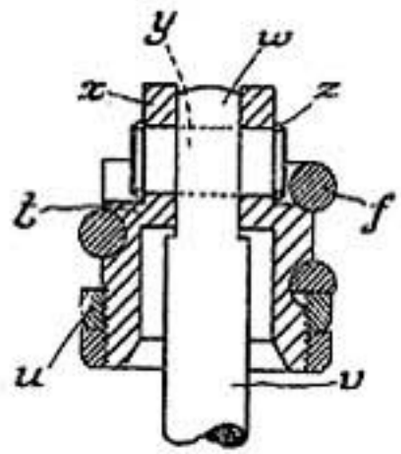


Fig. 3



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