PLUGS

Several types of plugs are available for use with the X, XN, R and RN lock mandrels.

Figure 1 illustrates a Type XX or a Type XXN plug assembly. The Type XX plug consists of a standard X lock mandrel (1), a standard X equalizing sub (2), and a valve cap (3) (bull plug). The Type XX plug may be installed in any X (selective) landing nipple in the well.

The Type XXN plug consists of a standard XN (no-go) lock mandrel, a standard X equalizing sub, and a valve cap. (Same equalizing sub and valve cap as used on XX plug.) The XXN plug may be set only in the XN "no go" landing nipple.

Note: The X lock mandrel may be converted to a XN lock mandrel by removing the X locking keys and replacing them with XN locking keys (or vise versa).

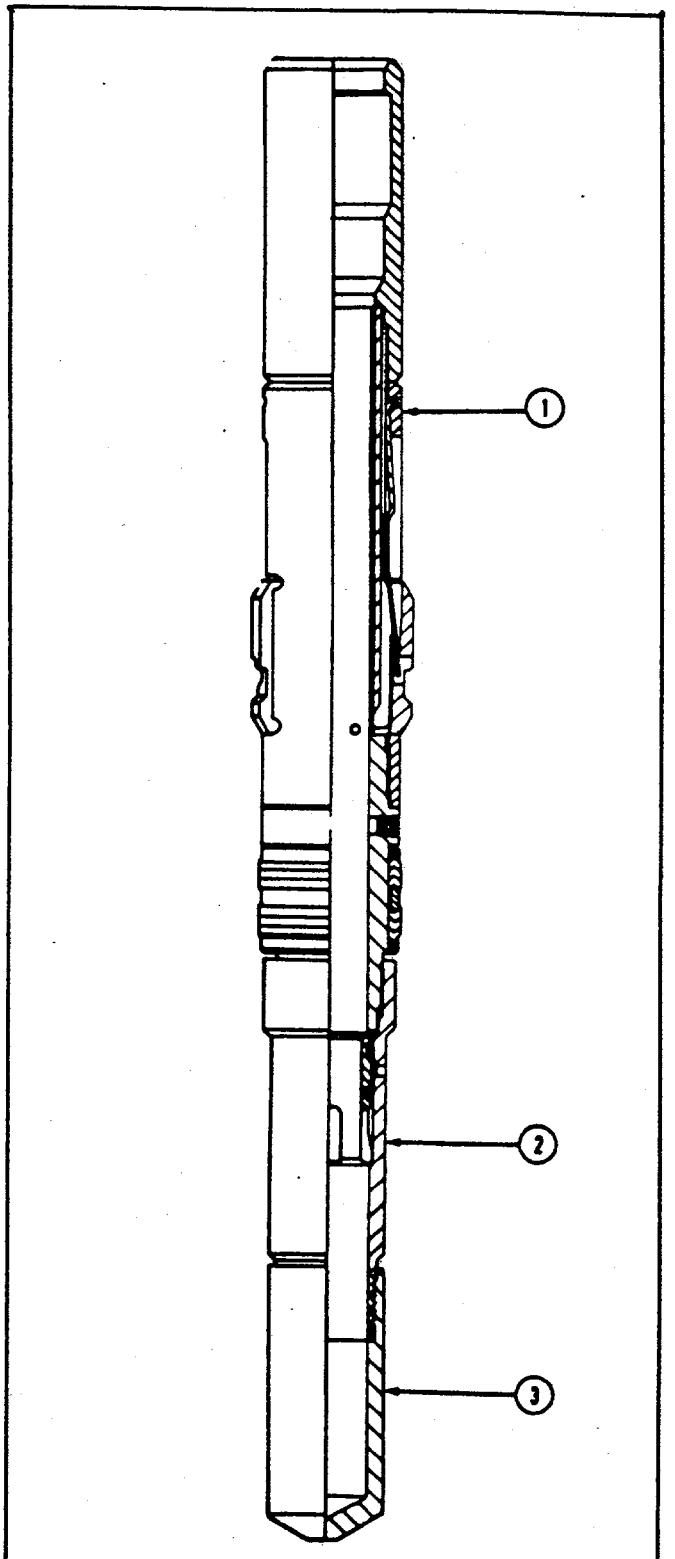


Fig 1

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Figure 2 illustrates the Type RR or a Type RRN plug assembly. The Type RR plug consists of a standard R lock mandrel; a standard R equalizing sub, and a valve cap. The RR plug may be installed in any R (selective) landing nipple in the well.

The Type RRN plug assembly consists of a standard RN lock mandrel, a standard R equalizing sub, and a valve cap. (Same equalizing sub and valve cap as used on the RR plug.) The RRN plug may be set only in the RN "no-go" landing nipple.

