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CALENDER

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FIG. 1.

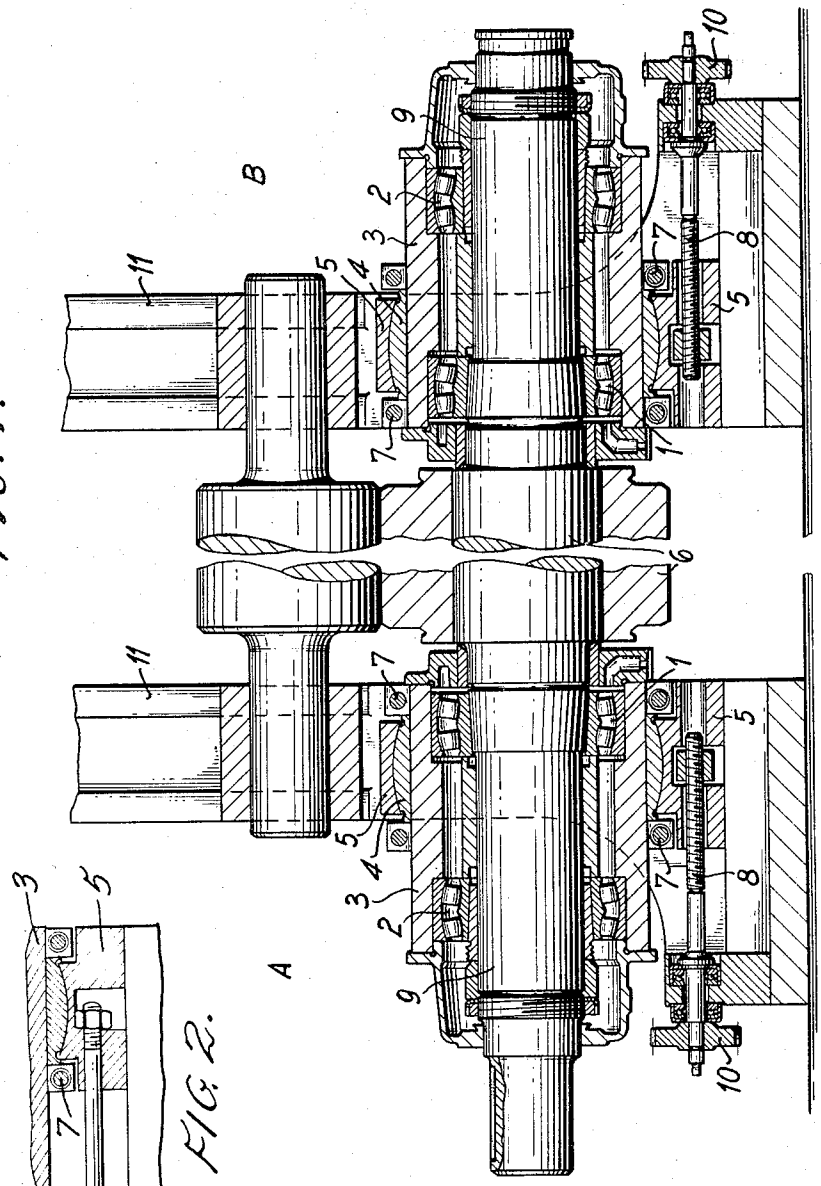

FIG. 2.

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CALENDER

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ABSTRACT OF THE DISCLOSURE

A calender for effecting a progressive change in the camber of a dead or compression-loaded roll, comprising a calender roll having a shaft extending from each end thereof. Journal bearings are provided for the shafts of the calender roll and bearing housings receive the corresponding of the journal bearings. The bearing housings are non-displaceable relative to the shafts of the calender roll. A displaceable bearing support is mounted on and concentrically surrounds each of the bearing housings. Means are provided for axial displacing of the bearing supports in order to permit adjustment complementary to the deflection of the calender roll.

The present invention relates to a calender capable of progressive adjustment of the camber of the dead or compression loaded rolls of chilled iron or steel.

Such calenders are employed for pressing, drawing and smoothing of thin sheets, in particular for the processing of textile goods, synthetic-resins of the thermoplastic type, paper or the like. Rolls manufactured of chilled iron or steel have however the disadvantage for this purpose that they deflect under the operational pressure and thus do not ensure a uniform gap width over the whole of the length of the rolls.

The measure proposed up to the present time for overcoming this disadvantage have not led to satisfactory results. Thus, for example, the frequently employed camber of the rolls has the advantage that any given camber can be employed only for a working pressure dependent on the material to be processed, so that on the change of the material and also of the working pressure required, the previously employed rolls must be interchanged with others of suitable camber. The interchange of the roll is, however, time-consuming and necessitates the provision of a large number of these expensive rolls with different cambers.

In addition other means, for example, the increase of the diameter of the rolls, the special hardening of steel rolls, the insertion of steel axles in chilled iron rolls and the imposition of a restoring moment on the extended shafts of the rolls, have not led to a satisfactory solution for the achievement of uniform gap width. Moreover, these measures can only be applied to calenders for particular operational tasks. This also applies to known measures for calenders with several roll systems with which for each roll system a pressure frame-work is provided in order to urge the rolls on one another by a pressure applied normal to or horizontally to the bearing of the shaft of the rolls, in such a manner that the forces acting on the rolls should counterbalance one another.

In order, in calender rolls of chilled iron or steel of great length, to ensure a uniform gap over the whole length of the rolls even for different working pressures, it has already been proposed by the inventor to make the distance between these supporting bearings of the rolls adjustable by means of displaceably mounted plain or roller bearings for the roll shafts. In this way it is possible to carry out rapidly and with safety the stepless change of camber required at any given time by simple means during the operation of the calender or roller machine.

