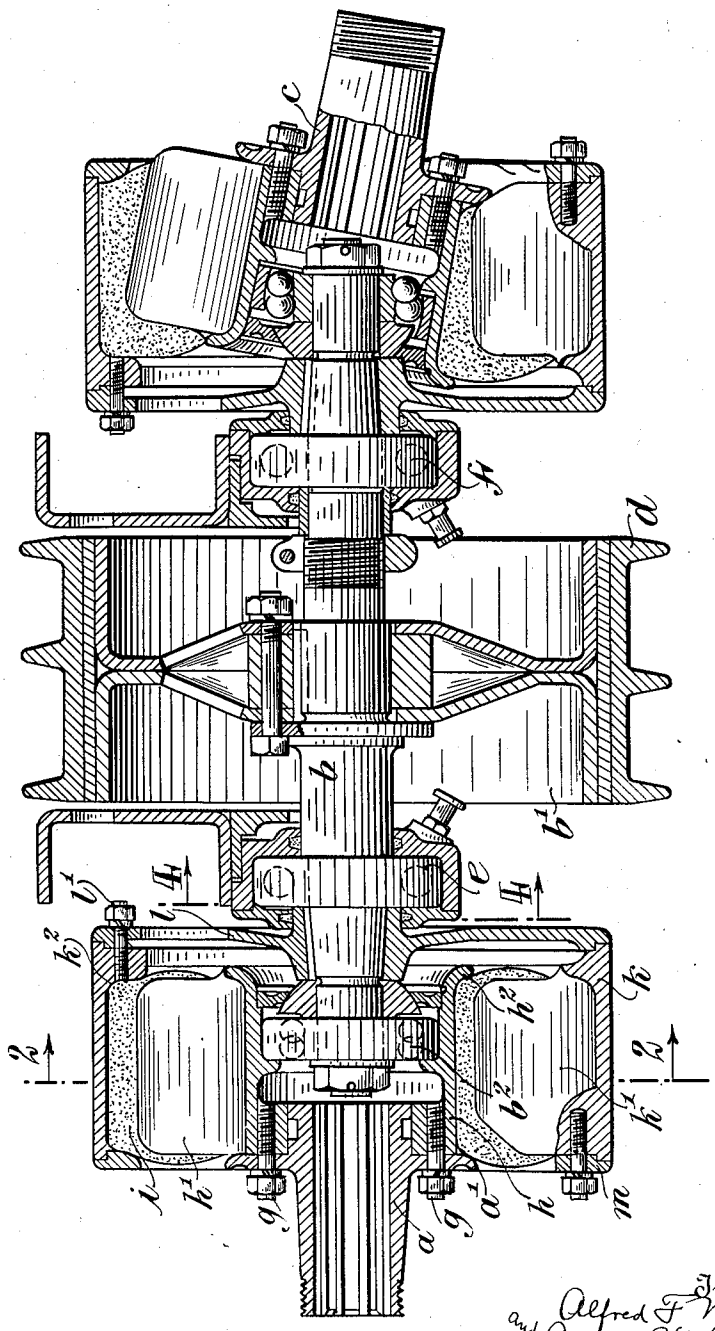
Nov. 17, 1925. 1,561,476

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TORQUE CUSHIONING DEVICE

Filed April 2, 1923 2 Sheets-Sheet 1

Fig. 1.



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Filed April 2, 1923 2 Sheets-Sheet 2

Fig. 2.

