

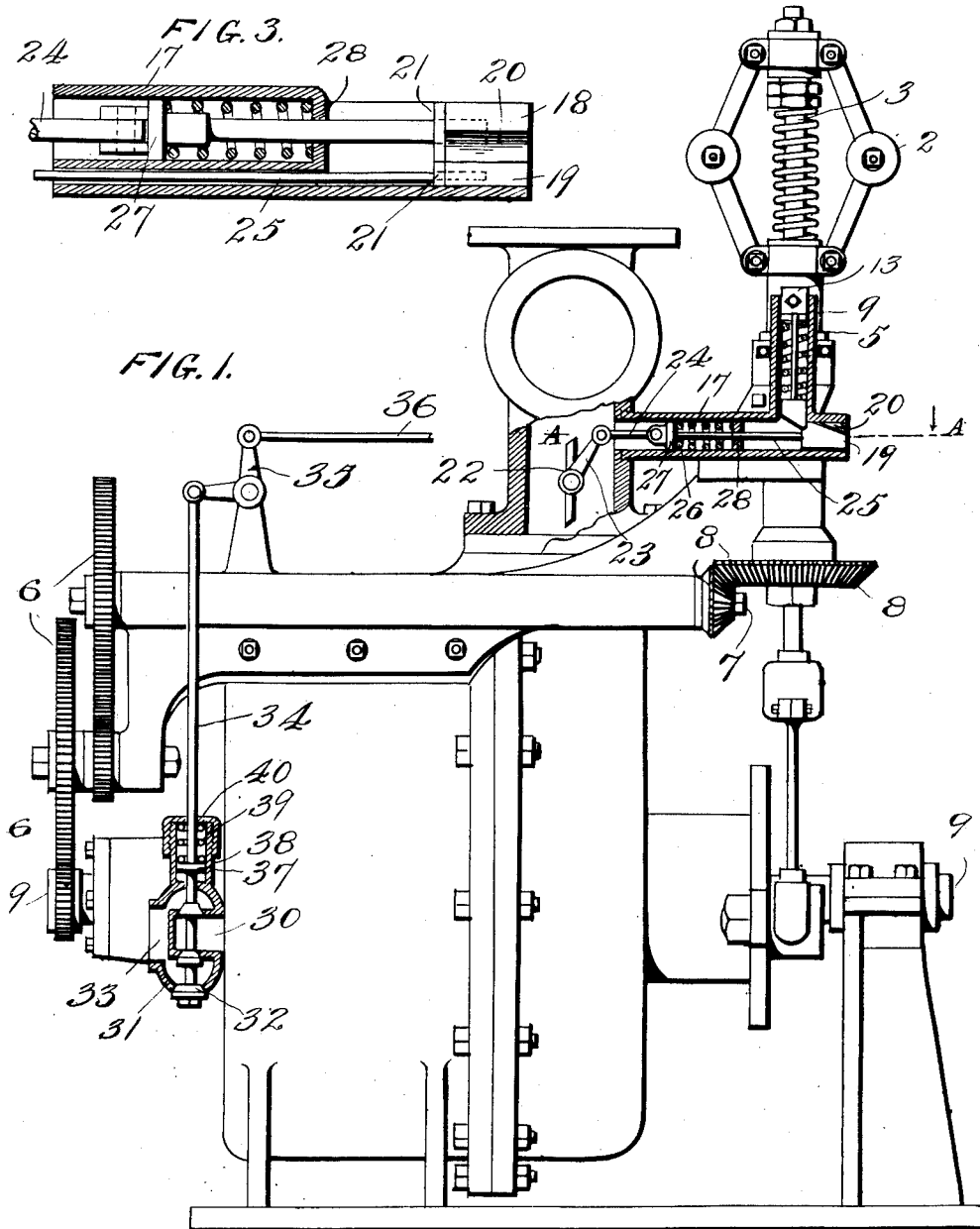
No. 879,121.