It is one object of the present invention to provide a substantial improvement in the bearing bracket spacing of interchangeable roller shafts of a calender, whereby not only the shaft support as such can be improved, but also the bearing bracket spacing can accommodate the actual compression loading of the calender rolls more easily, more rapidly and with greater security.

It is another object of the present invention to provide a calender in which a progressive change in the camber of a dead or compression-loaded roll can be effected by the provision of bearing supports which can be adjusted to achieve a desired deflection of the roll, which calender comprises plain or roller bearings acting as journal bearings for the calender roll, the bearing housings thereof being non-displaceable relatively to the shafts of the roll, and a displaceable bearing support mounted on each bearing housing, displacement of the displaceable bearing supports serving to adjust the deflection of the rolls.

It is yet another object of the present invention to provide a calender comprising a roll having a support shaft at each end thereof, bearing means journalling each said shaft in axially-fixed relation thereto, a bearing housing mounting each said bearing means and displaceable support means carrying each said bearing housing, said support means being displaceable axially of the shafts to adjust the effective support means of the roll.

The construction of the calender in accordance with the present invention has the advantage that for every change of the loading on the rolls the support bearings remain stationary at their position on the shafts of the rolls, the support bearing spacing being adjustable by stepless change of the camber of the rolls by means of adjustable roll deflection.

It is also a further object of the present invention to provide a calender, wherein the displaceable bearing on the bearing housing, which is preferably cylindrical, can be fixed at both sides by means of clamping rings. For the displacement of the displaceable bearings an adjustment spindle is provided on this bearing, which can be adjusted by hand or mechanically by a hand or gear wheel keyed on the spindle. In a further embodiment for the displacement of the displaceable bearing it is also possible to provide a hydraulically or pneumatically operating device engaging thereon.

With these and other objects in view which will become apparent in the following detailed description, the present invention will be clearly understood in connection with the accompanying drawing which shows, by way of example, a longitudinal section through the lower part of a calender, on which the roll shaft bearings according to the invention can be seen. The length of the rolls has been foreshortened as can be recognized from the interrupted lines, in order to improve the illustration of the bearings.

In the embodiment illustrated, by way of example, in the drawing the calender comprises a roll **6** manufactured of chilled iron or steel and is provided at each end with a shaft **9**, for the support of which two spaced roller bearings **1** and **2** are mounted in stands **11**. These roller bearings **1** and **2** are supported in a common bearing housing **3**, which is of cylindrical construction. Each bearing housing **3** carries a cylindrical ring **4** with a part-spherical outer surface in contact with a complementary surface of a bearing **5** and is displaceable to and from with the latter on the cylindrical outer surface of the bearing housing **3**.

For this purpose, in the illustrated embodiment of FIGURE 1, the displaceable bearing **5** is in engagement with an adjusting spindle **8**, which is adjustable by means of a crank (not shown) or other mechanism, such as a gear wheel **10** by means of a motor (not shown).

In another embodiment illustrated in FIGURE 2, the displacement of the bearing **5** can be effected by means of known hydraulically or pneumatically-operated devices.

The securing of the displaceable bearing **5** on the bearing housing **3** is effected by means of clamping rings **7** which are disposed at both sides of each displaceable bearing **5**.

Since the distance between the centers of both displaceable bearings **5** determines the curvature of the roll **6**, the curvature and thus the camber of the roll can be changed because the displaceable bearings **5** can be displaced in relation to one another. Thus it is also possible to use rolls with a predetermined camber. Preferably, the rolls are designed for the smallest distance between supports and the maximum pressure. The adjustment of the joints of bearing support on the shafts of the rollers can be effected for example by fixing the clamping rings **7** on the side A of the bearing housing **3** and freeing the clamping rings **7** on the side B. Now the adjustable bearing **5** on the side B is brought by means of the adjustment spindle **8** into the desired new position. Then the clamping ring **7** on the side B is fixed and that on the side A is freed and the displaceable bearing **5** on the side A is brought to a corresponding position by means of the adjusting spindle **8**. Finally, the clamping ring corresponding to the function of the support bearing on the side A (fixed bearing) is fixed and on the side B (loose bearing) is freed.

While I have disclosed one embodiment of the present invention, it is to be understood that this embodiment is given by example only and not in a limiting sense, the scope of the present invention being determined by the objects and the claims.

I claim:

1. A calender for effecting a progressive change in the camber of a dead or compression-loaded roll, comprising

a calender roll having a shaft extending from each end thereof,

journal bearings for said shafts of said calender roll,

bearing housings receiving the corresponding of said journal bearings and having an outer peripheral face,

said bearing housings being axially non-displaceable relatively to said shafts of said calender roll,

an axially displaceable bearing support mounted on and surrounding each of said bearing housings,

means for axial displacing of said bearing supports in order to permit adjustment complementary to the deflection of said calender roll, and which includes clamping rings disposed at both sides of said bearing supports for securing the latter on the corresponding of said bearing housings.

2. The calender, as set forth in claim **1**, wherein

said means for axial displacement of said bearing supports comprises a spindle threadedly engaging the corresponding of said bearing supports, and

means for turning said spindle for adjustment of said bearing supports.

3. The calender, as set forth in claim **2**, wherein

said means for turning said spindle comprises a wheel keyed on said spindle.

4. The calender, as set forth in claim **1**, wherein

said means for axial displacement of said bearing supports comprises a hydraulic device operatively connected with said bearing supports.

5. The calender, as set forth in claim **1**, wherein

said means for axial displacement of said bearing supports comprises a pneumatic device operatively connected with said bearing supports.

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