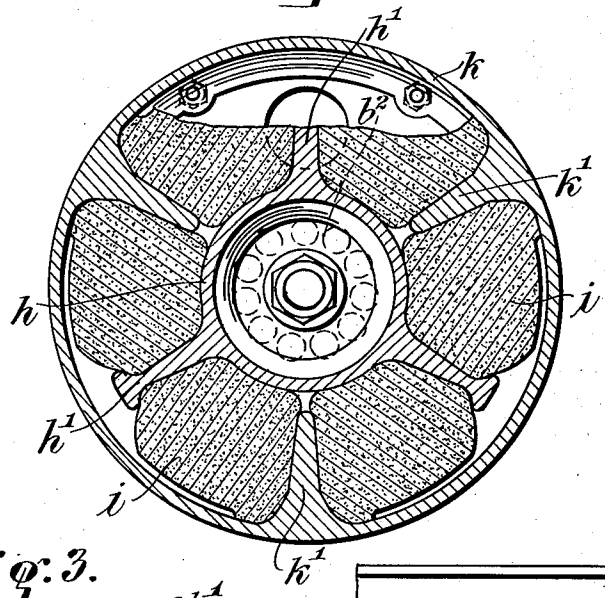
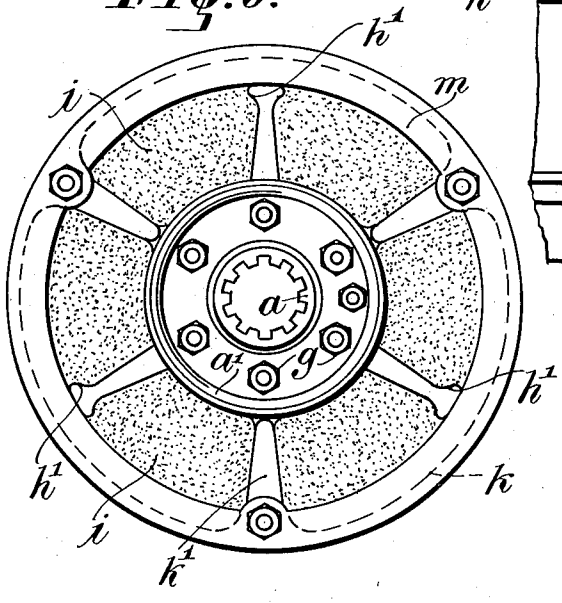


Fig. 3.



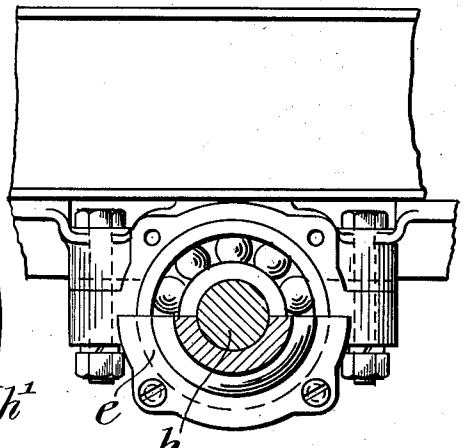


Fig. 4.

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UNITED STATES PATENT OFFICE.

ALFRED F. MASURY AND AUGUST H. LEIPERT, OF NEW YORK, N. Y., ASSIGNORS TO INTERNATIONAL MOTOR COMPANY, OF NEW YORK, N. Y., A CORPORATION OF DELAWARE.

TORQUE-CUSHIONING DEVICE.

Application filed April 2, 1923. Serial No. 629,290.

To all whom it may concern:

Be it known that we, ALFRED F. MASURY and AUGUST H. LEIPERT, citizens of the United States, and residents, respectively, of the borough of Manhattan and of the borough of Queens of the city of New York, in the State of New York, pray that Letters Patent of the United States may be granted to us for new and useful Improvements in Torque-Cushioning Devices, of which the following is a specification, reference being had to the accompanying drawings, forming a part hereof.

In a co-pending application Ser. No. 592,942 filed October 7, 1922, by the present applicants there is disclosed, shown, described and claimed a yielding connection for shafts adapted to afford capacity for universal movement therebetween. The construction with which the present case is concerned is one in which torque stresses incident to changes of speed in shafting are cushioned and a non-metallic connection between shaft sections afforded which shall be of such character as to eliminate noise and wear and problems of lubrication. A further object of the invention is to provide in devices of the character described metallic retaining means for the non-metallic devices which shall be so related upon assembly as to confine the nonmetallic material under compression.

These and other objects of the invention peculiar to the cushioning of torque stresses will appear in their true breadth in connection with the detailed description of the embodiment which is illustrated in the drawings by way of example. In the drawings:

Figure 1 is a view in longitudinal section through shaft sections of a propeller shaft for a motor vehicle and having incorporated therebetween improved torque cushioning devices which may or may not afford capacity for universal movement between the sections.

Figure 2 is a view in transverse section through the torque cushioning device shown at the left in Figure 1 and taken on the plane indicated by the line 2—2 of Figure 1 and looking in the direction of the arrows.

Figure 3 is a view in end elevation of said torque cushioning member.

Figure 4 is a view in section through one of the shafts taken on the plane indicated by the line 4—4 of Figure 1 and looking in the direction of the arrows.

