

受験番号 : 30IPM015

問 1

As depicted in fig. 7 and 8, a conventional squid-fishing apparatus includes: traction drums B installed on a hull A in an affixed manner and parallel to the side of the vessel; a flip-up squid landing bay C extending from the positions of installation of the traction drums B outward of the side of the vessel; guide rollers D (also referred to as tip rollers) attached to the front edge of the squid landing bay C; and fishing lines F that include front ends with weights E attached thereto and extend from the traction drums B through the guide rollers D into the sea, wherein the squid-fishing apparatus is configured to wind the fishing lines F by driving the traction drums B by means of a drive roller in a manner such that squids caught on fish hooks attached to the fishing lines F can be dropped onto the squid landing bay C while the fish hooks are being moved from the guide rollers D toward the traction drums B. Squids caught by such a squid-fishing apparatus naturally drop onto the squid landing bay C owing to the weight thereof while the fish hooks are being moved from the guide rollers D toward the traction drums B. Hence, much manpower is not required for pulling up the squids so that fishermen can focus on the task of monitoring machine operations and post-processing for caught squids, thereby providing, among other things, the advantage of performing tasks efficiently with relatively small number of workers.

[0003]

Problems to be Solved by the Device

In the meantime, the traction drums of such a conventional squid-fishing apparatus are arranged along the side of the hull, and hence the number of traction drums that can be installed is dependent on the length of the side of the hull. Thus, the hull size has been a factor that inevitably limits the number of squid-fishing apparatuses that can be installed. Such a conventional squid-fishing apparatus can be typically provided

with only one or at most two traction drums per squid landing bay. The traction drums of the conventional squid-fishing apparatus are installed on the deck. Accordingly, a worker in operation could be caught in the rolling drum, and in some reported cases, a weight attached to a fishing line being would up jumps onto the vessel and hit and killed a worker. Thus, the conventional squid-fishing apparatus involves a risk of serious accident during operations.

問 2

[0014] Numeral 41 indicates a drive-force/axial-force/motor-torque calculation unit. The drive-force/axial-force/motor-torque calculation unit determines an axial force, a drive force, and a motor torque from loads, shaft diameters, frictional coefficients, and pressure angles stored in a load/shaft-diameter/frictional-coefficient storage unit 21 and gear positions and gear sizes stored in a gear-position/gear-size storage unit 22. The following describes calculation principles by referring to fig. 2.

[0015] In fig. 2, G_n indicates a gear currently focused on; G_{n-1} , a gear on the drive side of the gear G_n ; G_{n+1} , a gear on the load side of the gear G_n . The gear G_n receives, from the gear G_{n-1} , a drive force (T_{n-1}) in a direction of a pressure angle α with reference to a tangent and receives, from the gear G_{n+1} , a reaction force ($-T_{n+1}$) applying a drive force (T_{n+1}) in a direction of a pressure angle α with reference to a tangent.

[0016] The total of these two forces is transferred from the gear G_n to a shaft S_n as an axial force A_n . While the gear G_n is rotating, the axial force A_n generates friction between the gear G_n and the shaft S_n , and the gear G_n receives a frictional force R_n which corresponds to the product of the axial force A_n and a frictional coefficient. Thus, driving the gear G_n involves determining not only a torque for driving the load but

also a torque loss resulting from the frictional force, i.e., involves determining some values, including the product of the radius of the shaft and the frictional force. Accordingly, a drive force with a load and frictional loss considered is determined for each pair of a gear to which a load is applied and a motor gear. In this way, the necessary motor torque is eventually determined.

問3

1. A method of fabricating a floor for a trailer (1), the method comprising:

an inner-floor-unit formation step of forming an inner floor unit (70) by installing, consecutively in a vehicle-width direction, a plurality of floor components (30) extending in a vehicle-length direction and then welding the plurality of floor components (30);

a temporary-floor-unit formation step of forming a temporary floor unit (71) by temporarily installing floor-edge-portion components (37) on both sides of the inner floor unit (70) that are located outward of the inner floor unit (70) in the width direction;

a width adjustment step of disposing the temporary floor unit (71) between a pair of guide walls (75) spaced apart from each other and affixing the floor-edge-portion components (37) to the guide walls (75) while adjusting the width of the temporary floor unit (71); and

a welding step of welding the inner floor unit (70) to the floor-edge-portion components (37), wherein

width adjustment plates (50) having adjustment margins in the width direction of the floor are provided at both edges of the inner floor unit (70) in the width direction, and the floor-edge-portion components (37) are provided with joint plates (55) welded to the width adjustment plates (50), and

the temporary-floor-unit formation step includes temporarily assembling the inner floor unit (70) and the

floor-edge-portion components (37) with the width adjustment plates (50) and the joint plates (55) placed over each other.

「幅寸法」は「仮組床ユニット」のものと考えました。