Dec. 14, 1937. A. C. CUMMINS 2,102,356

DIE ROLLING MILL

Filed March 21, 1934 2 Sheets-Sheet 1

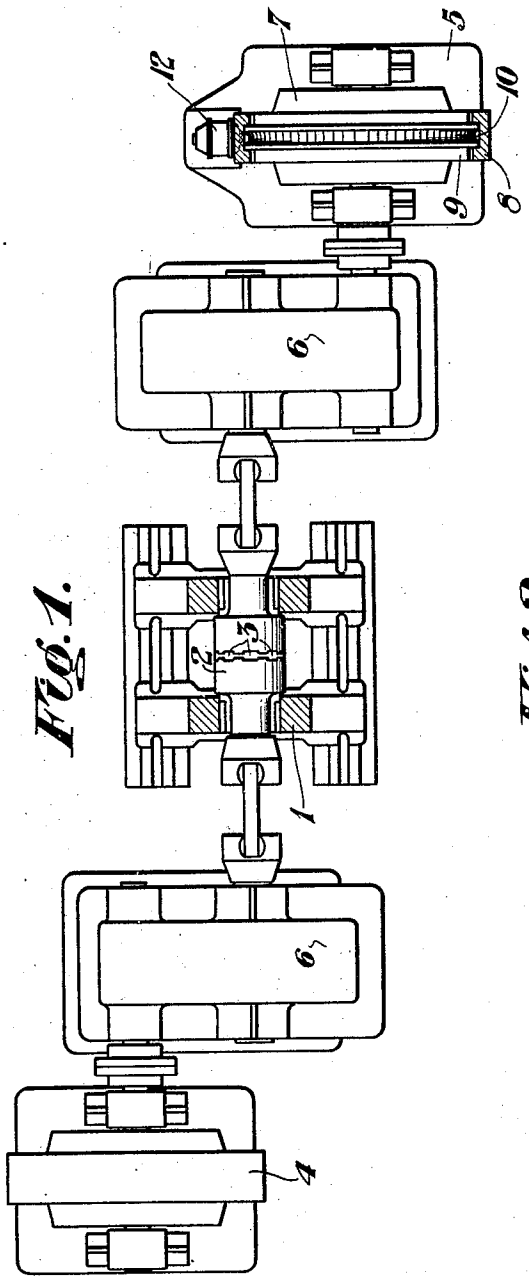


Fig. 1.

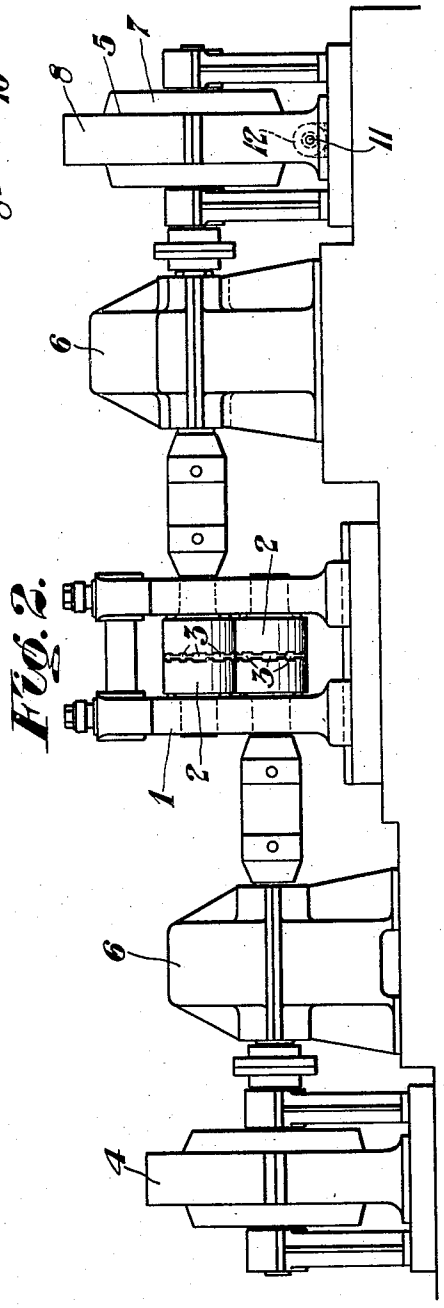


Fig. 2.

