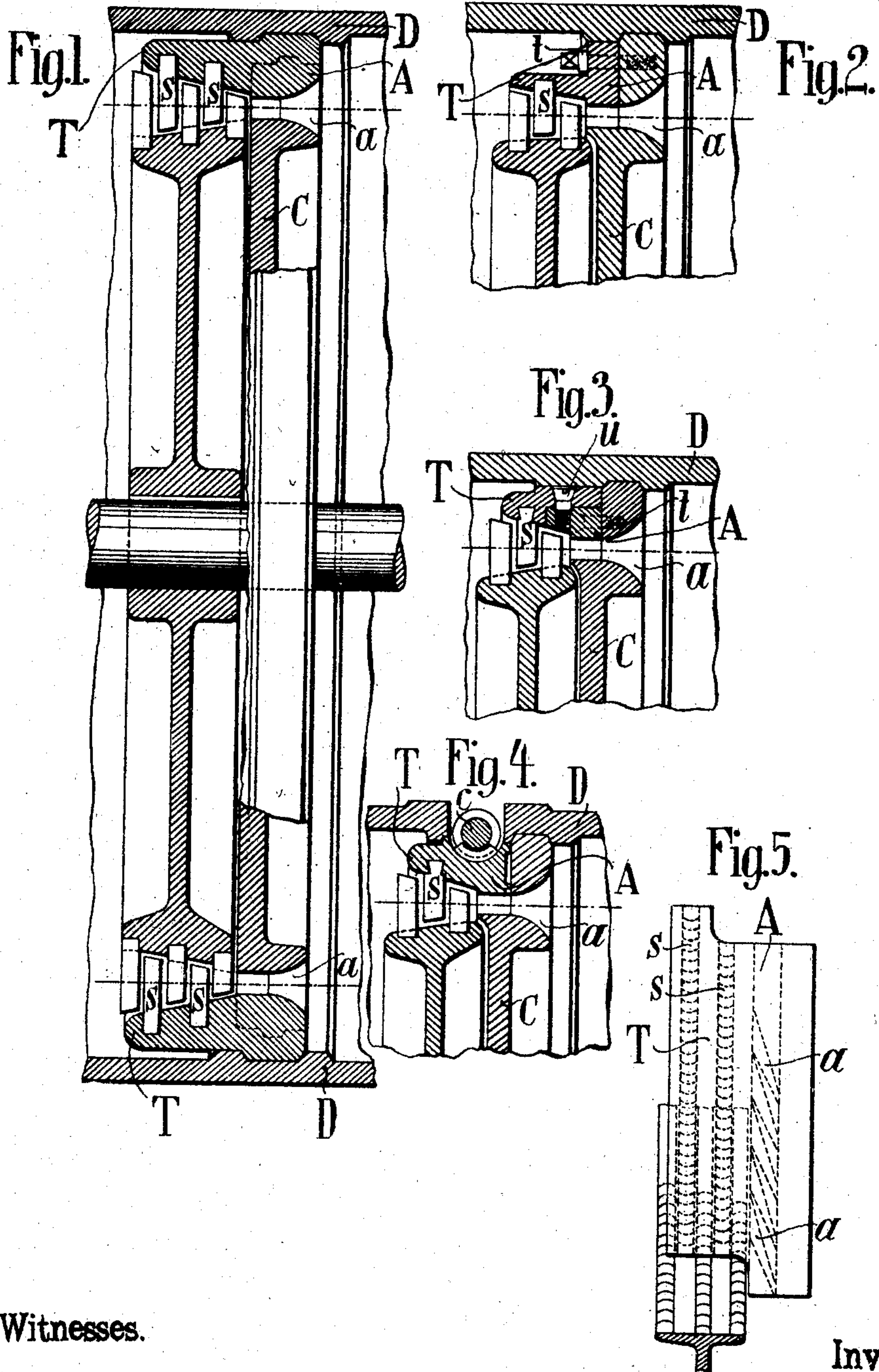


No. 864,199.

PATENTED AUG. 27, 1907.

R. SCHULZ.
STEAM TURBINE.
APPLICATION FILED JUNE 28, 1907.



Witnesses.

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RICHARD SCHULZ, OF BERLIN, GERMANY.

STEAM-TURBINE.

No. 864,199.

Specification of Letters Patent.

Patented Aug. 27, 1907.

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To all whom it may concern:

Be it known that I, RICHARD SCHULZ, a subject of the German Emperor, residing at Berlin, N. W., Germany, have invented certain new and useful Improvements in Steam-Turbines; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to letters or figures of reference marked thereon, which form a part of this specification.

The present invention relates to steam turbines and an important object is to provide guide blade holders for impact steam turbines in which there are one or more chambers that the steam flows through in an axial direction.

Guide blade holders for steam turbines that form part of the turbine housing and project through openings in the same into the interior of the turbine are known. It is likewise old to construct the guide blade holders so as to be revoluble and it is admissible to cut away the housing when short guide blade holders are used in order to fix them in place. With the requirements demanded for the driving of ships, it is necessary to have recourse to long guide blade holders extending over three quarters and some times the whole of the periphery so that it is preferable to mount the blades or holders independently of the housing. The longer guide blade holders must extend into the bottom half of the housing so that if it is desired to inspect or repair the guide blades which are in the bottom half of the housing the turbine shaft with all the moving parts, must first be lifted out. By using the guide blade holder made in accordance with the present invention it is not necessary to remove the shaft and other moving parts.