Note: The R lock mandrel may be converted to a RN lock mandrel by removing the R locking keys and replacing them with RN locking keys. (or vise-versa)

When running and installing these plugs (XX, XXN, RR, and RRN) a running prong must be used in conjunction with the running tool. The prong will hold the equalizing valve open to allow fluid by-pass during installation and will close the equalizing valve when the running tool releases from the plug assembly.

When retrieving these plugs, an equalizing (pulling) prong must be attached to the pulling tool in order to "open" the equalizing valve. Once the equalizing valve is open, time MUST be allowed for COMPLETE equalization of any pressure differential (from above or below) before attempting to unlock and retrieve the plug assembly.

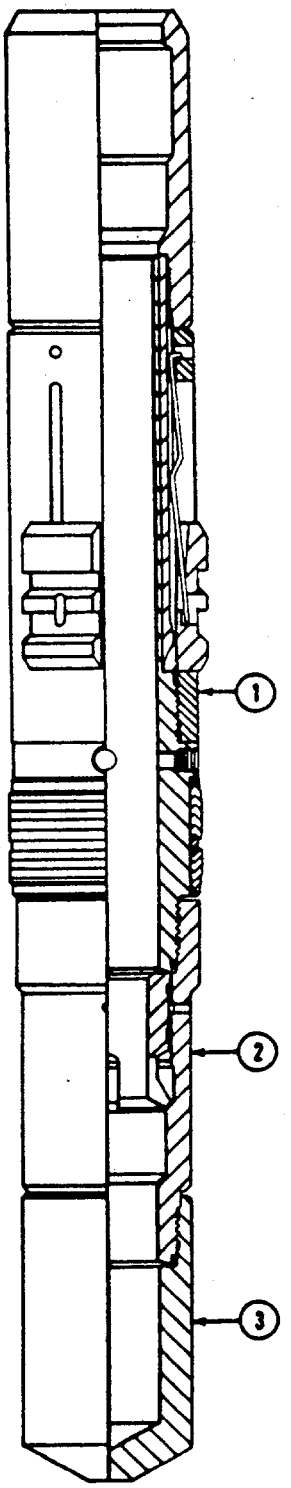


Fig 2

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Figure 3 illustrates a Type PX or Type PR equalizing assembly. This assembly consists of a prong assembly (1), a prong housing (2) and a valve cap (8). When attached to an appropriate lock mandrel, the assembly becomes a tubing plug that will simultaneously plug the tubing in both directions (from above and from below).

The PX equalizing assembly is used on the standard X and XN lock mandrels. The Type PR equalizing assembly is used on the standard R and RN lock mandrels.

