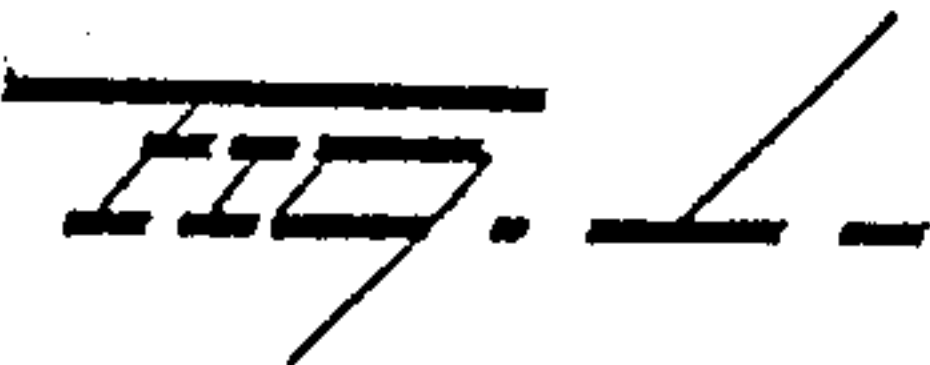


MOORE.

Patented Dec. 5, 1893.

162



Witnesses
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Sm type.

Pressure regulators.

3 Sheets—Sheet 3.

C. MOORE.
CALENDERING MACHINE.

No. 509,930.

Patented Dec. 5, 1893.