PATENTED FEB. 11, 1908.

H. G. ROBINSON.
SAFETY STOP FOR STEAM TURBINES.

APPLICATION FILED SEPT. 30, 1907.

2 SHEETS—SHEET 1.



WITNESSES
Chas. F. Davies
M. Smith.

INVENTOR
Hale G. Robinson
by Brock, Becken & Smith,
Attorneys

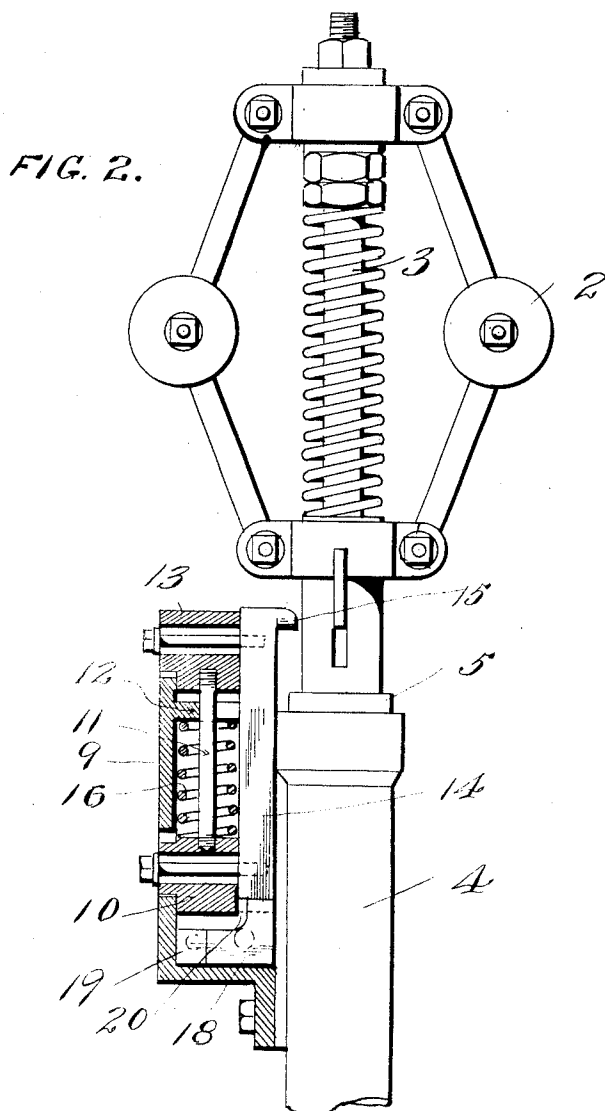
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W. Smith

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Hale G. Robinson,
by Brock, Becken & Smith, Attorney at Law

UNITED STATES PATENT OFFICE.

HALE G. ROBINSON, OF SANDUSKY, OHIO.

SAFETY-STOP FOR STEAM-TURBINES.

No. 879,121.

Specification of Letters Patent.

Patented Feb. 11, 1908.

Original application filed December 5, 1906. Serial No. 346,246. Divided and this application filed September 30, 1907.
Serial No. 395,055.

To all whom it may concern:

Be it known that I, HALE G. ROBINSON, a citizen of the United States, and a resident of Sandusky, in the county of Erie and State of Ohio, have invented a new and useful Safety-Stop for Steam-Turbines, of which the following is a specification.

My invention is a safety stop applied to a steam turbine and constructed and arranged so that when the speed of the turbine has reached a pre-determined point it closes a valve in the steam supply main. If the turbine operates in connection with a condenser the safety stop, preferably, is also arranged to open a valve connecting the condenser with the atmosphere.

The present application is a division of my pending application Serial No. 346,426, filed December 5, 1906.

My invention is capable of being constructed in many representative forms.

Hereinafter I describe an exemplifying form of the invention.

Referring to the drawing, Figure 1 is a side view, some of the parts being broken away and in section; Fig. 2, a detail of the governor and the trip, partly in section; and Fig. 3 is a section on a horizontal plane at A of Fig. 1.

