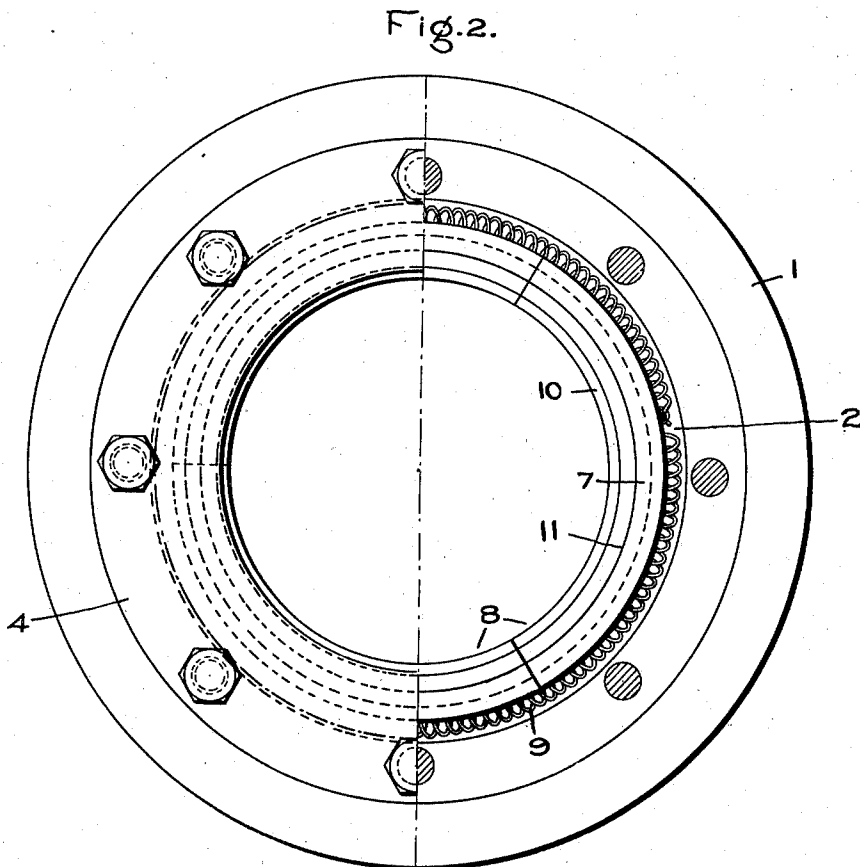
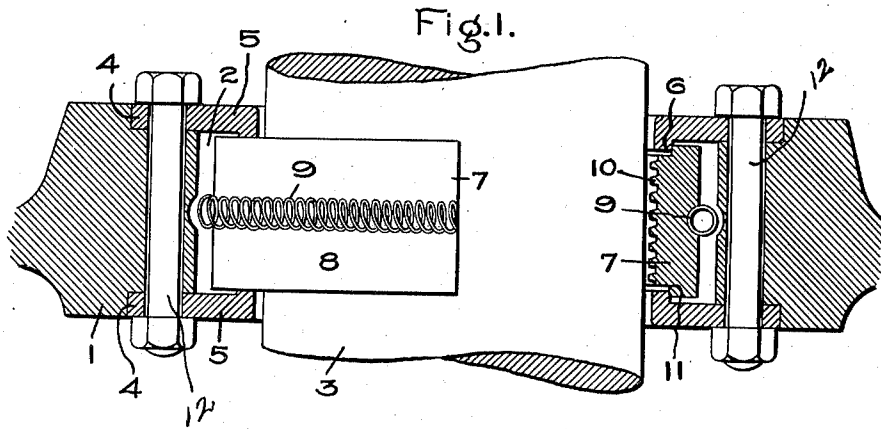


F. SAMUELSON.  
LEAKAGE REDUCING DEVICE.  
APPLICATION FILED MAR. 2, 1910.

967,247.

Patented Aug. 16, 1910.



WITNESSES:

J. Earl Ryan  
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INVENTOR

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BY

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HIS ATTORNEY

# UNITED STATES PATENT OFFICE.

FREDERICK SAMUELSON, OF RUGBY, ENGLAND, ASSIGNOR TO GENERAL ELECTRIC COMPANY, A CORPORATION OF NEW YORK.

## LEAKAGE-REDUCING DEVICE.

967,247.

Specification of Letters Patent.

Patented Aug. 16, 1910.

Application filed March 2, 1910. Serial No. 546,967.

*To all whom it may concern:*

Be it known that I, FREDERICK SAMUELSON, a subject of the King of Sweden, residing at Rugby, in the county of Warwick, England, have invented certain new and useful Improvements in Leakage-Reducing Devices, of which the following is a specification.

This invention relates to shaft packings or leakage reducing devices of the general type described in Letters Patent No. 957,887, dated May 17, 1910, to Oscar Junggren.

It has for its object to simplify and improve the construction of such packings so as to facilitate the assemblage or renewal of the parts, and also to improve the operation whereby the same is rendered more effective in operation.

