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REMOVABLE ROLL MEANS FOR CALENDER

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Fig. 1.

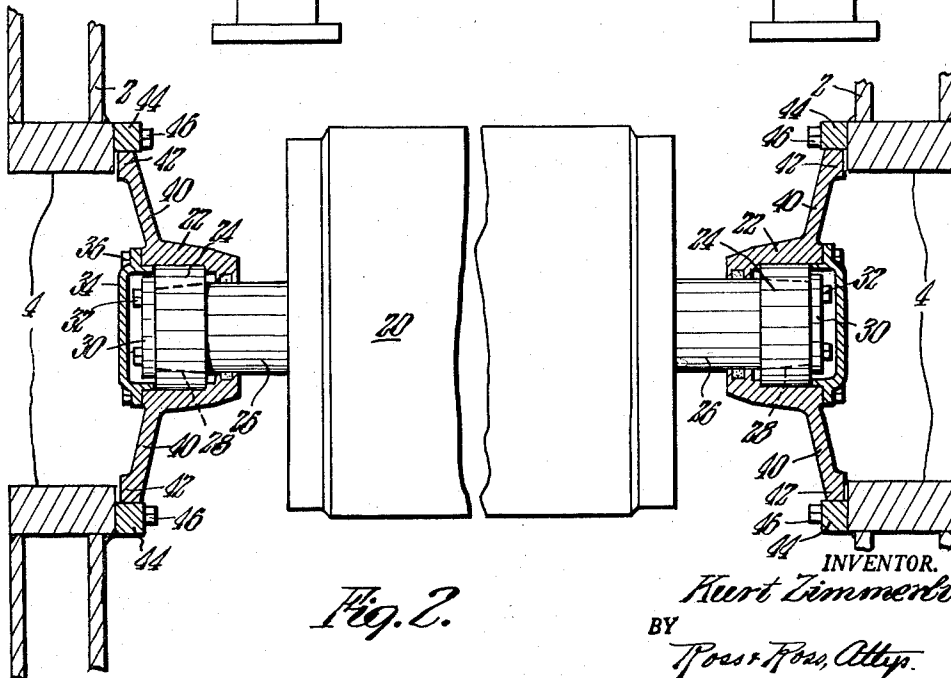
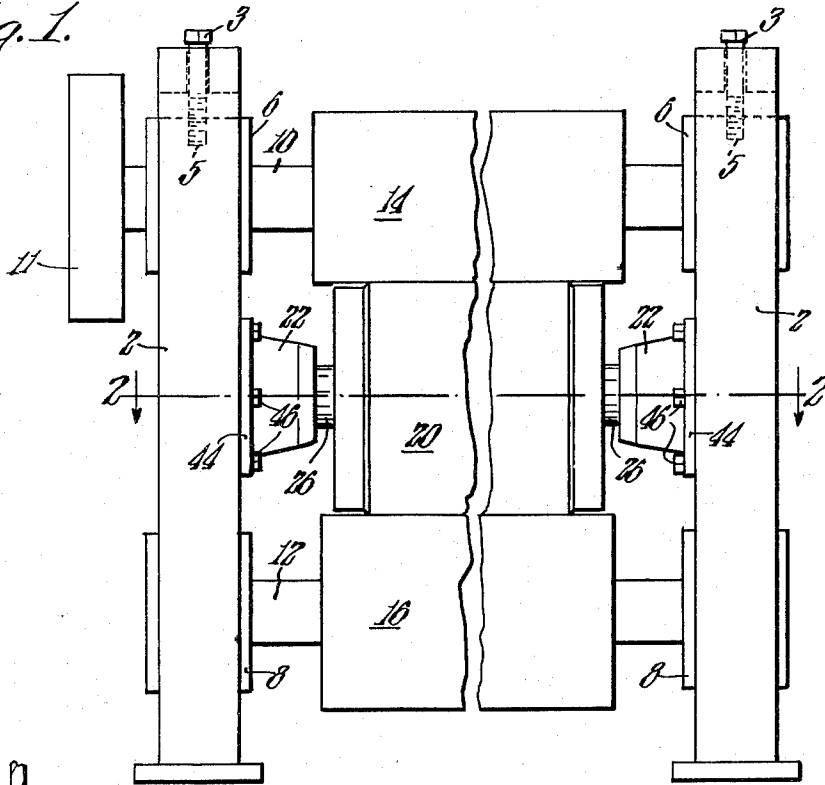


Fig. 2.

