Overspeed Trip Mechanism

Figure 1 shows the overspeed trip mechanism which automatically closes the throttle valve, thereby shutting down the turbine, if the speed increases to approximately 10% above normal.

As shown in this illustration, the trip weight "1" is carried in a hole drilled perpendicularly to the axis of rotation, either in the rotor shaft or in an overspeed trip body attached to the shaft. The center of gravity of the weight is slightly offset from the axis of rotation and normally it is held in place by the compression spring "2" and the retainer "4". If the speed of the turbine increases to the point for which the mechanism is set to operate (approximately 10% above normal) the weight "1", due to its increased centrifugal force, overcomes the compression of the spring "2" and moves outward striking the trip finger "6". The movement of the trip finger disengages the latch plates "10" and "11" thereby allowing the spring "18" to move the relay "17" upward. Upward movement of the relay, in turn, opens ports which release the oil pressure on the lower side of the throttle valve operating piston, closing the throttle valve and shutting down the turbine.

The mechanism can be tripped by hand by striking the trip lever "7" which disengages the latch plates "10" and "11", thus allowing the relay "7" to move upward and close the throttle valve in the same manner as described above. Tripping by hand, however, tests only the relay and throttle valve mechanism and does not test the overspeed trip weight and spring adjustment.

When this mechanism has operated, it must be reset by hand. This is accomplished by closing the throttle valve and then pulling upward on the resetting lever "13" until the latch plates "10" and "11" are again engaged. The resetting, of course, cannot be done until the turbine speed has decreased sufficiently to allow the overspeed trip weight to return to its normal position.

The turbine should be overspeeded occasionally to check the speed at which the weight "1" flies out, and actuates the trip linkage. 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 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 fails to fly out at the correct speed, the unit should be shut down and all 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. The linkage also should be inspected to see that all parts work freely. The overspeed test should again be run and if the same trouble results, it is evident that the compression of the spring "2" is not correct, and should be changed as follows.

In order to increase the tripping speed, insert thin liners or washers "3" (.005 to .010 thick) between the spring retainer "4" and the end of the spring so as to increase the spring compression.

In order to decrease the tripping speed, remove liners from between the retainer and the spring. In case there are no liners, grind the end of the spring squarely just enough to obtain the desired decrease in compression.

When making these adjustments, it is important to place the liners between the retainer "4" and the spring and not between the spring and the collar on the end of the weight.

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

Item No.	Name
1	Overspeed Trip Weight
2	Overspeed Trip Weight Spring
3	Overspeed Trip Spring Adjusting Liners
4	Overspeed Trip Spring Retainer
5	Overspeed Trip Spring Retainer Lock Washer
6	Overspeed Trip Finger
7	Hand Trip Lever
8	Overspeed Trip Finger Fulcrum Pin
9	Overspeed Trip Latch
10	Overspeed Trip Latch Plate
11	Overspeed Trip Resetting Lever Latch Plate
12	Overspeed Trip Resetting Lever Fulcrum Pin
13	Overspeed Trip Resetting Lever
14	Overspeed Trip Relay Pin
15	Overspeed Trip Relay Body Cover (Upper)
16	Gasket
17	Overspeed Trip Relay
18	Overspeed Trip Relay Spring
19	Overspeed Trip Relay Body
20	Overspeed Trip Relay Body Cover (Lower)

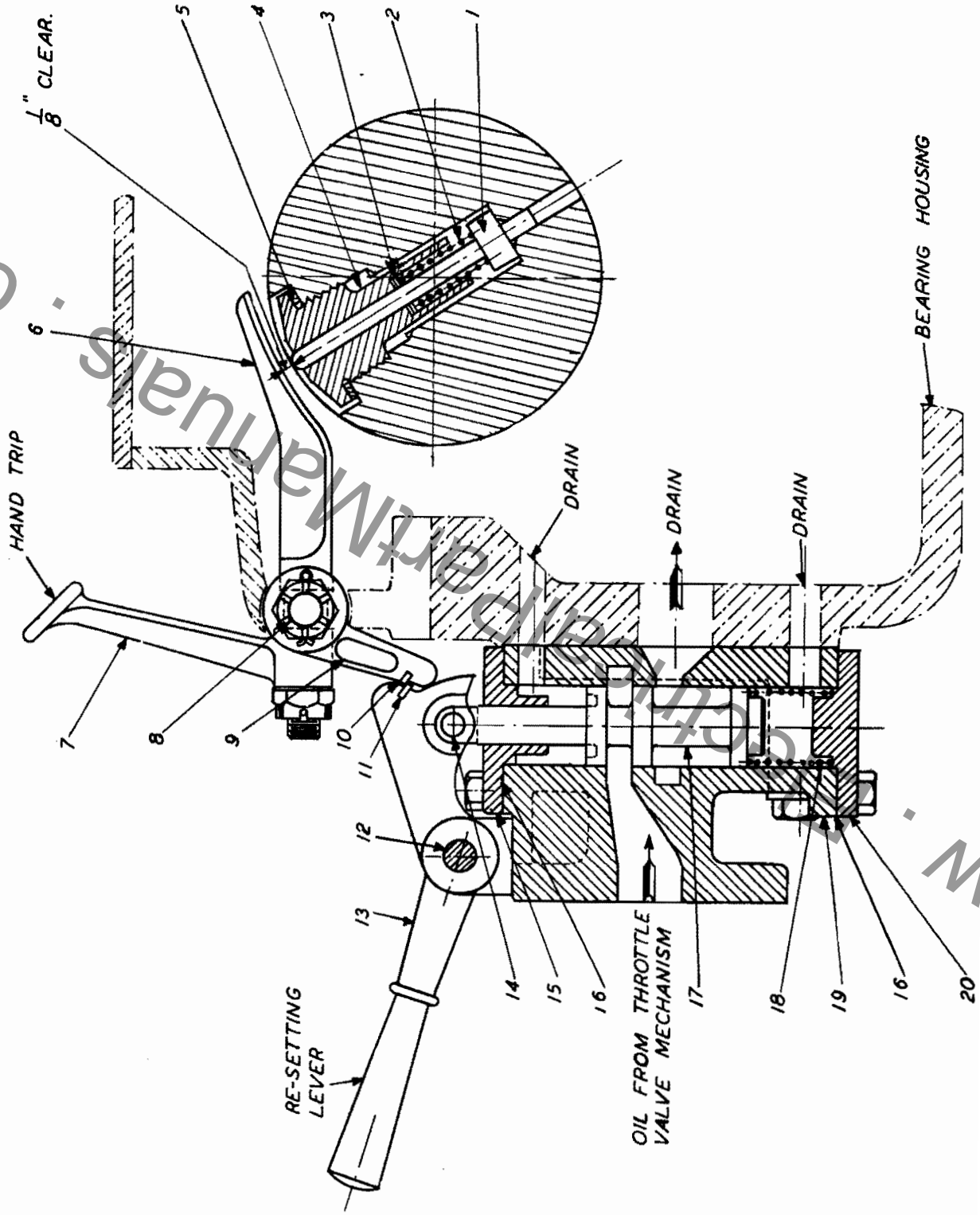

Fig. 1 - Assembly