Auto Stop Governor, Quick Closing Valve and Oil Failure Trip

Section C-C of Figure 1 shows the auto stop governor (or overspeed stop) which automatically closes the quick closing valve, thus shutting off the flow of steam to the turbine, if the speed increases to approximately 10% above normal. As shown in the illustration, the Auto Stop Governor body is keyed to the turbine shaft by the key "1" and further secured by the nut "4". The overspeed trip weight "5" is set in a hole drilled in the rotor shaft and auto stop governor body, perpendicularly to the axis of rotation. The center of gravity of the weight "5" is slightly offset from the axis of rotation, and normally it is held in place by the compression spring "6" and the retainer "7". If the speed of the turbine increases to the point for which the Auto Stop is set to operate (approximately 10% above normal), the weight "5", due to its increased centrifugal force, overcomes the compression of the spring "6" and flies out, striking the trigger "21". This disengages the latch plate "23" and cam "24" allowing the spring "42" to pull the quick closing valve "28" shut, thus shutting off the flow of steam to the turbine.

The quick closing valve "28" is of the "flapper" type. It is carried on the shaft "32" and leakage of steam outward along this shaft is controlled by the bushings "36" and "37". Two leak-offs, as shown in Section B-B, are provided from between these bushings and the steam leakage at these points should be led to a point at atmospheric pressure where a small amount of escaping steam is not objectionable.

The mechanism can be tripped by hand by pulling outward on the trigger "21" and disengaging the trigger plate "23" from the cam "24". Tripping by hand, however, tests only the quick closing valve and not the auto stop governor.

When the tripping mechanism has operated, it can be reset by closing the throttle valve and then pulling up on the handle "33" against the tension spring "42" until the trigger plate "23" engages the cam "24". The first upward movement of the handle "33" opens the pilot valve "30", which is considerably smaller than the quick closing valve "28". This decreases the pressure drop across the quick closing valve and enables the large valve to be opened easily. The handle will drop to its original position after resetting. The resetting, of course, cannot be done until the turbine speed has decreased sufficiently to allow the weight "5" to return to its normal position.

The turbine should be overspeeded occasionally to check the speed at which the weight "5" flies out and actuates the tripping mechanism. This test should be carried out in the following manner:

1. Close the throttle valve until the turbine speed drops below normal. The governing valves will then open wide. Place blocks under the valve operating lever so as to hold these valves open.

2. Open the throttle valve slowly, carefully watching the tachometer, and increase the speed to the tripping point. During this test an operator should stand by, ready to trip the mechanism by hand instantly if it does not trip automatically at approximately 10% overspeed.

If the weight "5" fails to fly out at the correct speed, the unit should be shut down and the auto stop parts inspected. Make sure that the weight is not sticking in the shaft or body and that the spring is not fouled in any way.

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The speed at which the auto stop will function can be adjusted by means of the shims "8". Increasing the thickness of the shims increases the tripping speed. Decreasing the thickness of the shims decreases the tripping speed.

OIL FAILURE TRIP

This mechanism is shown in Figure 1, Section A-A. Its function is to close the quick closing valve, thus shutting off the flow of steam to the turbine, if, for any reason, the oil pressure fails.

As shown in Section A-A, the mechanism is in its starting position with no oil pressure. The latch pin "18" and latch "20" are engaged to prevent the spring "11" from moving the rod "15" outward and tripping the quick closing valve by moving the trigger "21" outward.

Oil is admitted to the cylinder "10" on the right hand side of the plunger as shown. This oil pressure moves the plunger "12" toward the left and disengages the latch "20" and pin "18", the spring "19" moving the pin "18" upward free of the latch "20". The pressure now holds the plunger "12" in such a position that the rod "15" is clear of the trigger "21". In case the oil pressure fails, the pressure on the plunger "12" is relieved, which allows the spring "11" to move the plunger "12" and rod "15" outward, against the trigger "21", thus tripping the quick closing valve.

The trip can be reset by hand by pushing the latch "20" back until the end of the pin "18" engages the latch in the starting position as shown in the Figure.

The mechanism is adjusted at the time of final test so that no further adjustment should be needed in the field.

The following list of parts has been compiled to facilitate ordering spare or renewal parts by name and number, together with the serial number of the turbine:

Item No.	Name
1	Auto Stop Governor Body Key
2	Auto Stop Governor Body
3	Baffle Ring
4	Auto Stop Governor Body Nut
5	Auto Stop Governor Weight
6	Auto Stop Governor Weight Spring
7	Auto Stop Governor Spring Retainer Nut
8	Auto Stop Governor Spring Shims
9	Oil Failure Trip Cover and Plunger Stop
10	Oil Failure Trip Housing
11	Oil Failure Trip Plunger Spring
12	Oil Failure Trip Plunger
13	Oil Failure Trip Rod Spring Washer Pin
14	Oil Failure Trip Rod Spring Washer
15	Oil Failure Trip Rod
16	Oil Failure Trip Rod Spring
17	Oil Failure Trip Latch Bracket and Cover
18	Oil Failure Trip Latch Pin
19	Oil Failure Trip Latch Spring
20	Oil Failure Trip Latch
21	Auto Stop Trigger
22	Oil Failure Trip and Auto Stop Trigger Pin
23	Oil Failure Trip and Auto Stop Trigger Plate
24	Oil Failure Trip and Auto Stop Cam
25	Oil Failure Trip and Auto Stop Cam Adjusting Screw
26	Tap Bolt
27	Quick Closing Valve Cover
28	Quick Closing Valve Body