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REMOVABLE ROLL MEANS FOR CALENDER

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4 Claims. (Cl. 100—155)

This invention relates to new and useful improvements in structural refinements in calender apparatus having coacting rolls such as are used in the paper, textile and other industries for calendering webs of material, and is directed more particularly to a construction to facilitate the removal of a roll from the calender frames.

The invention resides in the particular arrangement, construction and relationship of the various elements of the calender apparatus as exemplified in the detailed disclosure hereinafter set forth wherein the objects of the invention as defined in the paragraphs below will be apparent.

The principal objects of the invention are directed to the provision of calender frames and a roll which are constructed and arranged for the removal of the roll from and insertion of the roll into the frames.

It is frequently desired and necessary to remove a roll from the calender frames for the refinishing or repairing of the roll or to replace it with a replacement roll, all of which according to the novel features of the invention may be readily and easily accomplished.

According to the prior art, the transversely spaced calender frames usually extend vertically, and have longitudinally extending slots for the boxes or bearings in which opposite ends of rolls may be journaled. For the removal of a roll, such as an intermediate roll, corresponding front or rear sides of the spaced side frames have been cut away so as to provide openings into the slots. Sections commonly known as cheeks are fitted in and are removably secured in these openings.

In order to remove a roll from the frames, the cheeks are removed from the openings of the side frames, so that the ends of the roll and the bearings may be withdrawn laterally outwardly through the openings. In assembling the roll in the frames, the roll ends and bearings are passed inwardly through the openings and into the slots, and the cheeks are then bolted in place to close the openings and to hold the bearings in the slots.

This recited prior practice not only is expensive but also has disadvantages in that the removal of the roll from and the insertion thereof into the calender side frames is a laborious operation and results in an objectionable length of down-time of the calender. Too, the fitting of the cheeks in the side frames requires extreme accuracy, and entails unreasonable expense. The openings of the side frames into the bearing slots thereof weaken the respective frames to the extent that the frames tend to yield under the normal pressures to which the rolls are subjected in the usual operation of the calender.

According to the novel features of this invention, the calender side frames and roll are constructed and arranged for the removal of a roll without the provision of the known openings in the side frames which are necessarily closed by cheeks. The removable roll hereof is separable from the side frames so as to facilitate its ready and easy removal outwardly between adjacent sides of the side frames. The side frames are in no way weak-

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ened so that they may function for the intended supporting purpose.

Another of the primary purposes hereof is to provide advantageous structural and operational features in a device of the class to which reference has been made leading to its simplicity in construction, its adaptability to economical manufacture and its efficiency and dependability in operational use, and providing important distinct advantages in durability, efficiency, ease of operation and the like.

Other objects and advantages of the present invention will be in part obvious or in part pointed out more fully hereinafter. All will become apparent as the detailed description of the exemplary form of the invention proceeds below; it being understood that the invention consists substantially in the combination, construction, location and relative arrangement of parts, all as described in detail hereinafter as shown in the accompanying drawing, and with particularity in the appended claims forming a part hereof.

To the accomplishment of these ends, the invention intended to be protected by Letters Patent will be understood to comprise the features set forth in this description and annexed drawing illustrating in detail a certain physical embodiment of the invention and showing parts combined and arranged in accordance with one mode which I have devised for the practical application of the principles hereof.