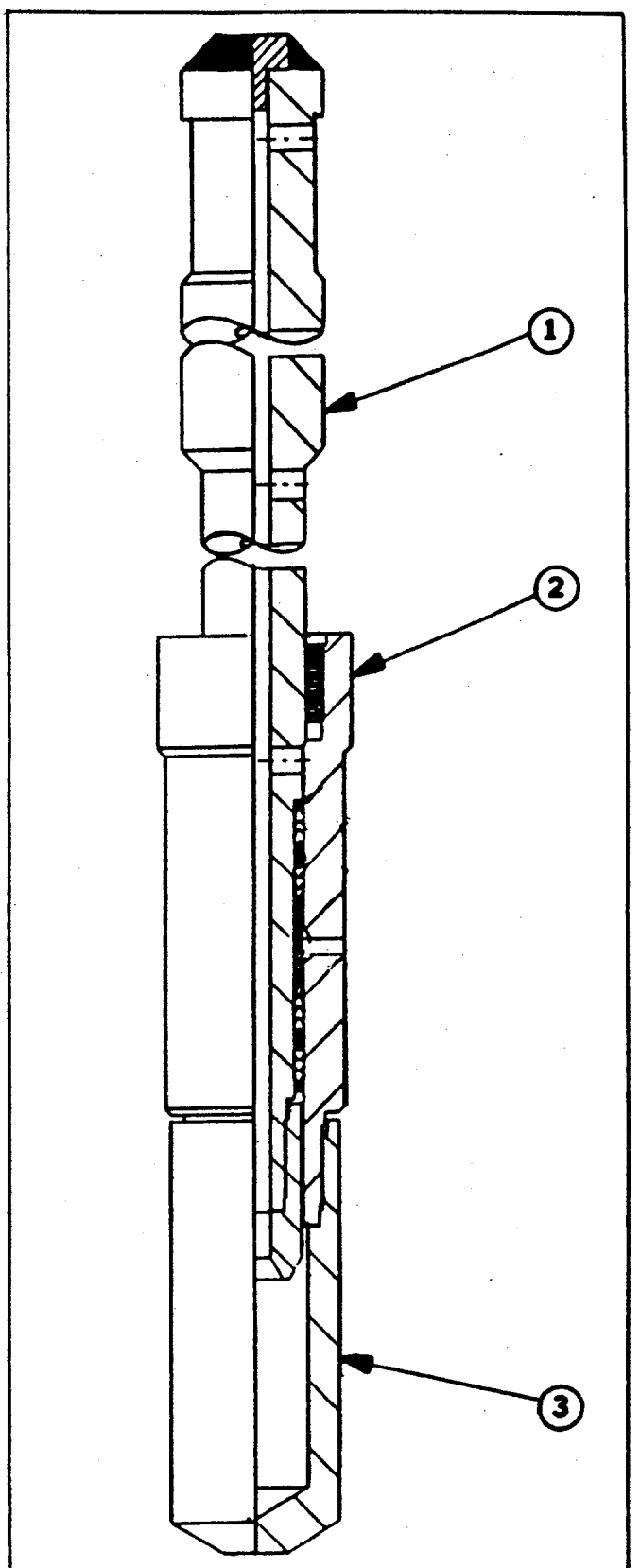


Fig 3

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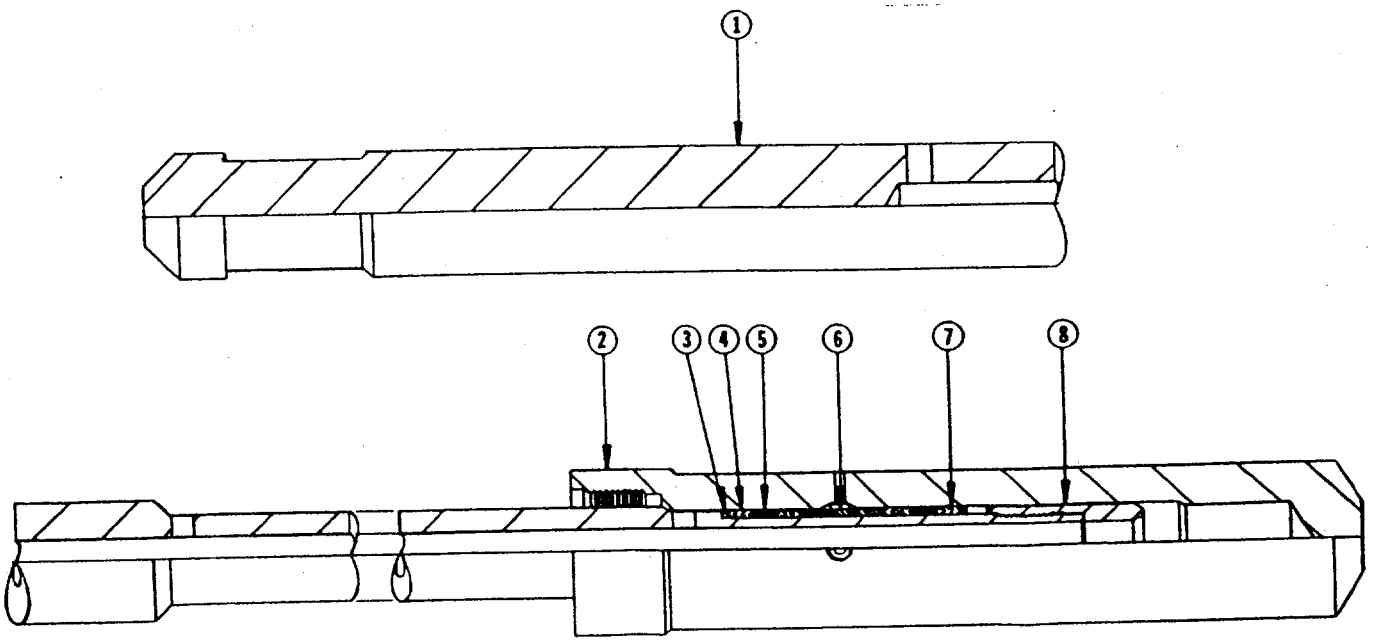


Fig 4

ITEM NO.	NAME	QTY.
1	Prong	1
2	Housing	1
3	Female Adapter	2
4	Vee Packing	8
5	Dbl. Male Adapter	2
6	Dbl. Female Adapter	1
7	Vee Packing	4
8	Packing Nut	1

Figure 4 illustrates a Type PXX or a Type PRR equalizing assembly. These assemblies are a more recent and improved design than the PX and PR equalizing assemblies that are shown in Figure 3.

The improvements are:

1) The prong housing (2) for PXX and PRR equalizing assemblies (Fig. 4) is of "one piece" construction and does not require a valve cap.

