

## CHAPTER XI.

### *NON-PLANE MOTION.*

#### § 62.—THE SCREW.

IN the preceding chapters we have limited ourselves almost entirely to the consideration of mechanisms in which only plane motions occur. These form by far the largest and most important class with which the engineer has practically to deal. We have now to notice some of the principal *non-plane* motions utilised in machinery, and shall in the first instance examine those conditioned by the use of the screw and nut, Fig. 261.<sup>1</sup>

In § 2 we have already noticed the characteristics of screw motion, or twist; and in § 10 we have seen that this motion could be completely constrained by the ordinary screw and nut, a pair of elements which we classed among the *lower* pairs because of its surface contact. Familiar and important as this pair is, there is hardly an instance in which it is used for the sake of its own characteristic helical motion. With scarcely an exception the screw motion is resolved into its two components, rotation and

<sup>1</sup> A more general investigation of screw motion in mechanisms, of which this is the simplest (and a very special) case, will be found in §§ 68. to 70.

translation, and these two motions are employed separately on different links of the chain containing the screw. Fig. 262 shows the most familiar illustration of this. The screw forms

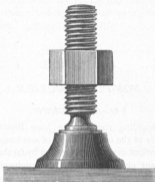


FIG. 261.

part of the link  $a$  of a three-link chain. The link carries also a turning element or pin, which is paired with  $c$ , and  $c$  in turn, forms a sliding pair with the outside of the nut  $b$ .



FIG. 262.

The motion of  $a$  relatively to  $c$  is a rotation,<sup>1</sup> that of  $b$  re-

<sup>1</sup> It is presupposed that suitable collars prevent any endlong motion of  $a$  in  $c$ .

