



F. VOITH.  
FRAMES AND BRASSES FOR CALENDER-ROLLS.  
No. 195,859. Patented Oct. 2, 1877.

Fig. 5.

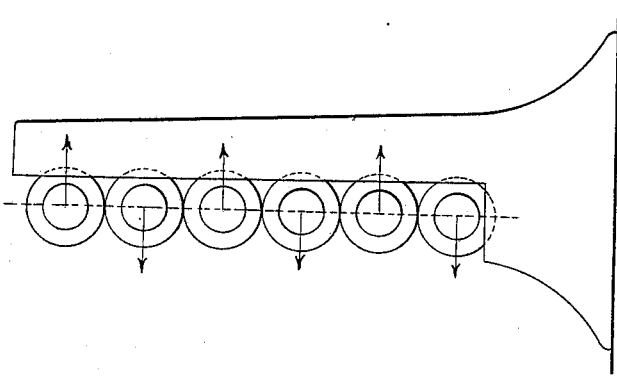


Fig. 7.

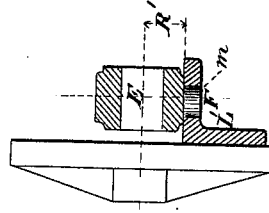


Fig. 4.

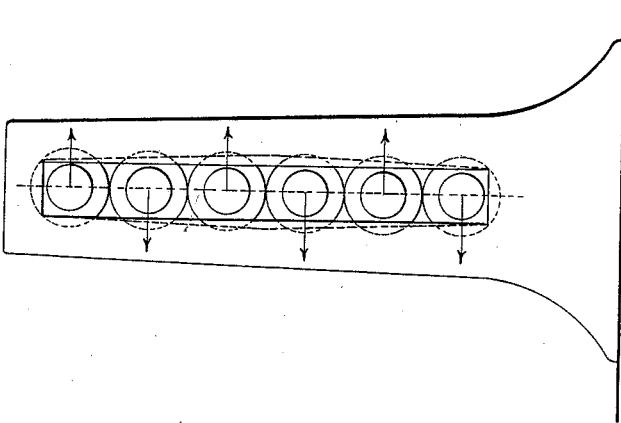
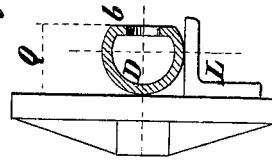


Fig. 6.



Witnesses  
John Becker  
Fred Haynes

Inwitness  
Friedrich Voith  
By his Attorneys  
Brown & Allen

# UNITED STATES PATENT OFFICE.

FRIEDRICH VOITH, OF HEIDENHEIM, WÜRTEMBERG, GERMANY.

## IMPROVEMENT IN FRAMES AND BRASSES FOR CALENDER-ROLLS.

Specification forming part of Letters Patent No. 195,859, dated October 2, 1877; application filed July 7, 1877.

### *To all whom it may concern:*

Be it known that I, FRIEDRICH VOITH, of Heidenheim, in the Kingdom of Württemberg, Empire of Germany, have invented an Improvement in Frames and Brasses for Calender-Rolls; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawing, forming part of this specification.

The invention has for its object to secure the parallelism of the axes of the rolls without special skill in construction of machinery for this purpose, to facilitate repairs, and the substitution of one roll for another in machinery of this kind.

My invention is applicable to all machines in which, for any purpose, two or more rolls are employed, one above the other, or placed side by side. For example, calenders for paper, cotton, or jute, smoothing-rolls on paper-machines, rolls for mangles, wet calenders for finishers, &c.

The invention is applicable, also, to chilled rolls, ordinary cast-iron rolls, paper rolls, brass rolls, or rolls of any other material employed for any purpose whatever.

The invention consists, principally, in the combination of hollow longitudinally and parallelly bored standards, slotted on their sides which face the roll-bearings, sliding blocks fitted to the cylindrical cavities in the standards as supports for the boxes and brasses or bushes which form the bearings for the journals of the rolls, the said boxes being pivoted to the said sliding blocks, and otherwise attached to the same, substantially as hereinafter set forth.

The housing frame or standard constructed by me serves to receive two or more rolls, which are to lie exactly parallel, whether the line drawn through the roll-centers is to be perpendicular, horizontal, or inclined in any degree.

As the most frequently employed, I take, to illustrate the invention, rolls the axes of which are in a vertical plane, and which run in contact with each other.

Figure 1 in the drawing is partly a front view and partly a sectional view of a machine comprising my invention, the section being on the line  $y y$  in Fig. 2. Fig. 2 is a section of

one of the standards and its inclosed sliding blocks made on the line  $x x$  in Fig. 1. Fig. 3 is a horizontal cross-section through a standard, sliding block, box, and bearing, made on the line  $z z$ , Fig. 1. Figs. 4, 5, 6, and 7 are diagrams, referred to in explanation of the construction and operation of the invention.

The roll-supports consist of two standards, A, cast with longitudinal cylindrical cavities  $C'$ , and which are bored out exactly perpendicular to the foundation-plate C, and each standard has a slot,  $a$ , on the side toward the rolls R. In these bored cylinders there is inserted for each bearing a cylindrical sliding block, D, turned to fit said cavities, each of which blocks has on one side of the same a segment cut away in such manner that a plane,  $b$ , parallel to the axis of the cylinder, is formed, which is rather narrower than the slot  $a$  in the frame. Against this plane the boxes E are held by one or more bolts, G. A pivot, F, projects from the rear of each box E, fitting accurately a hole bored in the sliding block D, which supports it.