In the patent above referred to is described a packing consisting of a one piece metal sleeve situated in the central or shaft aperture of a turbine diaphragm, provided with internal ribs projecting into close proximity to the shaft, said sleeve being held in place by plates secured to the diaphragm having annular projecting rings engaging shoulders formed on the sleeve. With this construction in the event of a sleeve becoming broken or damaged it is necessary to remove everything on the shaft above the broken sleeve in order to get a new one into its place. I overcome the above difficulty by dividing the sleeve into any convenient number of segments and locating them between one or more removable plates. The segments are surrounded by a flexible retaining device, such as a garter spring, so that should a segment be displaced owing to the shaft "whipping" or any other cause it will immediately return to its proper position when the cause of displacement is removed. This latter is a very great advantage, because when the shaft strikes any particular portion of the bore of the sleeve it only displaces one segment thereof, whose inertia is small, the others remaining in place or moving only slightly. If the point of contact is at the joint between two adjacent segments, then both will yield but only at the abutting ends. The elastic support or backing for the segments permits them to yield radially, and due to this fact there is less liability of the segment breaking or scoring the shaft, or both.

My invention is of great importance in all

turbines having diaphragms, but it is of the utmost importance in a turbine having many stages with only a single row of wheel vanes or blades in each stage between diaphragms. Since the action of the encircling spring is to return the segments to their proper central position as soon as the pressure due to the shaft is removed, it follows that the leakage through the clearance is reduced to a minimum, while the safety of the turbine and the packings is assured.

The accompanying drawing illustrates one of the embodiments of my invention, wherein—

Figure 1 is a sectional view through a portion of a turbine diaphragm showing the packing in place, and Fig. 2 is a part sectional plan view of the same.

In the drawings, 1 represents a diaphragm having a central bore 2, through which the shaft 3 passes. On each side of the diaphragm are removable plates 4 having annular flanges 5, which project closer to the shaft than does the wall of bore 2. It will be obvious that one of the plates 4 might be made integral with the diaphragm. The plates are each provided with a projecting rim or shoulder 6 concentric with the shaft, which is adapted to hold the packing sleeve 7 in position and limit its movement in a direction parallel to the shaft, and also to prevent the segments thereof from moving toward the shaft more than a certain limited amount. In other words, the shoulders form centering means for a plurality of independently movable pieces that are urged toward them by spring means.

The packing comprises a convenient number of segments 8 made of metal or other suitable material, which are surrounded by a garter spring 9 which tends to hold the segments in position and to return them to their normal position in engagement with the shoulders 6, where they are automatically centered, should they be displaced through whipping of the shaft or any other cause. The bore of the segments is provided with fluid baffling ribs or projections 10 of suitable construction. The segments are also provided with shoulders 11 that cooperate with the annular shoulders 6 on the plates. It will be obvious that the divisions between the segments of the sleeve may be either parallel with the axis and each other, or they may be provided with cooperating

projections and recesses so as to prevent the leakage of steam or other fluid between the segments. The segments are so arranged that they are free to expand axially without  
 5 binding, owing to the axial space left between the shoulders on the segments and those on the plates. They can expand circumferentially, owing to the space between the periphery of the sleeve and the wall of  
 10 the bore of the diaphragm. The plates are secured in place by a number of through bolts 12.

It will be observed, as a characteristic of this packing, that the holder is immovable  
 15 when the apparatus is in service, and that the segments of the sleeve only are permitted to move, and this under the control to a certain extent of the garter spring.

In accordance with the provisions of the  
 20 patent statutes, I have described the principle of operation of my invention, together with the apparatus which I now consider to represent the best embodiment thereof; but I desire to have it understood that the  
 25 apparatus shown is only illustrative and that the invention can be carried out by other means.

What I claim as new and desire to secure by Letters Patent of the United States, is—  
 30 1. In a device of the character described, the combination of a support having a bore or opening, a segmental packing sleeve loosely mounted in the bore, a retaining device located on each end of the sleeve which  
 35 is carried by the support, an annular shoulder on each of the devices which acts as a centering means for the several segments of the packing sleeve, and a spring means

which permits of the segments being forced outwardly and which returns them to engagement with the shoulders when the op-  
 40 posing force is removed.

2. In a device of the character described, the combination of a support having an aperture therein through which the shaft  
 45 to be packed extends, shouldered plates carried by the support, a segmental packing ring mounted between the plates and within the aperture, each of said segments having a shoulder that coöperates with the  
 50 shoulders on the plates to center the same and limit its inward movement toward the shaft, and an elastic means which returns each segment to engagement with the shoulders on the plates after displacement thereof.  
 55

3. In a device of the character described, the combination of a support having a central bore through which the shaft to be  
 packed extends, plates carried by the support through which the shaft extends, said  
 60 plates being provided with opposed shoulders, a segmental packing ring mounted between the plates and provided at its ends with shoulders that coöperate with the shoulders on the plates to limit the movements of  
 65 the segments toward the shaft, and a spring which encircles the segments and forces them back into engagement with the shoulders on the rings after being displaced by the shaft.  
 70

In witness whereof, I have hereunto set my hand this first day of March, 1910.

FREDERICK SAMUELSON.

Witnesses:

ALEX. F. MACDONALD,  
 BENJAMIN B. HULL.