CLAIMS

What is claimed is:

1. A frame apparatus for holding a flexible lance positioning mechanism adjacent to and spaced from a heat exchanger tube sheet, the apparatus comprising:

an upper guide rail;

a lower guide rail;

a positioner rail supported from one of the upper and lower guide rails and guided by the other of the upper and lower guide rails; and

a rail clamp assembly fastened to a portion of a tube sheet, the rail clamp assembly operably holding one of the upper and lower guide rails in a fixed position with respect to the tube sheet, the rail clamp assembly comprising:

a flat plate or beam member adapted to be fastened to the tube sheet;

a base plate spaced from the flat plate by one or more threaded shafts;

one or more clamp fingers rotatably fastened to the base plate, wherein the one or more clamp fingers is operable to rotate toward the base plate when the base plate is drawn against the flat plate or beam member.

2. The apparatus according to claim 1 wherein the flat plate or beam member is an elongated beam having the rail clamp assembly at a distal end of the beam and a screw clamp assembly at a proximal end of the beam.

3. The apparatus according to claim 1 wherein the flat plate or beam member is a generally trapezoidal shaped plate having a curved bottom edge and a plurality of apertures therethrough adjacent the bottom edge for receiving a plurality of bolts to fasten the member to the tube sheet.

4. The apparatus according to claim 3 wherein the base plate has a pair of spaced apart fingers rotatably supported therein and a pair of spaced apart threaded shafts beneath each of the fingers fastened to the base plate.

5. The apparatus according to claim 1 wherein each of the fingers engage a ball nose spring plunger in a first position permitting a rail to be attached to the

assembly and in a second position permitting the rail to be translated along the base plate.

6. The apparatus according to claim 5 wherein the threaded shaft draws the one or more fingers to a third position engaging the rail to hold rail within the rail clamp assembly.

7. A frame apparatus for holding a flexible lance positioning mechanism adjacent to and spaced from a heat exchanger tube sheet, the apparatus comprising:

an upper guide rail;

a lower guide rail;

a positioner support rail supported from the upper guide rail and restrained for lateral movement only along the lower guide rail; and

a plurality of rail clamp arm assemblies each configured to be fastened to a portion of a heat exchanger tube sheet so that each of the rail clamp arm assemblies operably holds one of the guide rails in a fixed position with respect to the tube sheet, each rail clamp arm assembly comprising:

an elongated beam having a screw clamp at a proximal end of the beam for fastening the elongated beam to the heat exchanger tube sheet; and

a rail clamp assembly at a distal end of the beam operable to releasably receive, hold and clamp a portion of one of the guide rails therein, wherein each rail clamp assembly includes a threaded hand screw threaded through the distal end of the beam into a base plate, a static clamp jaw fastened to the base plate, and a hooked clamp finger rotatably fastened to the base plate opposite the static clamp jaw.

8. The apparatus according to claim 7 wherein the clamp finger is rotatably fastened in a rectangular notch to the base plate via an axle screw.

9. The apparatus according to claim 8 wherein the hooked clamp finger has a parallel sided stem portion in the notch, a hook portion that extends toward the static clamp jaw and an opposite hammerhead portion that extends beyond a rear edge of the stem portion.

10. A frame apparatus for holding a flexible lance positioning mechanism adjacent to and spaced from a heat exchanger tube sheet, the apparatus comprising:

an upper guide rail;

a lower guide rail;

a positioner support rail supported from one of the upper and lower guide rails and restrained for lateral movement along the other of the guide rails; and

a plurality of rail clamp assemblies operable to releasably receive, hold and clamp a portion of one of the guide rails therein, each rail clamp assembly having a support plate adapted to be fastened to a peripheral portion of a heat exchanger tube sheet, a hand screw threaded through the support plate and rotatably fastened into a base plate, a static clamp jaw fastened to the base plate, and a hooked clamp finger rotatably fastened to the base plate opposite the static clamp jaw.

11. The apparatus according to claim 10 wherein the clamp finger is rotatably fastened in a rectangular notch to the base plate via an axle screw.

12. The apparatus according to claim 11 wherein the hooked clamp finger has a parallel sided stem portion in the notch, a hook portion that extends toward the static clamp jaw and an opposite hammerhead portion that extends beyond a rear edge of the stem portion.

13. The apparatus according to claim 12 wherein the hooked clamp finger is rotated toward the static clamp jaw when the hand screw tightens the base late against the support plate.

14. The apparatus according to claim 11 wherein each rail clamp assembly further comprises a ball nosed plunger extending from the base plate into the notch

so as to engage a depression in the hooked clamp finger to releasably hold the finger in an open position to receive a portion of a guide rail between the finger and the static clamp jaw.

15. The apparatus according to claim 12 wherein the hooked clamp finger is rotatably supported on an axle screw extending across the notch.

16. The apparatus according to claim 15 wherein the hammerhead portion extends toward the support plate from the base plate when the base plate is spaced from the support plate and causes the hook shaped finger to rotate toward the static clamp jaw when the base plate is fastened against the support plate.

17. The apparatus according to claim 15 further comprising a ball nosed plunger extending from the base plate into the notch above the axle screw.

18. The apparatus according to claim 17 wherein the plunger releasably engages a first detent in the hook shaped finger when the base plate is spaced from the support plate and the finger is rotated to a release position and engages a second detent in the hook shaped finger when the hook shaped finger is rotated to hold a rail between the hook shaped finger and the static clamp jaw.