It will be understood however that this is only indicative of but one of the various ways in which the principles of the invention may be employed and in which the component parts may be combined and arranged. It is not intended to be exhaustive of nor limiting of nor departing from the spirit of the invention. That is, the precise construction of the figures of the drawing need not be slavishly followed as, of course, the calender may have to be modified in accordance with the use to which it is to be put. Changes, modifications and alterations are contemplated and may be made and resort had to substitutions within the spirit and scope of the claims hereof. No limitations therefore are to be implied from the following specific description. Same is merely given with a view to illustrating and explaining the principles of the invention and their embodiment for practical use, in order that others skilled in the art may be enabled to adapt and modify them in numerous embodiments, variations and modifications, each as may be best adapted to the conditions of any particular use.

That is to say, the objects of the invention may be attained by use of constructions different in certain respects from that disclosed such as in size, form, proportion and the like, all without departing from the underlying principles and scope of the invention and it is understood that such will readily occur to those skilled in the art. The invention is susceptible of same, without departing from the real spirit or scope hereof. Such adaptations and/or changes should be and are intended to be comprehended within the meaning range of equivalence of the claims appended below.

In the accompanying drawing forming part of this specification and which illustrates, by way of example, the principle of the invention and the best mode, which has been contemplated, of applying that principle by way of a construction in accordance therewith, wherein like characteristics of reference or numerals are employed to designate like or corresponding parts throughout the several views:

Fig. 1 is a front elevational view of calender apparatus embodying the novel features of the invention; and

Fig. 2 is a sectional plan view on the line 2—2 of Fig. 1.

In the following description and claims, various details

will be identified by specific names for convenience. These names however are intended to be as generic in their application as the art will permit.

Referring now to the drawing forming a part of this specification more in detail, and referring more particularly to the preferred form of my invention selected for illustrative purposes, I have shown a three roll calender in order that the general relation and utility of the usual calender may be better understood.

The intermediate roll thereof is removable. A calender, it will be understood, may include any desired number of rolls, and the novel features of the invention may pertain to any roll of the calender.

Transversely spaced vertically extending side frames 2 are adapted to be supported on foundations, and held in their spaced relation by suitable tie means. Said frames may be in the form of castings or may be fabricated from welded together steel components, all as may be desired.

The side frames will have the usual oppositely spaced vertical slots 4 for boxes or bearings 6 and 8 in which opposite ends of shafts 10 and 12 respectively, of upper and lower rolls 14 and 16 respectively are journaled.

The upper bearings 6 may be moved upwardly so as to elevate the upper roll 14, and to hold the same above the roll 20 therebelow all to relieve the weight and pressure thereof from said roll 20. The roll 20, according to the invention, is removable from between the spaced frames 2. The elevation of the bearings 6 may be accomplished by bolts 3 for engaging in threaded sockets 5 of the bearings 6.

Housings for the removable roll 20 are represented by 22, and carry antifriction bearings 24 of any desired and well known form. Opposite ends 26 of the shaft of the roll 20 are journaled in the adjacent of the bearings 24.

Extremities 28 of the ends 26 of the roll shaft may be tapered, as shown. End plates 30 may be secured to the faces of said extremities 28 by bolts or screws 32 or the like. The end plates 30 hold the ends of the shaft against axial movement relative to the bearings.

Caps 34 are secured to outer sides of the housings 22 by means of bolts or screws 36, and about the bearings 24. Said bearings about the shoulders of the respective housings and are held therein as shown. The housings and caps may be arranged to contain lubricant for the bearings.

Webs or side portions 40 extend horizontally outwardly from opposite sides of the housings 22 and terminate in longitudinal vertically extending side edge portions 42.

Elongated guides 44 are secured to the inner faces of the side frames 2, and along opposite sides of the vertical slots in the frames. Securing bolts or screws 46, in engagement with the side frames, releasably hold the guides in the guiding position, as shown.

The components are so fitted that the housings 22, which rotatably support the ends 26 of the roll shaft, may move up and down within the guides 44 in the usual manner in the operation of the calender.

To remove the roll 20, the guides 44 at the front or rear sides of the side frames are removed by removing the securing bolts 46. The roll 20 and the housings 22 are thus free to be withdrawn outwardly between adjacent sides of the side frames.

