COMMERCIAL FISHERIES REVIEW

February 1954 Washington 25, D.C. Vol.16, No.2

DRUM SEINING--A NEW DEVELOPMENT IN THE PUGET SOUND SALMON FISHERY

By Keith A. Smith*

DRUM SEINING INTRODUCED

A new type purse-seine vessel has appeared in the Puget Sound, Washington, salmon fishery. In place of the conventional turntable, this vessel uses a large drum or reel mounted on the stern for setting, rewinding, and carrying the purse seine. Although one such drum seiner has been fishing out of Bellingham for several years, the first general trend toward the use of this new method became noticeable at the start of the 1953 season at which time 11 other seiners had been converted to this type of gear. The system originated in Canada, where a number of British Columbia fishermen have been operating drum-seine boats successfully for several years.

FIG. 1 - DRUM SEINER ON BOUNDARY BAY, PUGET SOUND.

Doubts were expressed at the beginning of the 1953 season by some fishermen as to the ability of drum seiners to catch sufficient numbers of salmon, especially in deep water and tide rips. A number of problems in operating the new gear were encountered at first, but results indicate that most of the drum seiners had a successful season. Statistics collected for July 1953, in the Point Roberts-Boundary Bay area where most of these boats fished, show an average catch of 317 salmon per boat per day for the drum seiners as compared with 219 salmon per boat per day for the conventional seiners.[1/] According to a reliable report, a drum seiner was high boat for the season in this area.

As a result of this excellent showing, many additional purse seiners are expected to be converted to drum seining for the 1954 season. The Bellingham firm that performed the conversions on 10 of the 12 boats that operated in 1953 is reportedly swamped with orders. Some observers feel that a revolution in the purse-seine fleet is under way.

DESCRIPTION OF GEAR AND EQUIPMENT

The main unit of gear in this system is the drum or reel upon which the seine is wound. This drum is mounted on the stern of the vessel either above the deck or in a well that is built into the deck (figure 2). It is constructed of sheet steel and is designed to hold from 250 to 300 fathoms of purse seine. The drum is 6 to 8 feet in diameter and as long as the beam of the vessel will permit. The diameter of the core is about 10 inches.

*FISHERY METHODS AND EQUIPMENT SPECIALIST, EXPLORATORY FISHING AND GEAR DEVELOPMENT SECTION, BRANCH OF COMMERCIAL FISHERIES, U. S. FISH AND WILDLIFE SERVICE, SEATTLE, WASHINGTON.

1/UNPUBLISHED STATISTICS OF THE WASHINGTON STATE DEPARTMENT OF FISHERIES.

