

certain cases. The form (c) is used for railroad cars, the bearing here only coming in contact with the shaft for a small part of the circumference of the latter, the two being held in contact purely because of the connection to the car which rests on top of *B*, the collars *C* are here of slightly different form. At (d) we have a vertical bearing which, in a somewhat better form is often used in turbines, but here again we would only get the turning motion: provided the weight were on the vertical shaft and pressed it into *B*. In this case there is only one part corresponding to the collar *C*, which is the part of *B* below the shaft.

In the cases (a) and (b), turning motion will take place by construction, and is said to be secured by *chain closure*, which will be

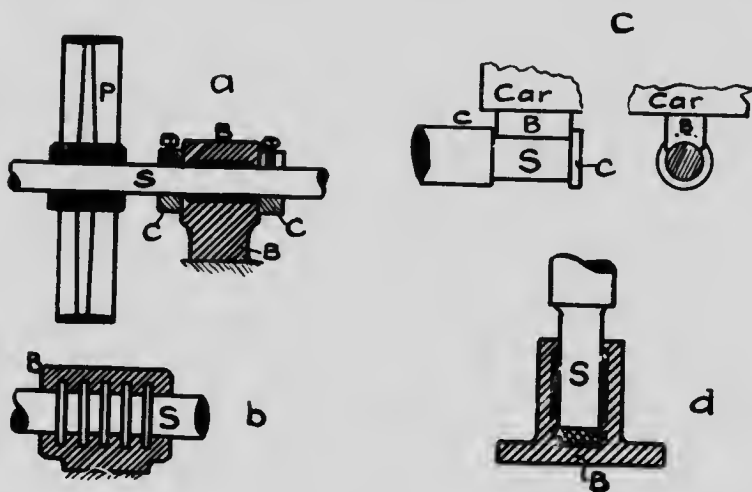


Fig. 1

referred to later, while in the cases (c) and (d) the motion is only constrained so long as the external forces act in such a way as to press the two elements of the pair together, plane motion being secured by *force closure*. In cases, such as those described, where force closure is permissible it forms the cheaper construction as a general rule.

Sliding motion.—The *sliding pair* also consists of two elements, and if a section of these elements is taken normal to the direction of sliding the elements must be non-circular. As in the previous case the sliding pair in practice has very many forms, a few of which