According to the present invention the guide blade holder is arranged in a ring or a portion of a ring which is detachably connected to and which forms an extension of the guide rim or nozzle rim of a guide disk or partition revoluble around the shaft of the turbine.

In order that the invention may be clearly understood reference is made to the accompanying drawing in which are some forms of guide blade holders made in accordance with this invention, are shown, and in which,

Figure 1 is a longitudinal axial section through a part of a turbine. Figs. 2 and 3 are sections through parts of the housing, guide apparatus or nozzles and the running wheel. Fig. 4 is a section of guide blade holder formed as a regulating slide and containing the exhaust ends of the nozzles, and Fig. 5 is a plan of one form of guide blade holder.

In Fig. 1 the nozzles are formed in a rim in the partition or guide disk C that separates the several stages and a ring A detachably surrounding the latter, said ring A forms an extension of the guide rim on the partition.

The partition C is capable of being revolved about the shaft.

The holder T for the stationary guide blades *s* is formed as flange or extension of the ring A and in one piece with it. If the nozzles *a* are distributed at different portions of the circumference of the disk or partition C then radially divided arcuate portions or sectors of a ring A each provided with the stationary blade holder T, are connected to the partition C.

In the form shown in Fig. 2 the ring or portion of the ring A is detachably attached by means of screws *t* to the rim of nozzles on the partition or guide disk C and the holder T for the stationary guide blades *s* projects laterally from the ring A.

In the form shown in Fig. 3 the ring A or portion of the ring containing the exhaust ends of the nozzles *a*, is secured to the nozzle rim or disk C by means of screws *t* and the holder T for the stationary blades *s* is detachably secured to the ring A by bolts or screws *u*.

In the form shown in Fig. 4 the portion of a ring A that forms a portion of the guide rim on the guide disk A and contains the exhaust ends of the nozzles *a* is adjustable with respect to the nozzles and disk or partition C, the holder T for the stationary blades *s* being adjustable with the ring portion A and is shown in this figure as made in one piece with A.

Any well known devices for adjusting the ring portion A may be used, and I have shown a worm *c* engaging worm teeth on the ring portion A which latter thus serves as a regulating slide for controlling the steam through the nozzles *a* to vary the expansion and impact of the steam, compare also Fig. 5 with respect to this. The guide blades in rigid connection with the exhaust ends of the nozzles and participating in the adjusting movement is a decided advantage. The guide blade holders can be made in one piece with or may be joined to the ring or portion of ring that forms an extension or part of the guide or nozzle ring.

As special advantages of the present invention may be mentioned: That when the guide blades are rigidly connected to the nozzles or nozzle supports, they are independent of the housing of the turbine and the interior of the housing is easier to finish. The housing retains its full strength because large openings there-through are not necessary. Special axial adjustment of the guide blade holders are not necessary. The arrangement also enables the guide blades, that are at the bottom of the housing of the turbine, to be rotated above the shaft after the upper half of the housing has been removed by rotating the guide rim, so that the blades can be renovated.

I claim:—

1. In a steam turbine of the type described, the combination with a guide-disk having a guide-rim revoluble thereon, of a guide blade holder attached to and forming an extension of said guide-rim.

2. In a steam turbine of the type described, the combination with a guide-disk having a guide-rim revoluble thereon, of a guide blade holder detachably attached to and forming an extension of said guide-rim.
- 5 3. In a steam turbine of the type described, the combination with a guide-disk having a guide-rim revoluble thereon, of a ring shaped guide-blade holder attached to and forming an extension of said guide-rim.
- 10 4. In a steam turbine of the type described, the combination with a guide-disk having a guide-rim revoluble thereon, of a ring shaped guide-blade holder detachably attached to and forming an extension of said guide-rim on said guide-disk, as set forth, for the purpose specified.
- 15 5. In a steam turbine of the type described, the combination with a guide-disk having a guide-rim revoluble thereon, of a portion of a ring attached to and forming an extension of said guide-rim, and a guide-blade holder attached to said portion of a ring, as set forth.
- 20 6. In a steam turbine of the type described, the combination with a guide-disk having a guide-rim revoluble thereon, of a portion of a ring attached to and forming an extension of said guide-rim, and a guide-blade holder detachably attached to said portion of a ring, for the purpose specified.
- 25 7. In a steam turbine of the type described, the combination with a guide-disk having a guide-rim revoluble thereon; of a ring attached to and forming an extension of said guide-rim, and a guide-blade holder attached to
- 30 said ring, for the purpose specified.

8. In a steam turbine of the type described, the combination with a guide-disk having a guide-rim revoluble thereon, of a ring attached to and forming an extension of said guide-rim and a guide-blade holder detachably attached to said ring, for the purpose specified.

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9. In a steam turbine of the type described, the combination with a guide-disk having a guide-rim revoluble thereon, of a revoluble ring portion contacting and forming an extension of said guide-rim, a guide-blade holder on said ring portion and means for rotating said ring portion against said guide-rim, whereby when said ring portion is moved the holder participates in the movement.

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10. In a steam turbine of the type described, the combination with a nozzle element; of a holder for the stationary guide blades said holder containing the exhaust

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11. In a steam turbine of the type described, the combination with a nozzle element; of a holder for the stationary guide blades containing a portion of the nozzles and means to adjust the holder relatively to the nozzle element.

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In testimony that I claim the foregoing as my invention, I have signed my name in presence of two subscribing witnesses.

RICHARD, SCHULZ.

Witnesses:

JOHANNES HEIN,
HENRY HASPER.