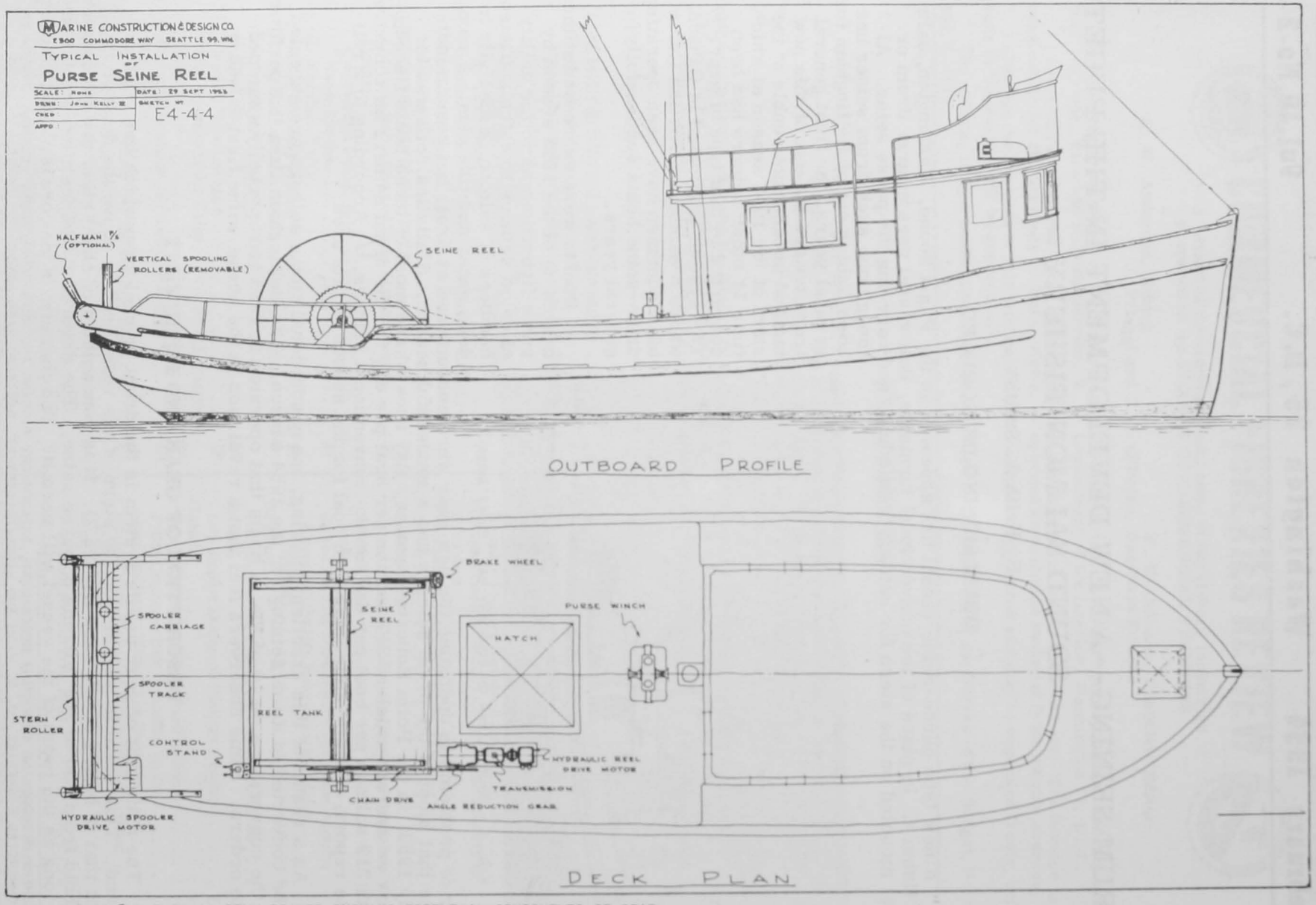

FIG. 2 - TYPICAL DRUM SEINER SHOWING ESSENTIAL COMPONENTS OF GEAR.

At the stern a roller is provided that is similar in design and function to the roller of the conventional seiner. It is free to turn with the seine as the seine is being set or hauled.

A spooler is provided for bunching the seine and winding it evenly on the drum as it is being hauled. This spooler consists of two vertical rollers, a carriage, and a

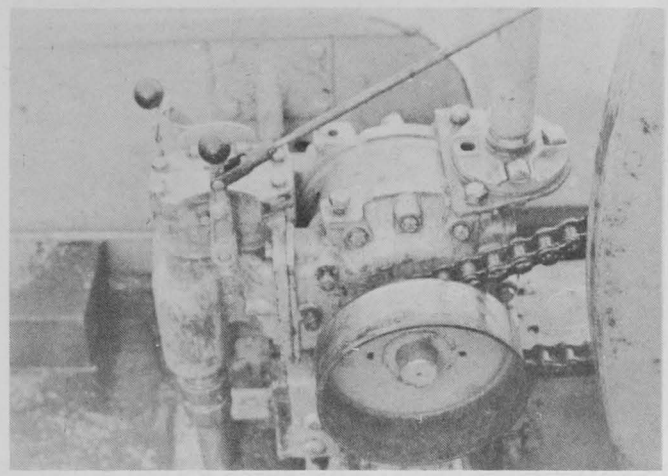

FIG. 3 - HYDRAULIC-DRIVE UNIT FURNISHING POWER FOR THE DRUM THROUGH A CHAIN AND SPROCKET; USED ON SOME DRUM SEINERS.

FIG. 4 - THE SKIFF IS TOWED PREPARATORY TO MAKING A SET.

carriage track. The rollers are about 6 inches in diameter, 30 inches high, and 15 inches apart. They are set in sockets in the carriage, which runs back and forth on the track across the stern of the vessel while the net is being reeled in. When the net is being set, the spoolers are removed from their sockets.

The drum is rotated by means of a mechanical or hydraulic system. In the mechanical system, power is taken either from the winch drive or directly from the main engine by means of gears and shafting to a truck transmission that is mounted just forward of the drum. The transmission provides for variation in speed and for reversing the rotation of the drum. It is coupled to a differential or angle reduction gear that drives the drum by means of a chain and sprocket. The hydraulic system utilizes a hydraulic pump mounted on the main engine and a hydraulic motor located near the drum. A gear transmission may or may not be used between the drum and the hydraulic motor (fig. 2 and 3). The spooler may be driven by means of a mechanical, hydraulic, or electrical system.