As stated hereinbefore this application is concerned with the incorporation of non-metallic driving members between shaft sections for cushioning yieldingly the stresses incidental to changes in speed of such shafts. More particularly, the invention is concerned with reference to the association of such devices with sections of a propeller shaft for a motor vehicle wherein torque stresses are very great especially at the time of starting and stopping the vehicle. To emphasize the importance of such a particular application of the invention the drawings show in proximity to the torque cushioning devices a brake on the propeller shaft, the stresses impressed by the brake being absorbed yieldingly and cushioned by the non-metallic connecting elements between proximate shaft sections. For the purposes of this application it may be assumed that driving power is transmitted through a shaft section splined in a hub *a* and transmitted through a short brake shaft section *b* to a third shaft section which may be splined in a hub *c*, the last named section, for instance, transmitting the power to the final drive of a vehicle. On the brake shaft section *b* or at any other point between the motor and the driving wheels, in the case of a vehicle, there may be provided a brake drum *b'* to which braking effort may be applied through a band *d* in accordance with approved practice. The invention is not to be limited to the use of the particular shafting in which the devices are incorporated nor to the relative point of application of power or braking effort to such shafting. Bearings for the support of the braking shaft section *b* are indicated at *e* and *f*. It is the object of the present invention to connect two or more shaft sections in a power line with non-metallic devices which shall efficiently transmit driving forces and yet cushion all stresses in the line incidental to a change of speed and eliminate noise and wear and the necessity for lubrication. In the particular embodiment illustrated by way of example the hub *a* is shown as having bolted thereon by bolts *g* a spider *h* which has radially extending flanges *h'* on the faces of which may be formed seats for non-metallic yielding blocks *i* of rubber or other suitable mate-

rial. On the proximate end of the other shaft section b is carried a circular spider k having inwardly extending radial flanges k' on which the blocks i also seat. The spider k may be bolted to a carrier l keyed on the shaft b as by bolts l'. From Figure 1 it appears clearly that the ring k may be shouldered as at k^2 to hold the blocks i against displacement in one direction and a retaining ring m may be bolted to the other end of the ring to afford complementary confining means for the blocks. A similar seating may be afforded at the inner ends of the blocks by a circular flange a' on the hub a through which the bolts g may pass and a flange h^2 at the remote end of the spider h.

The invention is not to be limited to the provision of an inner bearing b^2 for the end of the shaft b within the annular spider h since such a bearing as indicated at the right end of Figure 1 has its principal importance when the cushioning devices are intended to afford capacity for relative universal movement between joined shaft sections. The invention is not to be limited to shafting where universal movement is afforded but is concerned particularly with incorporation in any part of a power transmitting line of non-metallic means for cushioning stresses and absorbing them to some extent.

In assembling the parts it is proposed that the radially extending flanges h', k' shall be so related to one another and the blocks i be of such size and shape that the blocks shall be confined under compression by the flanges to the end that greater durability and life shall be obtained and further compression of one block, perhaps, afford opportunity for relief expansion of an adjoining block. This result may be obtained in assembling by inserting one block after another between adjoining flanges and finally compressing all of the blocks by rotating one of the spiders relatively to the other to afford sufficient space for the introduction of the last block. The total aggregate clearance between the flanges is less than the total aggregate widths of all of the blocks in accordance with this particular object of the invention.

Where, as illustrated, several shaft sections are connected in the manner suggested provision may be made, as indicated at the right side in Figure 1 for universal movement between certain of said sections and where so desired, it is true that the improved torque cushioning devices lend themselves to such capacity if of the general design described herein although the invention is not to be so limited.

In operation, the functioning of the device should be evident from the standpoint of its mechanical operation and its cushioning and absorbing properties and while possibly all of the resulting advantages are not specifically enumerated herein among them are to be mentioned briefly relief from stresses afforded all parts from the power unit through gearing to the driven parts and the protection afforded all metal in the line of transmission against the disintegrating influences of vibrations and stresses.

Changes in the particualr form and design for particular situations may be made without departing from the spirit of the invention since the present application is merely intended to teach the manner in which the desired results may be secured by one skilled in the art.

What we claim is:

1. In combination, a propeller shaft section operatively connected with the prime mover of a motor vehicle, means to apply braking torque to said section, a second propeller shaft section connected operatively with the final drive of the vehicle and driving connections between said shaft sections comprising non-metallic cushioning devices for the torque stresses set up between the shaft sections.

2. In combination, a propeller shaft section operatively connected with the prime mover of a motor vehicle, a brake drum carried with said section, means to apply braking power to said drum, a second propeller shaft section operatively connected with the final drive of the vehicle, means to connect the two sections yieldingly including a carrier carried with one end of a shaft section, a circular spider secured to the carrier, a retaining ring secured to the spider, a flange formed with the proximate end of the other shaft section, a spider secured to said flange and non-metallic yielding material retained between the spiders under compression.

This specification signed this 29th day of March, A. D. 1923.

ALFRED F. MASURY.
AUGUST H. LEIPERT.