Inventor:
ALDEN C. CUMMINS,
by: Ussins & Lauber
his Attorneys.

Dec. 14, 1937. A. C. CUMMINS 2,102,356

DIE ROLLING MILL

Filed March 21, 1934 2 Sheets-Sheet 2

Fig. 3.

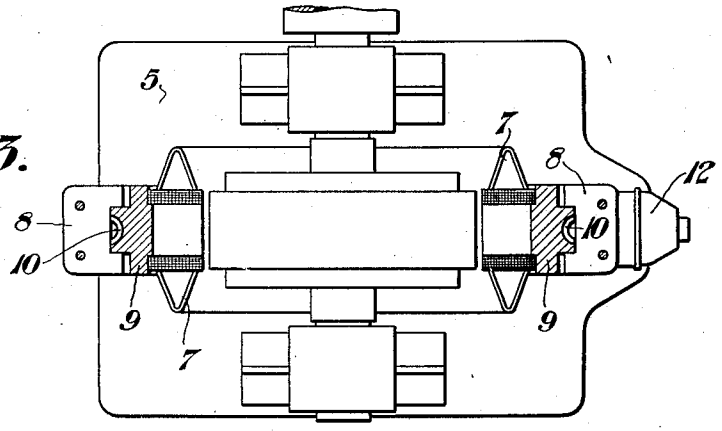


Fig. 4.

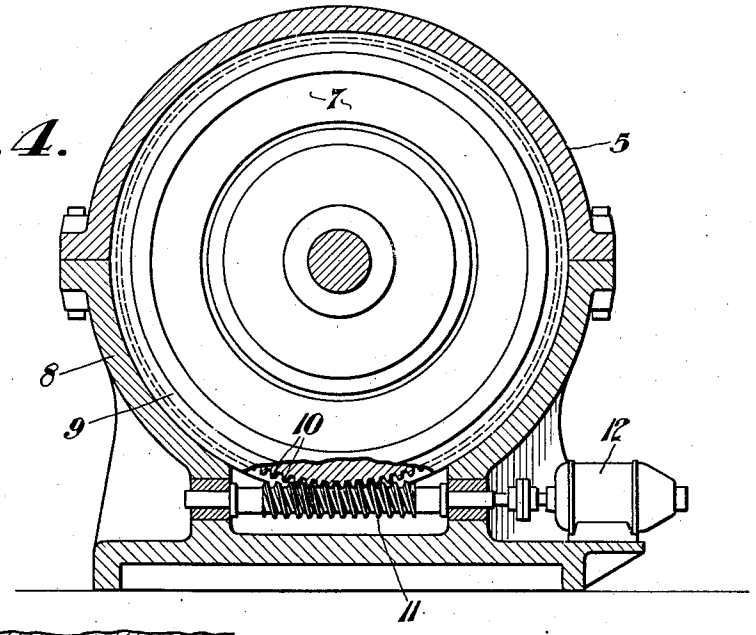
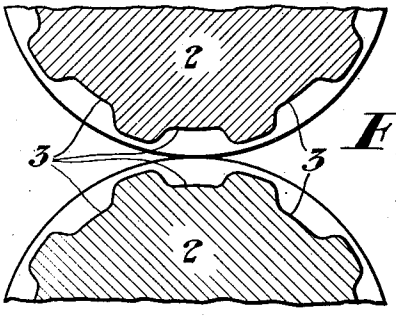


Fig. 5.



Inventor:
ALDEN C. CUMMINS,
by: Usina & Rauber
his Attorneys.

Patented Dec. 14, 1937 2,102,356

UNITED STATES PATENT OFFICE

2,102,356

DIE-ROLLING MILL

Alden C. Cummins, Duquesne, Pa.

Application March 21, 1934, Serial No. 716,687

4 Claims. (Cl. 80—24)

This invention relates to die-rolling mills, one of the objects being the provision of an improved means for adjusting the cooperative rolls of such mills so that their respective matrices may be mutually registered. Other objects may be inferred.

Referring to the drawings:

Figure 1 is a top view of a mill illustrating the principles of the invention.

Figure 2 is an end view.

Figures 3 and 4 are horizontal and vertical cross-sections of one of the motors included by the mill.

Figure 5 is a cross-sectional view of the die-rolling rolls.