FIG. 5 - A SET IS STARTED AS THE SEINE UNWINDS RAPIDLY FROM THE DRUM. THE ROLLERS OF THE SPOOLER ARE REMOVED FROM THEIR SOCKETS WHILE THE SEINE IS BEING SET. ONE OF THESE ROLLERS CAN BE SEEN STOWED JUST BEHIND THE FISHERMAN'S RIGHT WRIST.

For use in drum seining, the seine must be hung so that the lead line is nearly the same length as the cork line. The common practice is to hang 11 fathoms of web to 10 fathoms of cork line

and $9\frac{1}{2}$ fathoms of lead line. Some fishermen feel that a completely "square" hanging, with lead lines and cork lines of equal length, would be even better. If the lead line is

FIGS. 6 AND 7 - THE SEINE IS TOWED BY THE BOAT AND SKIFF BEFORE IT IS CLOSED AND PURSED.

1/10 shorter than the cork line, as in the conventional seine, excessive strain is put on the lead line when it is being set or hauled, which may cause it to part. The seines for drum operation are 250 to 300 fathoms long, and are made up of 3 strips of $4\frac{1}{4}$-inch mesh (stretched measure) of cotton webbing, each strip 100 meshes deep.

ADVANTAGES OF DRUM SEINING

The chief advantages of this gear are that it reduces the number of crew members required to operate the boat; it allows a set to be made in much less time; and it hauls the net by power so that much less labor is required by the fishermen. A crew of 5 men is used on the drum seiner as compared with a crew of 9 on the conventional type seiner. Since fishing is done on a share basis, this means each fisherman and the boat

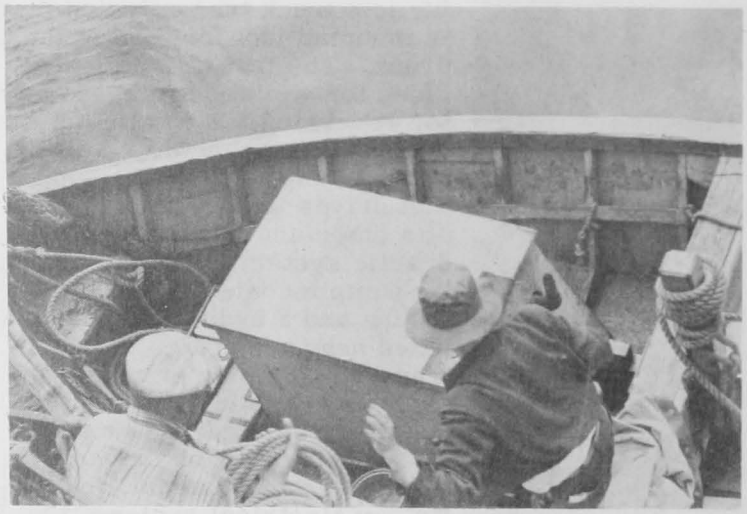

FIG. 8 - THE RUNNING LINE IS PASSED FROM THE SKIFF TO THE BOAT.

FIG. 9 - THE SKIFF TOWS THE VESSEL AWAY FROM THE SEINE DURING PURSING AND HAULING

owner receives a proportionally larger share. Individual sets are completed in as little as 40 minutes, making possible up to 20 sets per day, a great increase over the 8 to 10 per day possible with conventional gear. These two factors can, of course, result in more money for the drum-seine crews and operators. In addition, the work is easier.

Instead of 7 or 8 fishermen pulling 250 or more fathoms of seine out of the water and stacking it on the turntable each time a set is completed, one man operates two levers