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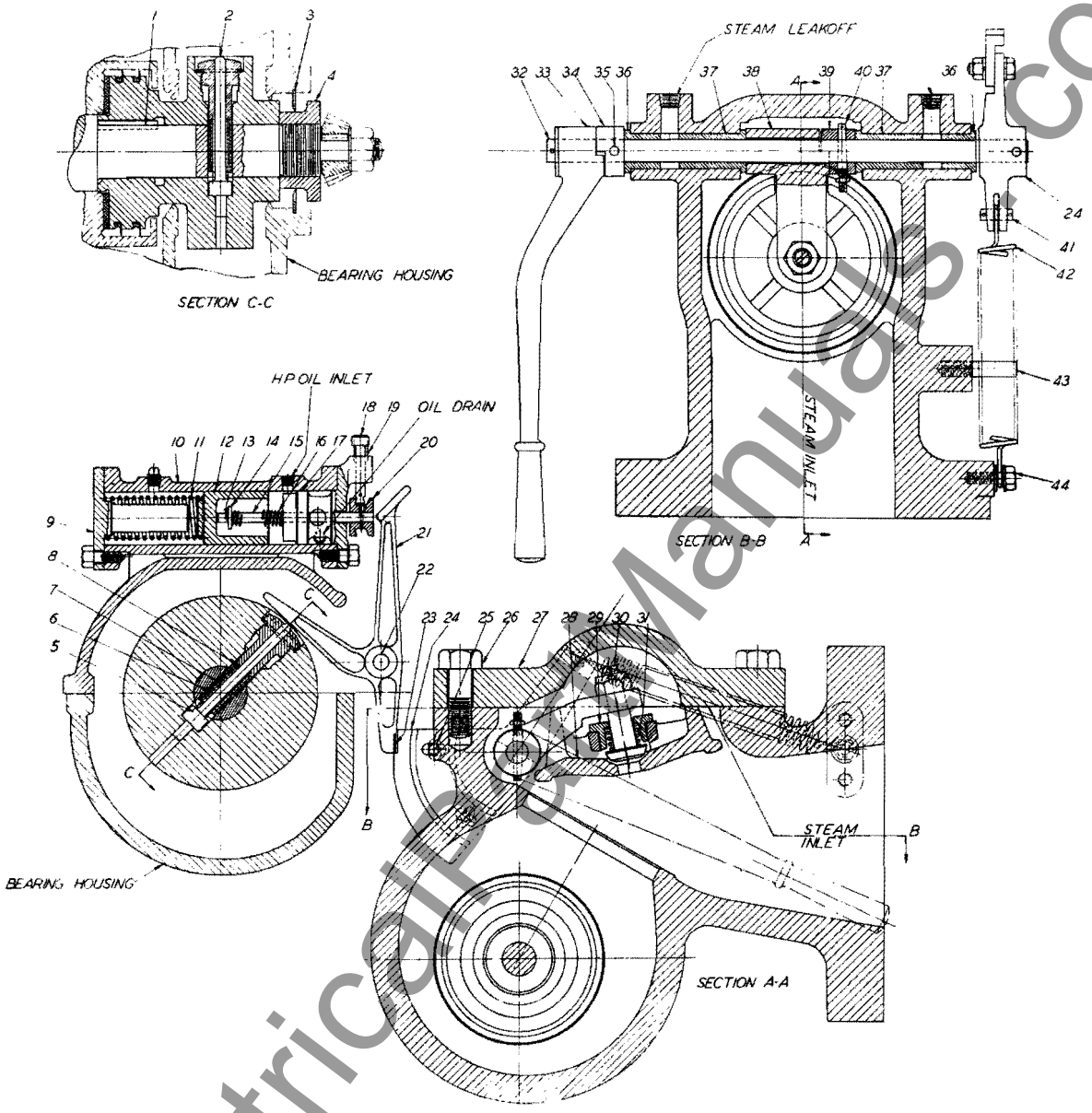

Fig. 1 - Auto Stop and Quick Closing Valve Assembly

Item No.	Name
29	Pilot Valve Spring Bushing
30	Pilot Valve
31	Pilot Valve Spring
32	Quick Closing Valve Shaft
33	Quick Closing Valve Latch Handle
34	Quick Closing Valve Latch Handle Pickup Collar
35	Quick Closing Valve Latch Handle Pickup Collar Pin
36	Quick Closing Valve Shaft Bushing (Outer)
37	Quick Closing Valve Shaft Bushing (Inner)
38	Quick Closing Valve and Pilot Valve Bracket
39	Quick Closing Valve and Pilot Valve Bracket Pickup Collar
40	Pickup Collar Pin
41	Quick Closing Valve Spring Pin
42	Quick Closing Valve Spring
43	Quick Closing Valve Spring Stop Pin
44	Spring Tap Bolt

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