



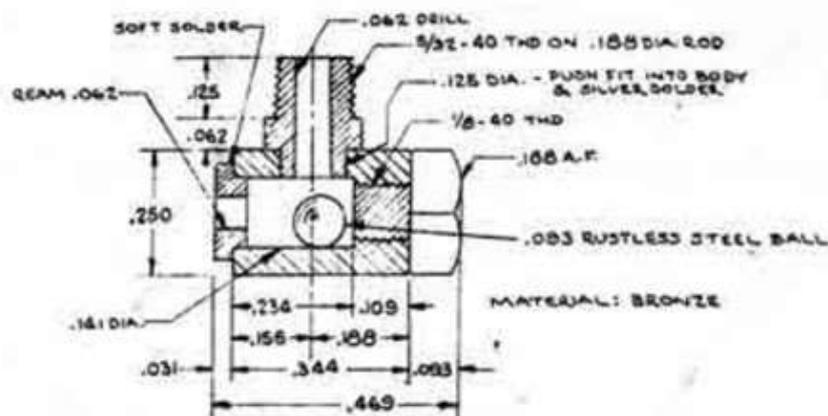
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## Automatic Drain Cocks

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Several 2 1/2" gauge enthusiasts have enquired about the automatic cylinder drain cocks installed on my Baltimore & Ohio 4-6-0, but until recently I have been reluctant to describe them in detail due to insufficient experience at the track, with them. Now, after a year in service, they seem to have performed well enough to justify this description. The cylinders of my engine have the typical LBSC proportions of 13/16 bore and 11/8" stroke, with 3/8" rust less steel valve bobbins in drawn bronze liners. The cylinders are cast gun metal without lagging, so condensation could hardly be worse, yet the cylinder cocks have proven able to clear condensate upon starting while remaining steam-tight in running. I do not know who the originator of the basic design is; it came to me from Bill Van Brocklin by way of my father, who has successfully fitted them to several 1" scale locomotives. At first glance these cocks might be expected to operate like a snifting valve, simply closing upon initial application of pressure, preventing exit of water.

In practice however, there seems to be sufficient turbulence within the valve chamber to bounce the ball around, preventing it from seating permanently until the water is cleared, the comparatively small ball in a large diameter, long, horizontal chamber enhances the effect of this turbulence. I cannot admit to having ever suddenly opening the regulator and starting out at a gallop immediately after raising steam - that would be foolish even with manually operated drain cocks - but by allowing the drivers to turn over slowly for a few revolutions, initial condensation is relieved, and from then on whenever the regulator is opened after a stand, the drain cocks can be heard to go "pff-frt", emitting a light spray and are thereafter silent and tightly closed. Despite my enthusiasm, a vestige of doubt inevitably lingers, as it does with any "automatic" device. Still, these cylinder cocks can be recommended where an unobtrusive fitting without complicated mechanical linkage is required and where reasonable care in operation is exercised.



## CONSTRUCTION TIPS

These fittings present somewhat of a machining problem because of their small size. I have found that the best procedure is to make certain parts one at a time, initially using full lengths of stock to facilitate handling; the partially fabricated part is then cut off, and assembly completed. The sequence of operations listed below was used in making my cylinder drain cocks.

Chuck a length of 1/4" dia. bronze rod and face end for drain cock body.

Remove rod from chuck. Drill a 1/8" dia. hole E" deep inside of rod using a fixture to accurately position hole. Temporarily leave rod full length; do not cut off body at this time.

Chuck a length of 3/16" dia. bronze rod and turn down end for 5/32" x 40 tpi thread. Drill 1/16" dia. hole 3/8" deep. Cut off about 5/16" from end and turn 1/8" dia. spigot for push fit into side of body.

Push bush (step 3) into body and silver solder.

Once again chuck length of 1/4" dia rod. Drill 0.093" dia. about 1/2" deep. Tap six threads using 1/8" x 40 tpi tap.

Cut off 1/2"(full) from end of rod. Reverse in chuck and turn length to 0.343". Drill 0.141" dia. hole 0.234" deep.

Remove from chuck and run 1/8" x 40 tpi tap through previously started threads at end of body. Repeat for required quantity of drain cock body assemblies.

Make plug from 3/16" AF hex rod. Thread 1/8 x 40 tpi 0.109" long, allowing relief at shoulder to permit drawing up plug tightly in body.

Turn valve seat from 3/16" dia. rod. Drill and ream 1/16" dia. hole, then biff valve seat with 3/32" diameter rust less steel ball.

Push valve seat into body and soft solder. To avoid applying excess solder, first hammer solder to about 1/64" thickness, then snip off a very small piece and apply to heated and fluxed body/seat assembly.

Lap seat with 3/32" dia. ball, using scouring powder for lapping compound. The lap is made with the ball epoxied to the end of a short length of rod or tube. Twirl tube between fingers as ball is pressed against valve seat.

Thoroughly clean drain cock, drop in a new rustless steel ball, then screw in and tighten plug.

Try each drain cock individually in cylinder. If necessary, run 5/32" x 40 die over bush to extend threads so that drain cock screws into cylinder tightly and with proper orientation.