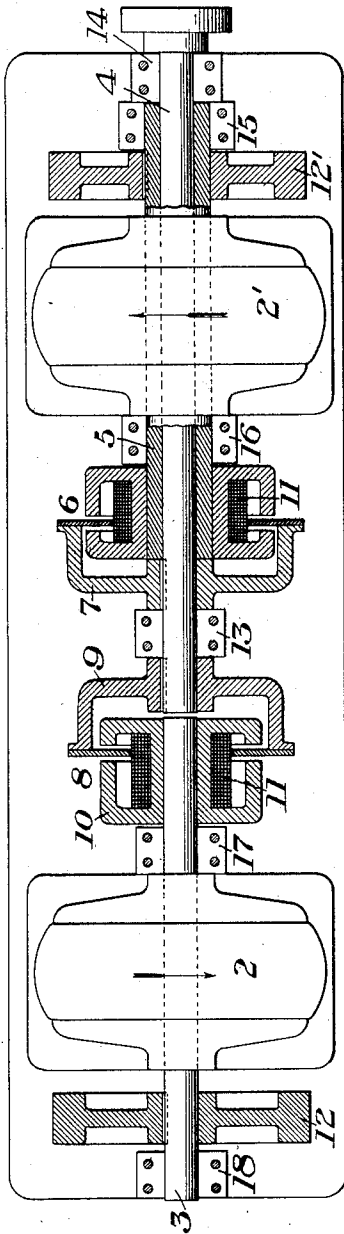


F. DU P. THOMSON.
 REVERSING DRIVING MECHANISM.
 APPLICATION FILED OCT. 22, 1907.

1,024,298.

Patented Apr. 23, 1912.



WITNESSES

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UNITED STATES PATENT OFFICE.

FRANCIS DU PONT THOMSON, OF WHEELING, WEST VIRGINIA.

REVERSING DRIVING MECHANISM.

1,024,298.

Specification of Letters Patent.

Patented Apr. 23, 1912.

Application filed October 22, 1907. Serial No. 398,610.

To all whom it may concern:

Be it known that I, FRANCIS DU PONT THOMSON, of Wheeling, Ohio county, West Virginia, have invented a new and useful
5 Reversing Driving Mechanism, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming part of this specification, in which the figure is a sectional plan
10 view showing one form of my improved driving apparatus.

My invention relates to reversing driving apparatus, and is especially applicable to rolling mills; though it may be applied to
15 any other uses.

The object of the invention is to provide apparatus which will permit of the period of time when the piece of metal is in the rolls of a reversing mill as well as the interval necessary for returning it into the
20 rolls for a pass in the opposite direction, to be utilized to accelerate the speed of the fly wheel whose stored energy is to effect the succeeding pass.

Another object of the invention is to provide means for making such reversals without the medium of gears, crossed and open belts, or similar devices, permitting the driven shaft to be in exact axial alinement
30 with that of the motor, and in this way reduce the time heretofore necessary to build up the speed to the desired rate between the time the metal being rolled leaves the rolls and again enters the same rolls.

To that end the invention consists in providing two motors, each connected to a common driven shaft and each having a severable clutch connection therewith, both motors being preferably driven continuously.

40 It also consists in such combination with the use of clutches; and further, in the construction and arrangement of the parts as hereinafter more fully described.

In the drawing, the reference numerals 2,
45 2' represent electric motors of any desirable type which are mounted upon two shafts 3 and 4 which are in endwise alinement. The rotary element of motor 2 is secured to the shaft 3, while the rotary element of motor
50 2' is secured to a sleeve or hollow shaft 5 loosely surrounding the shaft 4 and arranged to be connected thereto when desired by an induction clutch 6, one member 7 of which is secured to the shaft 4 while the
55 other member is secured to the sleeve. The shafts 3 and 4 may be connected together by

the induction clutch 8 having one member 9 secured to shaft 4 while the other member 10 is secured to the shaft 3. The connections for energizing the coils 11 of these induction
60 clutches may be arranged in any desirable manner. In this form, 12, 12' indicate the fly wheels secured to the two shafts.

13, 14 represent bearings for the shaft 4, while 17 and 18 represent the bearings for
65 the shaft 3.

15 and 16 represent bearings for the sleeve or hollow shaft 5.

The shaft to be driven (not shown) may form an extension of the shaft 4 or be con-
70 nected thereto in any desirable manner.

In the use of the apparatus, both motors are driven continuously in opposite directions. When the clutch 6 is actuated to connect the motor 2' to the shaft 4, the driven
75 shaft will be actuated in one direction, and when this clutch is deenergized and the clutch 8 is actuated the shaft will be driven in the opposite direction. Owing to the fact that both motors are driven continuously,
80 the time lost in reversing and in building up the speed of the mill is greatly reduced and the driven shaft may be started at once into full speed. The advantages of such a combination over that where a single motor is
85 reversed and must be stopped and built up into a certain speed of rotation in the opposite direction or where a single motor with suitable gears and clutches, is employed to give opposite direction of rotation to a
90 driven shaft, will be apparent to those skilled in the art.

The use of electro-magnetic clutches is of especial advantage in connection with my electric motor drive, as a certain amount of
95 slip is afforded while the full speed is being attained.

In rolling mill work, where the rolling is effected by the inertia of the fly-wheel, it is necessary that the motor and fly-wheel
100 which is doing the work be reduced in speed, at the same time that the other motor and fly-wheel are increasing in speed preparatory to the next pass of the metal. It is therefore
105 necessary that the two motors shall not be intergeared but shall act independently of each other, and this is accomplished by my invention.

Many changes may be made in the form and arrangement of the clutches, the shafts,
110 the motors and connections, without departing from my invention.

I claim:—

1. In a reversing driving apparatus, a pair of shafts in endwise alinement, one of said shafts being connected to the device to be driven, a motor secured to the other shaft, an induction clutch having a driving and driven member arranged to connect said shafts, a tubular shaft arranged to rotate about the axis of the first shaft, a motor secured to the tubular shaft, and an induction clutch connection between the tubular shaft and the first shaft, the induction clutch connections providing means to increase the torque in proportion to the slip between the clutch members; substantially as described.

2. In a reversing driving apparatus, a pair of shafts in endwise alinement, a motor and a fly wheel secured to one shaft, a sleeve

rotatably mounted on the other shaft, a motor and a fly-wheel connected to the sleeve, an induction clutch having a driving and a driven member arranged to connect the sleeve and the shaft on which it is mounted, and an induction clutch connection between the pair of shafts in endwise alinement, the induction clutch connections providing means to relatively increase the torque in proportion to the slip between the clutch members; substantially as described.

In testimony whereof, I have hereunto set my hand.

FRANCIS DU PONT THOMSON.

Witnesses:

WM. H. TRACY,
T. R. KLIEVES.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."
