

whose magnitude is their sum

$P, T; Q, T$; of which the forces T , being equal and opposite, may be removed altogether, leaving the forces P, Q acting in a direction parallel to their original direction, and combining into a single force $(P + Q)$.

and whose moment is the sum of their moments.

Again, the moment of this single force $(P + Q)$ about O is equal to the algebraic sum of those of its components R and S (§ 84); and the moment of R is equal to the sum of the moments of its components, namely, P and T ; and so is that of S to the sum of the moments of Q and T ; among which moments those of the forces T destroy each other, leaving the algebraic sum of the moments of the original forces P, Q equal to the moment of the single force $(P + Q)$, which has been shown to be their equivalent.

If the Forces P, Q had been taken acting in opposite directions, we should have found by the same process that the single equivalent force had for its magnitude the difference of those of P and Q , and acted in the direction of the greater force, but that its moment was still equal to the algebraic sum of their moments.

If, therefore, we now extend to parallel forces the same method of indicating oppositeness of direction by difference of sign, which was used in the case of Forces acting in the same line, we can include the above cases in a single statement, as follows:

Two parallel forces acting on a rigid system are equivalent to a single parallel force which is equal to their algebraic sum, and whose moment round any point in the plane of the forces is equal to the algebraic sum of the moments of the two forces.

Exception.
A couple.

In one case, however, the above process becomes nugatory, which is when the two forces are parallel, equal, and opposite. Such a pair of forces is called a *couple*, and the case must be excluded from our general statement.

Any two
Forces, Resultant of.

86. If to this single equivalent Force in § 85, we give the name of *Resultant*, we can now include the results of the two last articles in one statement: