SECTION XVIII.

To convert alternate rectilinear motion, of uniform velocity, or which varies by a given law, into alternate motion in a given curve, of velocity similar to that of the original motion, uniform, or variable by a given law, and in the same or in different planes of direction.

THE given alternate rectilinear movement will first be converted into an alternate circular movement by Section XVII, and the movement so obtained into an alternate movement in a given curve, by Section X.

SECTION XIX.

To convert alternate circular motion, of uniform velocity, or the velocity of which varies by a given law, into an alternate circular movement, of velocity similar to that of the original motion, uniform, or variable by a given law, and in the same, or in different planes of direction.

A 19.

ALL the arrangements contained in Section VIII, and a part of those contained in Section IX, will afford solutions of this problem.

B 19. Plate 9.

M. Camus in the Receuil des Machines approuvées par l'Academie, Vol. ii, Nos. 136 and 137, describes some machines of his invention for the purpose of giving motion to several sieves by one operation.

The entire arrangement in the figure may be reduced to a large table ABCD; above the table is placed a plane board EF, supported by two iron axes n, m, which turn on iron upright pieces, fixed to the table. Upon the prolongation of one of the axes n m, or upon an arm s, is fixed the pendulum RS; and the sieves are arranged on the board EF.

The moving power produces the oscillation of the pendulum R S, and consequently also communicates an alternate circular movement to the board E F; at each oscillation the edges of the board strike against the table B C, and very effectively represents the motion usually communicated by hand.

C 19.

In this machine the cord a b c is attached in a to the spring B, and after being coiled about the cylinder A, is afterwards attached to the extremity c of the treadle D. The alternate circular movement of the treadle communicates a movement of the same description to the cylinder A.

D 19.

In this arrangement, the alternate circular movement of the treadle D, produces the direct circular movement of the fly wheel M, and also a second alternate circular movement in the cylinder A.

E 19.

The Nippers of the Sawing Machine.

These nippers are composed of two pieces of iron a b c d, e f g h, which turn upon the centre or axis i; the extremities a b and e f of these pieces are cut in a semi-circular form; the interior edge is serrated, they form together the jaws or head of the nippers. The other extremities b c d and f g h of the same pieces, terminate in two circular arcs d c and g h; the first of them being toothed on its outer or convex edge, the latter on its inner, or concave edge. At the middle point between the interval which separates the two circular arcs d c and g h, an axis C is placed perpendicularly to the plane of the machine; this axis carries two pinions n and m, the first of which, n drives the arc d c, and the second m, the arc g h.

The alternate circular movement of the axis C, operates to open or close the jaws of the nippers at pleasure.

F 19. Plate 10.

A long bar or plank A B, is traversed in its middle by an axis fixed at the