By this construction I obtain the following advantages: The rolls are easily changed, and perfect accessibility of all moving parts and those subject to wear is secured. Every single roll can be taken out directly by taking off the nuts from the bolts G, which connect the bearings to the sliding blocks D, whether it is desired for turning, regrinding, &c., to repair the bearings or renew them.

The rolls lying above the roll to be taken out must be held fast, which can be easily and quickly effected by means of lifting-screws  $G'$ . These lifting-screws extend into the sliding blocks, and by means of the washers H and the nuts J underneath the washer every sliding block and every roll can be lifted up from the one below it, and held till the roll which has to be taken out is taken out and returned or replaced with a spare one.

The lower bearing also lies on a plane surface, K, of the standard, and has its lower surface turned concentric with the pivot F, and has, therefore, the same advantages as the others.

The effect on the standards of the side pressures, which the rolls when in operation exercise on the bearings, is almost nothing, and has no kind of influence upon the proper po-

sition of the bearings, as is the case with the ordinary constructions in use, especially with very high frames, for eight or more rolls.

As may be seen by the diagram, Fig. 4, the effects of the different side pressures indicated by arrows caused by the driving of rolls in the old method act to spread standards or frames that are not very strongly made, and to cause a bending of the two sides, as shown by dotted outlines, in such a way that the middle boxes have a certain amount of play in the frame, and therefore the rolls do not work correctly.

In my construction this effect of side strain cannot take place. The rolls being all arranged on one side of the standard, as shown in the diagram, Fig. 5, the side pressures act in opposite directions, as indicated by the arrows, and, so to speak, neutralize each other, so far as tendency to bend the standard is concerned.

All rolls lie exactly parallel to each other, and the axes of all the rolls lie exactly in the same plane, which arrangement is quite easily attained without special expenditure of time and labor, and without necessitating a specially-skilled workman to effect the construction. In order to show this it will be necessary to describe the method of fitting up the calender.

The cylindrical cavities in the standards can be accurately bored out on any good and powerful lathe by means of a special boring-bar, and at the same time the foot of the standard can be turned off perpendicular to the axis of the boring-bar by means of a slide-rest.

If, now, the two standards are placed on the solid bed-plate, which has previously been well planed or turned off, it is evident that the axes of the two cylindrical holes bored in the standards must stand exactly parallel. The sliding blocks D are turned to fit in the cylindrical cavities bored out in the standards, and afterward fastened to a face-plate against an elbow, L, Fig. 6, faced off on the plane surfaces *b*, Figs. 2, 3, and 6, and the holes for the pivots F bored out.

By this method the plane *b*, faced off on the sliding block, must be exactly parallel with its axis. The sliding blocks must all have absolutely the same measurement Q, Fig. 6, which is the only point where exact measurement is necessary to insure perfection of the machine, or rather the exact parallelism of the rolls.

On the bearing E, Fig. 7, the side which is to be bolted against the sliding block is faced off at the same time the pivot F is turned. After this all the bearings, one after another, are fixed on an elbow, L', Fig. 7, on the face-plate, bored out to receive the brass linings or bushings, and faced off. The elbow L' has a hole, *m*, in it in which the pivot F of the bearing fits, and in this way, when the elbow

remains unmoved for all the bearings, the dimensions will remain absolutely the same for all, and their accuracy is really independent of the care and skill of the workman.

If, through want of skill on the part of the workman, the elbow is ever so placed that the axis of the pivot F prolonged does not cut the line of centers of the lathe, this has no influence either upon the parallelism of the rolls or upon the flexibility of the bearings. The distance of the center of the rolls from the middle of the cylindrical hollow in the standard is exactly alike for all rolls, and is the sum of  $Q+R'$ , minus the radius of the sliding block D.

As the bushes or linings S, of iron or brass, are turned up and bored complete, and forced in the iron bearings, it is evident that the measure  $Q+R'$  is in no way altered, and if the bushes or linings require renewal, the parallelism of the rolls will still remain as at first.

From this method of construction great facility of erecting the machine results.

When the two standards are set up on the foundation-plate the axes of the cavities bored out in the standards will be exactly parallel. The sliding blocks are next inserted, the bearings put on the roll-journals, and the rolls brought to the sliding blocks and bolted loosely to them. After all the rolls are in their places the bolts G are screwed up tight, and thus the bearings are fastened firmly to the sliding blocks in the position which they have themselves taken.

The bolts G may be constructed with shoulders, so as to permit the bearing to swing freely while it is still held firmly to its place, such construction being intended when considerable lifting of one end of the rolls is necessary during the working of the calender.

The machine is readily and cheaply repaired, while at the same time the most extreme accuracy is obtained in absolute independence of the skill of the workman.

I claim—

1. The combination, with the sliding blocks D, fitted to the cylindrical cavities C' in the said standards, of the bearings E, pivoted and having a bolt or bolts, G, for attaching the same to the said sliding blocks, substantially as and for the purpose specified.

2. The combination, with the sliding blocks D of the screws G', working in the cylindrical cavities C', of the standards A, for lifting said blocks and their attached rolls, substantially as and for the purpose set forth.

In testimony that I claim the foregoing I have hereunto set my hand this 8th day of November, 1876.

FRIEDRICH VOITH.

Witnesses:

FRANZ WIRTH,  
FRANZ HASSLACHER.