This invention relates to improvements in multiple rudder steering mechanism, and an object of the invention is to provide improved means for synchronizing the movements of and for maintaining a predetermined normal relation between the rudders.

Another object of the invention is to provide improved means for operatively connecting the rudders whereby operation of one rudder from any source necessarily results in a corresponding operation of the companion rudder or rudders.

A further object of the invention is to provide an improved steering gear of the stated characteristics which lends itself readily to operation from any conventional type of steering mechanism.

Still another object of the invention is to provide a novel multiple rudder driving mechanism having provision both for manual and power operation.

A further object of the invention is to provide a steering mechanism of the aforesaid character in which the adjustment from power to manual operation or vice versa is an operation of extreme simplicity.

A still further object of the invention is to provide a hydraulic steering mechanism having novel and improved means for synchronizing the rudder operation.

The invention also contemplates provision of a novel hydraulic operating mechanism for multiple rudder steering devices having novel means providing for manual operation of the rudders.

The invention further resides in certain novel structural details hereinafter set forth and illustrated in the attached drawings, in which:

Figure 1 is a plan view of a steering mechanism made in accordance with my invention, and

Fig. 2 is a section on the line 2—2, Fig. 1.

With reference to the drawings, in which I have illustrated my invention as applied to a dual rudder steering system, 1 and 2 indicate the respective rudder stocks, to each of which is attached an arm, 3 and 4 respectively, extending toward each other from what may be termed the inner or adjacent sides of the said stocks. The arms 3 and 4 which in effect constitute tillers are respectively associated with double-acting rams 5 and 6, the ends of the ram 5 operating in cylinders 7, 7, and the ram 6 being similarly operatively associated with cylinders 8, 8. As illustrated in Fig. 2, each of the rams carries a trunnion block 9 which respectively slideably embrace the tiller arms 3 and 4 and are free to rotate on their vertical axes within a supporting yoke 11 carried by the respective rams. The cylinders 7 and 8 of the two fluid motors may be connected in any suitable manner with a source of fluid energy to operate synchronously and in opposite directions to thereby simultaneously and correspondingly actuate the rudders attached to the stocks 1 and 2.

Supported in suitable bearings 12 between the fluid motors, which bearings are in the present instance supported by channel beams 13, 13 and 14, 14 attached to the motor frames, is a shaft 15 which carries at its upper end a pinion 16. Meshing with opposite sides of the pinion 16 is a pair of segmental gears or racks 17, 17 which are respectively connected to the upper ends of the rudder stocks 1 and 2. The two stocks are thus positively united through the gears 16 and 17 so that any angular movement of one stock must necessarily involve a corresponding movement in the opposite direction of the other stock. Any predetermined relative position of the two rudders is thus necessarily continuously maintained.

Preferably as illustrated in Fig. 2, provision is made for connecting the upper end of the shaft 15 through a clutch 18 with a shaft extension 19, thereby providing for manual or other actuation of the pinion 16 and a resultant operation of the two rudder posts 1 and 2. To facilitate such operation, means may be provided for bypassing the cylinders 7 and 8 so as to leave the pistons 5 and 6 free to move in either direction under actuation from the pinion. Where provision for manual operation is made by a hand pump associated with the cylinders 7 and 8 of the hydraulic motors, the shaft extension 19 and clutch 18 may be eliminated.

While the aforesaid method of inter-
6. A steering mechanism comprising a plurality of rudders, a stock for each of said rudders, a motor operatively connected with each of said stocks, means operatively connecting one of said stocks with another for maintaining a constant positional relation between the rudders, an extension shaft, manual operating means associated with said shaft, and a clutch for connecting said extension shaft with said stock-connecting means for affording manual operation of said rudders.

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