To facilitate the removal of the said roll and housings, the bolts 3 are engaged in the sockets 5 of the upper bearings 6 so as to elevate said bearings and the upper roll 14, thereby to relieve the roll 20 of the weight and pressure thereon.

The roll 20 and housings 22 may be withdrawn by any suitable means such as a block and tackle, or the roll may be rolled outwardly onto a support or the like, all as may be desired.

With the roll and the housings passed inwardly between the side frames, the guides are secured in place so that the housings are guided for the operation of the calender.

The overall length of the roll and the housings is rela-

tively less than the distance between the inner adjacent sides of the side frames whereby the said roll and housings may be easily passed in and out between the side frames. By the removal of the guides 44 on the front or rear sides of the side frames, the roll 20 may be passed, outwardly for removal and inwardly for replacement, between the side frames.

The side frames thus do not require openings through which the ends of the roll shaft and bearings need be passed, since the overall length of the assembly does not exceed the distance between the inner adjacent faces of the side frames. Thereby, the novel features thereof may be employed with presently existing calenders.

It is to be further understood that the phraseology or terminology employed herein is for the purpose of description and not of limitation. Although specific terms are employed, they are used in a generic and descriptive sense only and not for purposes of limitation.

Without further analysis, the foregoing is intended to so fully reveal the gist of my invention and the construction and operation of the device thereof that others can, by applying current knowledge, readily adapt it for various applications without omitting features which, from the standpoint of prior art, fairly constitute essential characteristics of the generic or specific aspects of this invention. The substitution of equivalents and other modifications are contemplated, as circumstances may suggest or render expedient, since the invention is susceptible of various changes and modifications without departing from the real spirit or underlying principles of the invention. In other words, it is not desired to limit the invention to the exact construction shown and described as the objects of the invention may be attained by the use of constructions different in certain respects from that disclosed.

The following claims are desired to include within the scope of the invention all such suitable variations, modifications and equivalents by which substantially the results of the invention may be obtained through the use of substantially the same or equivalent devices or means.

Accordingly, limitation of this invention should be made only as determined by a proper interpretation of the terms used in the subjoined claims.

It is intended to claim the invention, broadly as well as specifically, as indicated by the appended claims.

What is claimed as new and useful is:

1. Calender apparatus comprising in combination, transversely spaced side frames having longitudinally extending slots, upper bearings in said slots for opposite ends of the shaft of an upper roll, means to elevate said upper bearings and upper roll to relieve a removable roll therebelow of pressure, elongated guide members, means removably securing said guide members to adjacent inner sides of said side frames along opposite longitudinal side edges of said slots and outwardly thereof providing face portions of said side frames along the sides of said slots, housings having opposite elongated side portions between the guide members of each side frame on the face portions thereof, a removable roll having a shaft provided with opposite ends, bearing means in said housings for said opposite ends of said shaft, and means for holding said housing and bearing means and shaft ends against axial displacement, the overall length of said roll and housings being relatively less than the distance between adjacent inner sides of said side frames whereby said roll and housings may be passed outwardly between said side frames by removing guide members adjacent corresponding sides of said side frames.

2. Calender apparatus as set forth in claim 1 wherein, the means for holding the shaft ends and bearing means and housings against axial displacement includes tapering portions of said shaft ends held in said bearings by plates secured to said ends, and caps secured to outer sides of said housings for urging said bearing means against inner portions thereof.

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3. Calender apparatus as set forth in claim 1 wherein the side portions of the housings are carried by web portions extending outwardly from opposite sides of central portions thereof.

4. A structure including a calender roll and rotatably supporting means therefor comprising, said calender roll having a body and shaft ends at opposite ends thereof, said rotatably supporting means including housings at opposite ends of said roll having bearing means for said shaft ends, means to hold said bearing means and shaft ends against axial displacement, and means to hold said housings and

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bearing means against axial displacement, the means for holding the bearing means and shaft ends against displacement includes tapering portions provided on said shaft ends in said bearing means, and plates secured to outer end faces of said shaft ends.

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