Reference numeral 1 designates the turbine casing. A centrifugal governor 2 is carried by vertical shaft 3 rotatably mounted in a sleeve 4 carried by the casing.

5 is a collar connected with the governor so that it rises as the speed of the turbine increases and falls as the speed decreases, but not connected to rotate with the governor.

A train of reduction gearing 6, horizontal shaft 7 and bevel gears 8 connect the main shaft 9 of the turbine with the governor.

A latch casing 9 is bolted with its open side against sleeve 4. Within the casing is the latch 10 which is connected to a stem passing through a flange 12 formed in the latch casing, and in turn connected to a block 13. Latch 10 and block 13 are bolted to a slide 14 which carries at its upper end a hook 15 projecting into the path of collar 5. The latch is urged downward into contact with the bolts which will later be described by a spring 16 compressed between the latch and flange 11.

Numeral 17 designates a horizontal continuation of casing 9. Casing 17 forms a guide way for bolts 18 and 19, each of which

has a beveled face 20, and a squared face 21, the latter faces being adapted to engage the latch.

22 is a butterfly valve in the steam supply pipe; 23 an arm carried by the valve; 24 a link and 25 a rod connecting the link with bolt 18. A spring 26 confined between a shoulder 27 formed on rod 25 and an abutment 28 within the casing 17 urges valve 22 to close.

When the speed of the turbine rises above the pre-determined point, collar 5 strikes hook 15, raising the hook and with it the latch. The latch coming free from the squared face 21 of bolt 18, permits the bolt to move to the left, as seen in Fig. 1, under influence of spring 26, and thus the butterfly valve 22 is closed, shutting off the supply of steam and causing the turbine to slow down below the danger point. The parts may then be restored to normal position by the operator grasping arm 23 which is exterior to the main pipe and returning bolt 18 to its normal engagement with latch 10, as seen in Fig. 1.

30 is a passage connecting the exhaust of the turbine with a condenser (not shown).

31 is a casing surrounding passage 30; 32 a balance valve connecting passage 30 with the casing, and 33 an opening into the atmosphere. Valve 32 is on a stem 34 connected with one arm of bell-crank 35, the other arm of which is connected by a link 36 with the other bolt 19. Valve stem 34 carries a flange 37 moving within an extension 38 of valve-casing 31. Extension 38 is provided with a cap 40, and spring 39, confined between the cap and flange 37, urges the valve to open. When the speed of the turbine rises to the predetermined point and latch 10 releases bolt 18 as has been described, bolt 19 is at the same time released, and spring 39 thereupon is free to open valve 32. This establishes communication between the atmosphere and the condenser, breaking the vacuum. The rotative effect normally exerted by the condenser upon the turbine is discontinued and the speed of the machine quickly falls to the normal. Valve 32 may be restored to normal closed position by pulling rod 36 to the right, as seen in Fig. 1, at the same time that valve 22 is restored to its normal open position.

Balanced valve 32 and its related parts are sometimes termed for convenience a vacuum breaker.

I claim:

1. The combination of a centrifugal governor, a main steam valve, a vacuum breaker, a latch adapted to be raised by the governor when a certain speed is exceeded, means normally urging the steam valve to close and the vacuum breaker to open, and separate bolts one connected with the valve and one with the breaker and both engaged
10 by the latch.

2. In a turbine, the combination of a centrifugal governor, a collar carried by the governor, a latch, a hook carried by the latch

adapted to be engaged by the collar, two bolts engaged by the latch, a steam main, a valve therein, means urging the valve to close, a passage connecting the exhaust with a condenser, a vacuum valve for connecting the exhaust with atmosphere, means normally urging the valve to open, and a bolt connected with the vacuum valve and engaging the latch.

HALE G. ROBINSON.

Witnesses:

C. A. UTHE,
PHILIP J. PFANNER.