УДК 622.276.34

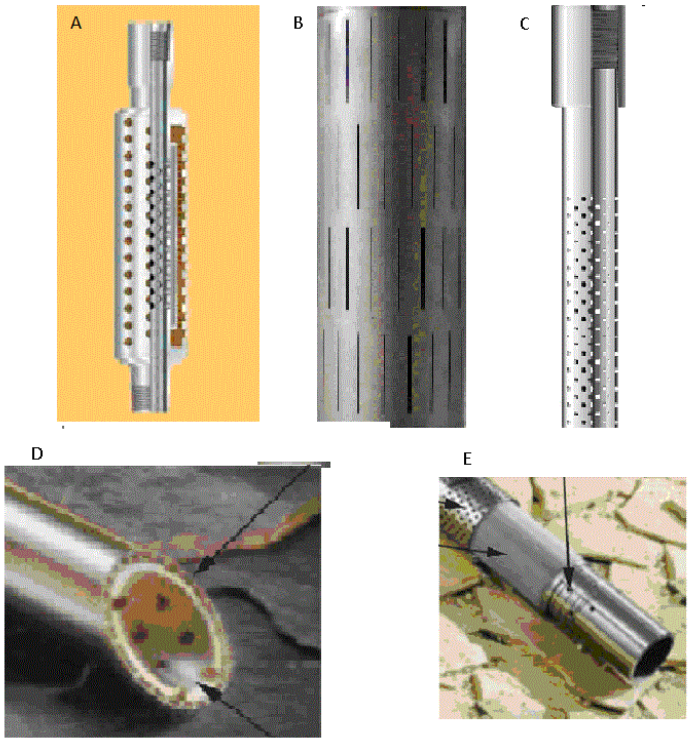
WELL FILTER

Ledkov A.O.
Scientific supervisor: candidate of science, professor SFU Kondrashov P.M.
Siberian Federal University

Production reliability is essential in offshore and maximum productivity is important anywhere. The control of sand flow in unconsolidated formations can be one of the most critical problems in well completion. There is the sand control technology it is chemical and mechanical solutions. The experience of hydrocarbons recovery shows that rational way of getting rid of sand in the bore-hole filters installation. The main advantages of applying well screens are:

1. Improving the quality of extracting hydrocarbons;
2. Prolongation of downhole equipment operation life by preventing sand and other solid fractions;
3. Reduction of tubing string wear.

There are currently many types of well screens (fig.1), but the most widely used are frame-rod well screen, ringed well screen and perforated well screen. Design of each well screen requires a separate approach for the accurate calculation of seepage flow to the well.



A - gravel-packed filter; B - slotted strainer; C – perforated filter;
D – wire – wrapped filter; E – gauze filter.

Figure 1 – Well strainer

The things that affect well screen design are:

1. Required production (GPM);
2. Required fluid quality (human consumption, agricultural, industrial, irrigation, etc…);
3. Well depth (feet below surface determines radial and axial pressure);

4. Production zone thickness (total vertical feet of aquifer);
5. Porosity of production zone (how coarse, sharp, tight or homogeneous the production layer is);
6. Casing diameter (if water well has telescoping screen, the screen must fit inside casing);
7. Available funds.

Once the need for a screen has been established, it is necessary to select the proper slot size. This slot size is determined by examining and analyzing the cuttings recovered from the borehole. A slot size is then selected which allows water to freely enter the well while holding back the majority of the aquifer material. If the slot size is too large, sand will pass through the screen along with the water, go through the pump and enter the distribution lines. This not only is a nuisance, it will also cause excessive wear on the pump, thus shortening the life of the pump. If the slot size is too small, water will not freely enter the well which can erroneously give the impression that the well is running dry. This condition also makes the pump work harder, shortening it's effective lifetime.

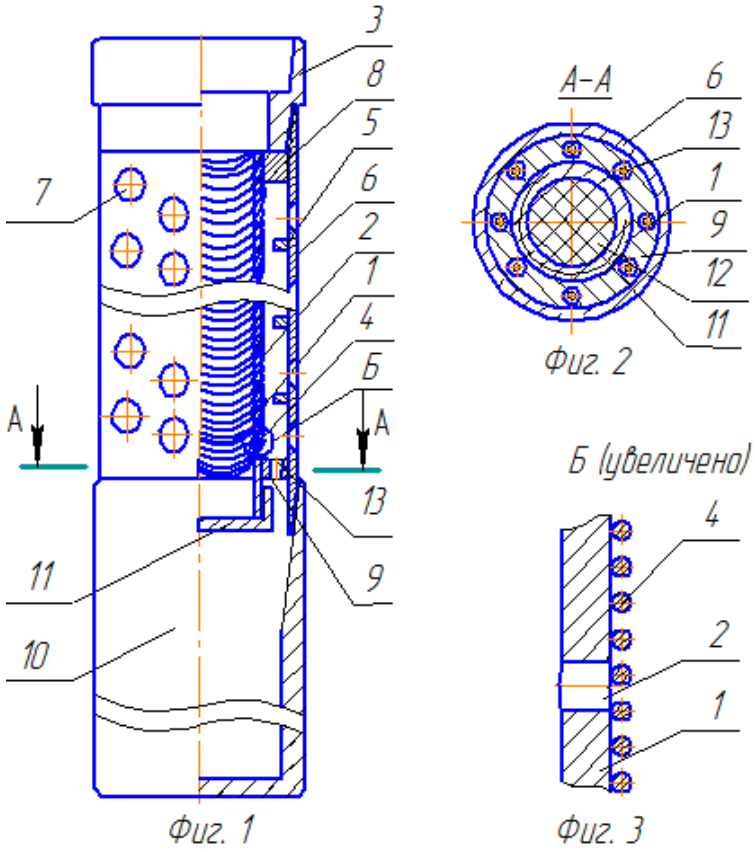


Figure 2 – Well filter

Well filter (fig.2), includes perforated pipe with joint sleeve, wire winding, spiral stiffeners, perforated protection housing and catching chamber. Stiffeners are mounted at the inner surface of protection housing. Rings are installed between the housing and pipe at top and bottom parts, so that the bottom ring features holes connecting space between pipe and protection housing to the catching chamber. Wire winding and pipe hole rows are directed opposite to stiffeners and housing hole rows. Inner space of the pipe is screened from the catching chamber by a cover. This innovation increased operation life of filtering surface.

Аннотация

В работе рассмотрены наиболее применяемые виды фильтров, их достоинства и недостатки. Основные параметры и требования, которым должен соответствовать скважинный фильтр. Применение правильно подобранного скважинного фильтра позволяет эксплуатировать скважину с высоким дебитом в течение длительного времени. Предложена конструкция скважинного фильтра, патент на изобретение №2439293, позволяющая увеличить время работы фильтрующей поверхности, как следствие увеличить межремонтный период работы скважины.