The mill illustrated by the above includes a frame 1 in which two cooperative rolls 2 are journaled. As shown by the cross-sectional view, these rolls are individually provided with cooperative recesses or matrices 3 which are shaped according to the requirements of the work being rolled.

Since these matrices cooperate to produce the work, it is obvious that those of the respective rolls must be mutually registered if the work is to have the proper shape. Heretofore, the rolls of such a mill have been driven by one motor through a conventional pinion-stand. This requires an adjustable coupling between one of the rolls and the pinion-stand to provide for the angular adjustment of this roll relative to the other for the purpose of registering the respective matrices. This coupling is necessarily of such character that the mill must be stopped each time an adjustment is made, and it also has the disadvantage that its range is limited due to its necessarily small diameter. The present invention is characterized in that it permits this adjustment to be made through an unlimited range while the mill is operating.

Referring again to the drawings, each of the rolls 2 are individually driven by electric motors 4 and 5 through gear boxes 6. These gear boxes are not absolutely necessary, but are ordinarily required because of the mechanical problem of driving the rolls 2 at relatively slow speeds.

The motors 4 and 5 are of the alternating current synchronous type, and are connected to the same line so as to operate synchronously. By this means the rolls 2 are driven with as positive a speed relationship as they are when mechanically interconnected by a pinion-stand.

One of the motors, 5 for instance, has its stator windings 7 rotatively mounted by a frame 8 that is anchored to the floor. These windings may be carried by a ring 9 having gear teeth 10 cut in its periphery and meshed with a worm 11 driven by an electric reversing motor 12.

It is obvious that the above described motor construction provides for the angular adjustment of the rolls 2, operation of the motor 12 turning the stator windings 7 of the synchronous motor 5 and consequently changing the mechanical relationship of the rolls 2. This may be done while the motors are operating and the rolls 2 are turning, there being obviously no necessity for the shut-down, formerly required. Furthermore, the motor 12 may be operated to turn the stator windings through a complete revolution so that the possible adjustment range is unlimited.

It may be assumed that the motors will normally operate in synchronism. The reversing control for the motor 12 may, and preferably should, be located at a point convenient to the mill operator. Then if the appearance of the work being rolled indicates the necessity for a change in the relationship of the rolls 2, the operator may control the motor 12 so that it drives the stator windings 7 in one direction or another. This changes the mechanical relationship of this stator respecting the stator of the motor 4, thus also changing the mechanical relationship of the rolls 2.

Although a specific example of this invention is disclosed in accordance with the patent statutes, it is not intended that its scope be limited exactly thereto, except as defined in the following claims.

I claim:

1. A die-rolling mill including the combination of a frame, cooperative rolls journaled in said frame, said rolls being individually provided with cooperative recesses or matrices which are shaped according to the requirements of the work being rolled, a synchronous electric motor arranged to drive one of said rolls, a second synchronous electric motor arranged to drive the other of said rolls and means for rotatively mounting at least the stator windings of at least one of said motors so as to thereby effect angular adjustments of said rolls.

2. A die-rolling mill including the combination of a frame, cooperative rolls journaled in said frame, said rolls being individually provided with cooperative recesses or matrices which are shaped according to the requirements of the work being rolled, a synchronous electric motor arranged to drive one of said rolls, a second synchronous electric motor arranged to drive the other of said rolls, means for rotatively mounting at least the stator windings of at least one of said motors

so as to thereby effect angular adjustments of said rolls, and adjustable means for restraining rotation of said stator windings.

3. A die rolling mill including the combination of a frame, cooperative rolls journaled in said frame, said rolls being individually provided with cooperative recesses or matrices which are shaped according to the requirements of the work being rolled, a synchronous electric motor arranged to drive one of said rolls, a second synchronous electric motor arranged to drive the other of said rolls, means for rotatively mounting at least the stator windings of at least one of said motors so as to thereby effect angular adjustments of said rolls, a ring gear encircling said stator windings, a worm gear in mesh with said ring gear and a reversing electric motor arranged to drive said worm gear.

4. A die-rolling mill powering and roll angularity adjusting system including a synchronous electric motor for each of the mill rolls, whereby the latter may be turned in synchronism, and means for turning the stator of one of said motors relative the stator of the other, whereby to permit roll angularity adjustment of the mill.

ALDEN C. CUMMINS.