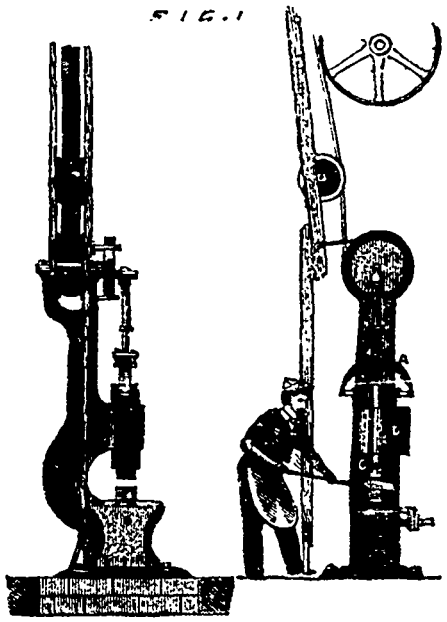
FACTS AND FIGURES CONNECTED WITH BELTING.

By Mr. J. H. Cooper, in the *Journal of the Franklin Institute.*

IMPARTING AND ARRESTING MOTION.

The dead stroke power hammer of Mr. T. Shaw, (Fig. 1) illustrates the application of the belt for giving to and taking motion from a shaft at the pleasure of the operator. The same devices can, however, by an easy transition, be applied to other machines. In this the driving pulley, carrying a loose belt, is on a line shaft over the driven flanged pulley, which latter is on a shaft at the top of the hammer frame. This shaft carries a crank wheel actuating the hammer, as shown, and is partly invested by a leather band for arresting its motion. One end of this band is secured to a pin in the hammer frame under the crank wheel; the other end is fastened to the swinging lever to which also the tightener pulley of the driving belt is applied The action of these belts is produced by opposite motions of the lever; thus, when the operator pushes it, the arresting band releases the crank wheel, and the tightener pulley presses upon the driving belt, which, being constantly in motion, applies its adhesion to the pulley on the crank shaft and propels the hammer, and it does this with a varying velocity,

FIG. 1



according to the pressure upon the tightener. Withdrawing the lever relaxes the driving belt and tightens the arresting band. These motions are under the easy control of the operator, and such is the nature and action of the belt, in this application, that these motions can be repeated rapidly and effectively without destructive wear to any part of the machine.

TRANSMITTING MOTION.

To transmit motion from one shaft to another at right angles thereto, by a belt, when the shafts are not in the same plane.—Let E (Fig. 2) be the driving shaft with tight pulley A, and loose pulley B, and F the driven shaft with tight pulley D, and loose pulley C; all the pulleys of the same size and with rounded face in the usual way.

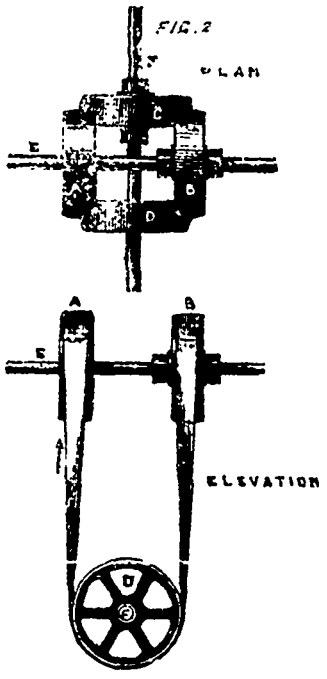
Let the pulleys be arranged in a square on the plan, whose side is the diameter of pulleys at centre of face, and let an endless belt be put on as shown and run in the direction of the arrow. It will be noticed the loose pulleys C and B run in opposite directions from that of the shafts on which they turn, but since they carry the slack fold of the belt, they are relieved of heavy strain on the shafts. This is a good plan for wide belts when the shafts are a proper distance apart, say ten times the breadth of the belt, and solves that sometimes difficult problem of carrying considerable power around a corner by a belt. There is no loss of contact of the belt on any of the pulleys of this system, and no lateral straining and tearing of the fibres of the belt as in the usual quarter twist arrangement in which only two pulleys are used. The lower shaft may drive the upper one, as well, by changing the direction of motion, or changing the relative positions of the tight and loose pulleys.

WEAVER'S BELTING.

The object of this arrangement (Fig. 3) is to obtain high speed in a shaft directly from a driving pulley without the aid of intermediate counter pulleys or gears, and with reduced lateral stress on the bearings of the driven shaft.

A, B, and C show three shafts parallel to one another. A and C carry straight-faced pulleys, upon which run two belts

FIG. 2



of equal length and width, separated to prevent contact with each other while running. The lower fold of belt D is carried over shaft B, and the upper fold of belt E is carried under B, and each, in running, imparts motion to the driven shaft in the same direction, and at the same time balancing the lateral pressure on its journals. A is the driven shaft with large pulley; B the driven shaft of comparatively small diameter, and C, a counter shaft, with its pulley of any convenient diameter, is placed in position to carry and return the belts, and may be moved and secured to and from B by screw adjustment or otherwise, to secure proper tension of belts.

FIG. 3