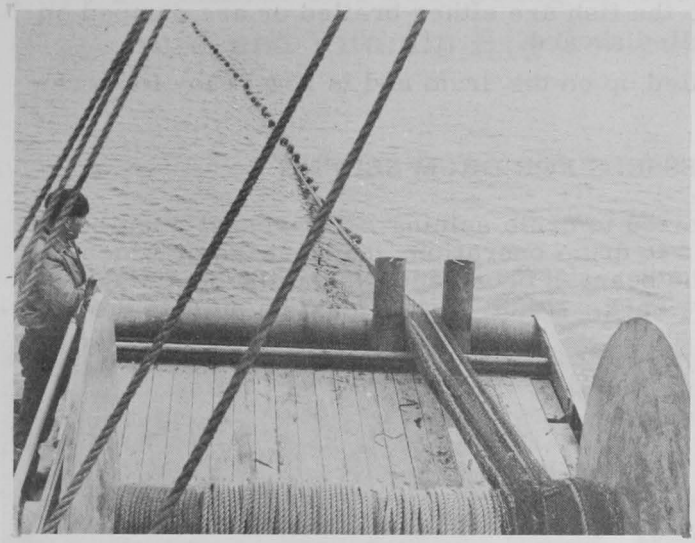

FIG. 10 - PURSING AND HAULING OF THE SEINE ARE STARTED SIMULTANEOUSLY. THE FISHERMAN AT THE LEFT CONTROLS THE ACTION OF THE DRUM AND THE LEVEL-WIND SPOOLER, BOTH OF WHICH ARE GEARED TO THE MAINE ENGINE ON THIS PARTICULAR VESSEL.

FIG. 11 - THE PURSE RINGS ARE DRAWN UP TO THE DAVIT.

controlling the rotation of the drum and the position of the spooler. Power from the main engine does all the work of rolling up the seine in proper order for making a new set. The fishermen are not so exhausted after a day of fishing.

Another advantage of drum seiners, or at least those with wells, is that the seine can be easily treated with salt or bluestone solution by filling the well with the solution and rotating the net in it.

METHOD OF OPERATION

The setting and hauling of the seine, similar in many respects to conventional purse seining, is as follows:

1. The fishing area is searched, with the seine skiff in tow. The fish-bag end of the seine is secured to the skiff (fig. 4).
2. When fish are located, the skiff is released, the net starts to unwind from the drum (fig. 5).
3. The seine is paid out in nearly a straight line until most of the net is in the water. It is then towed into a U shape by the skiff and the vessel running parallel courses into the tidal flow or toward the area where the fish are believed to be. The net is towed for several minutes in this manner before it is closed (fig. 6 and 7).
4. The net is closed and the running line and purse line are passed from the skiff to the boat (fig. 8). The skiff is then taken around to the opposite side of the boat and is used to tow the boat away from the seine. (This towing is done to prevent the seine from bunching up under the boat and possibly becoming fouled in the propeller.) (fig. 9)
5. The bunt end of the net is pursed, and the wing end of the net is started onto the drum immediately after the circle is closed (fig. 10).
6. Pursing is continued until the purse rings are drawn up to the davit at which time they are threaded onto a device called a "clothespin" and are then hoisted to deck level (fig. 11 and 12).

7. Reeling in the seine is continued, with the seine coming in over the stern and the purse rings being pulled off the clothespin by their bridles (fig. 13).

8. As on the conventional seiners, the fish are either brailed or are dumped on deck as the fish-bag end is pulled aboard.

9. The remainder of the net is rolled up on the drum and is now ready for a new set.

CONVERSION OF VESSELS FOR DRUM SEINING

Not all purse seiners can be converted to drum seining. The vessel must be of suitable design. In converting a seiner to drum operation, the first factor which the owner must consider is stability. If the beam is broad enough and the boat stable enough, the reel may be mounted above deck. If not, a well must be built in the after-

FIG. 12 - THE "PURSE RINGS ARE THREADED ONTO THE "CLOTHESPIN" AND HOISTED INTO POSITION AT DECK LEVEL.

FIG. 13 - THE PURSE RINGS ARE PULLED OFF THE CLOTHESPIN BY THEIR BRIDLES, ONE BY ONE, AND GO BACK OVER THE ROLLER AND ON TO THE DRUM ALONG WITH THE PURSE LINE AND THE OTHER PARTS OF THE SEINE.

deck. The drum is installed in this well so that about one-third of the diameter of the reel is below the deck level, thus lowering the center of gravity. When the well is installed, adequate provision must be made for strengthening the deck. Otherwise, the vessel might be greatly weakened, since it is necessary to cut the deck open almost from gunwale to gunwale.

It is quite possible that in the near future new purse seiners will be designed and built especially for drum seining. It appears, however, that most of those in operation next year will be converted from the conventional purse-seine type. As in all new developments, the first models have had numerous sources of trouble which needed to be worked out. Many of the problems have been solved, others will be also as more experience with the method is gained. For use in other fisheries which require that the seine net be quickly set in a complete circle, two possible improvements have been suggested: (1) a swivel arrangement on the entire drum installation, or (2) the use of a vertical drum in place of the horizontal drum. The drum seiner of the future will undoubtedly have many improvements over the present, and should gradually evolve into an even more efficient unit.