2) The prong housing (2) has four equalizing ports with three of the ports being threaded to accept plugs. This allows the user to select the number of ports best suited to the well conditions that the assembly is to be used in. The older PX and PR prong housings have only two unthreaded equalizing ports.

The PXX equalizing assembly is used on the standard X and XN lock mandrels. The PRR equalizing assembly is used on the standard R and RN lock mandrels.

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Figure 5 illustrates a PX, PXN, PR or PRN plug assembly, dependent upon the lock mandrel being used. (X, XN, R, or RN). These plug assemblies are used to plug the tubing in both directions (from above and below).

Two wireline trips are required to run the plug and two trips are required to pull the plug. First the prong housing and valve cap are made up to the appropriate lock mandrel.

This assembly (lock mandrel, housing and valve cap) is run into the well and is installed in the appropriate landing nipple (X, XN, R or RN). A running prong is not required because the equalizing ports in the prong housing are open to provide fluid by-pass up through the assembly.

A second wireline trip is required to run and install the prong in the previously installed assembly. As the lower set of seals on the prong enter the seal bore in the prong housing, any fluid in the housing and valve cap is allowed to displace up through the bore of the prong and out through the side ports in the prong, above the seals. Light downward jar action moves the prong down until a no go shoulder on the prong stops on an internal shoulder in the prong housing. At this point the ports in the prong housing are isolated between the upper and lower seals on the prong and the tubing is plugged in both directions (from above and below).

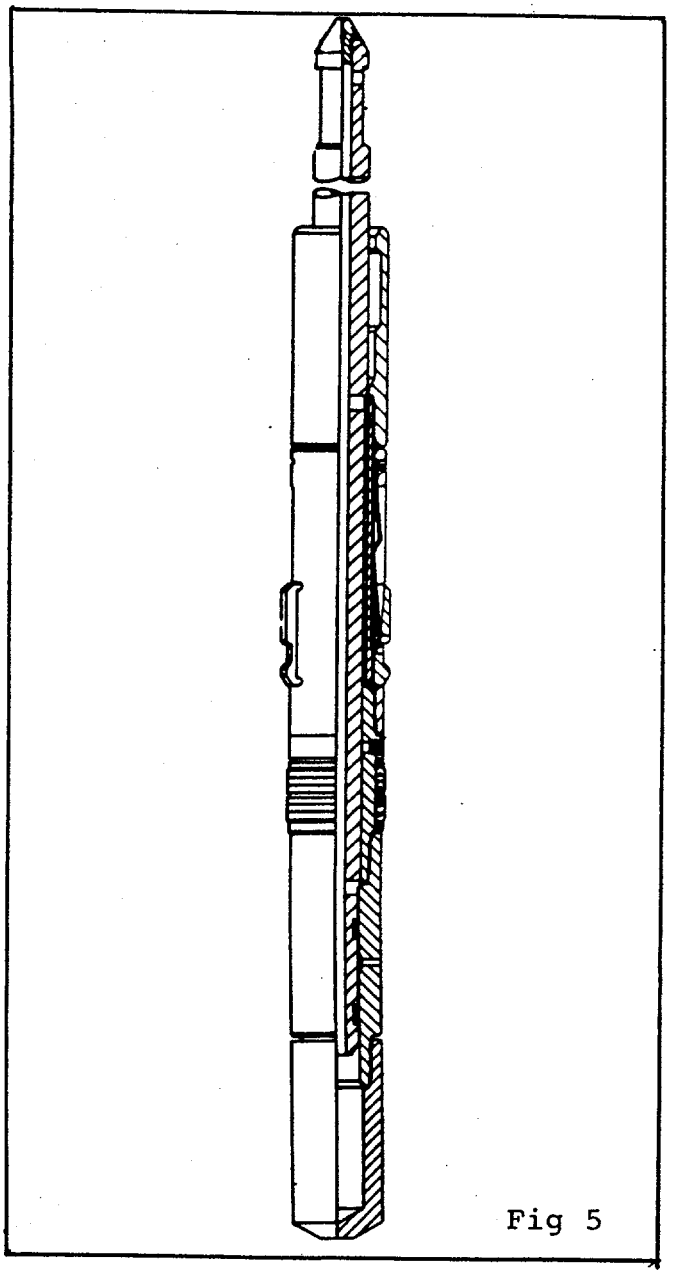


Fig 5

Two wireline trips are required to retrieve this plug assembly. First, the prong is retrieved. This allows equalization of any pressure differential across the plug assembly. A second wireline trip is required to retrieve the lock mandrel/prong housing assembly.

This type of plugging device is designed for use in wells where sand or other sediment may settle into or around the plugging device.

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