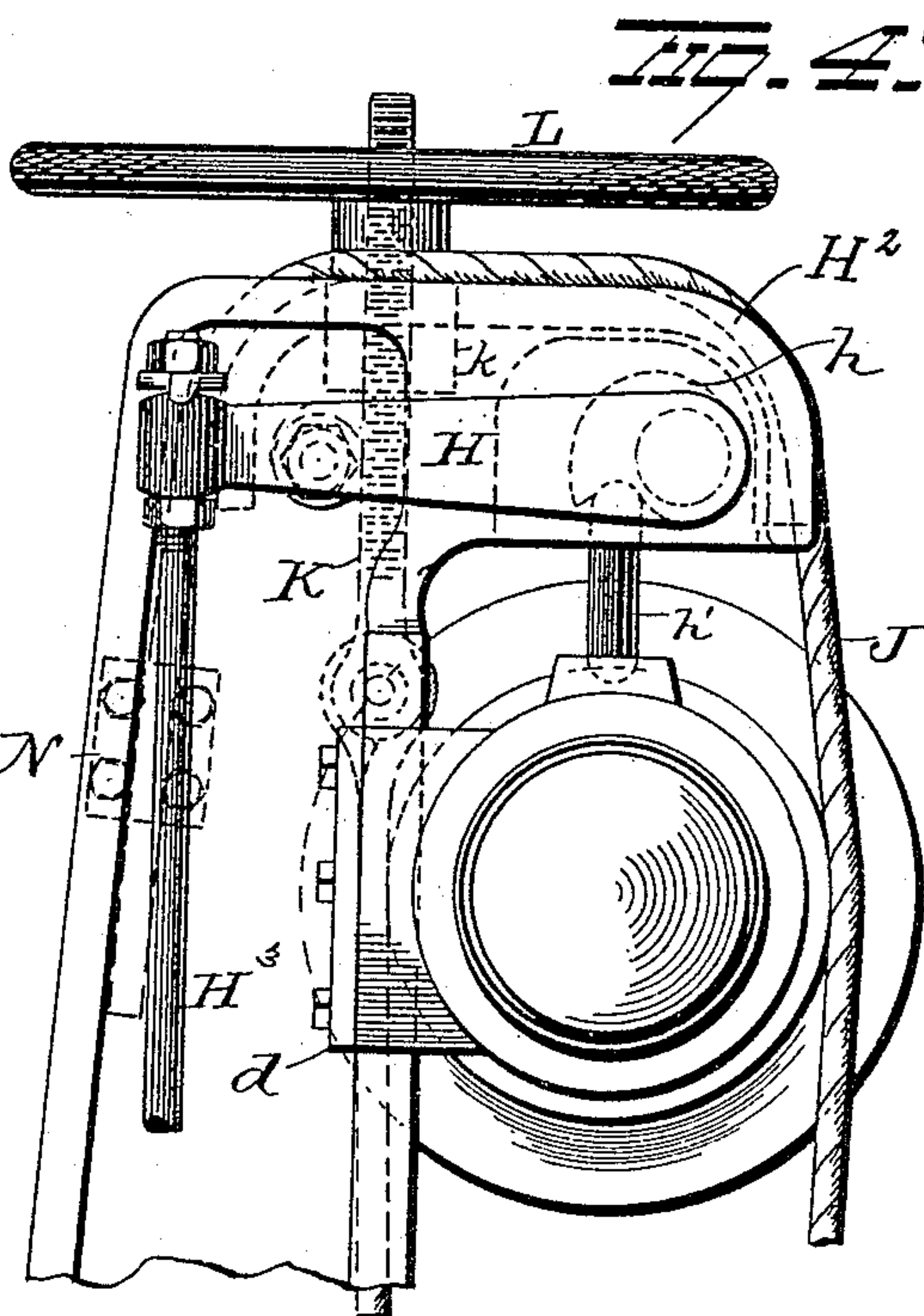
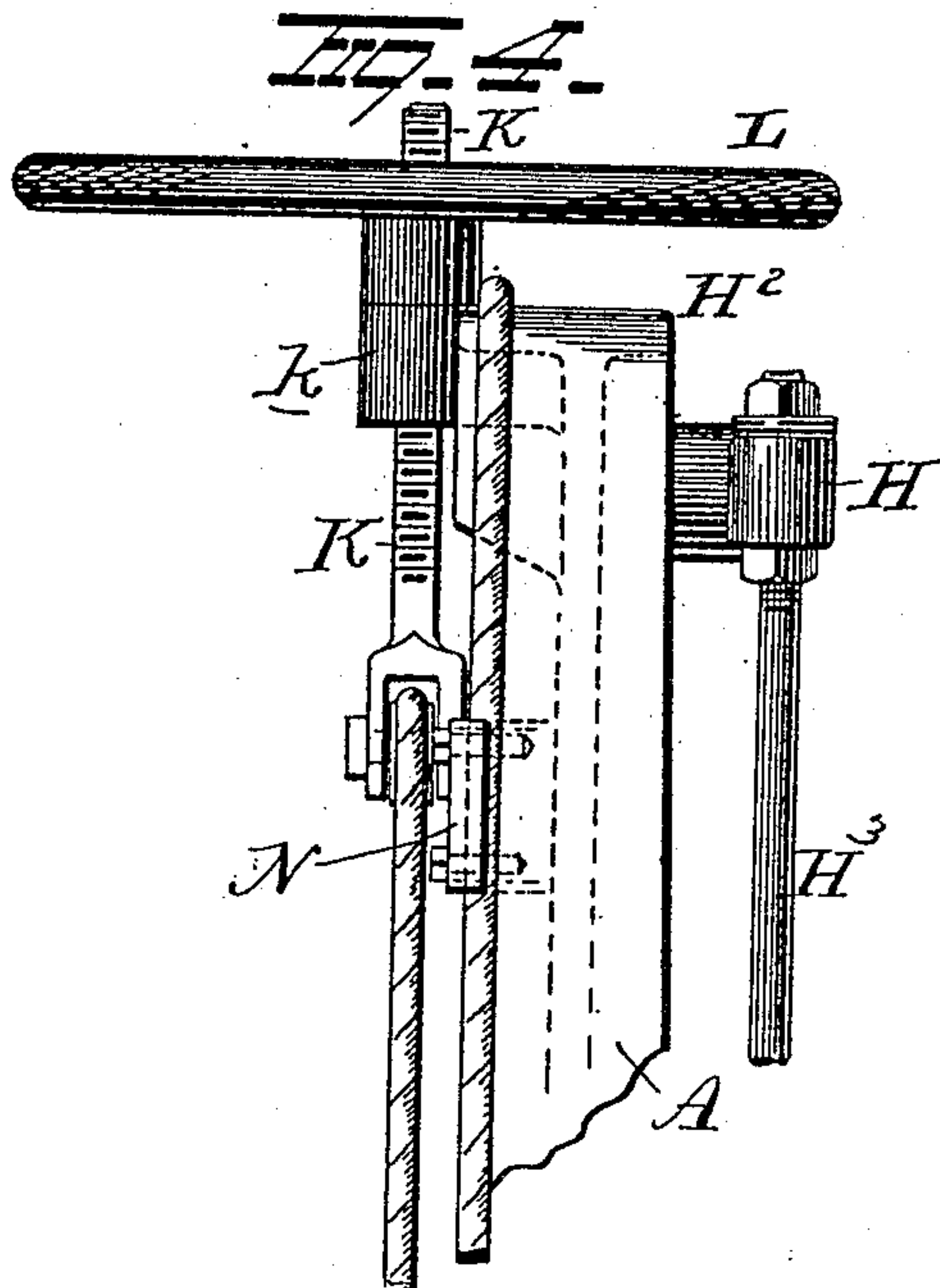
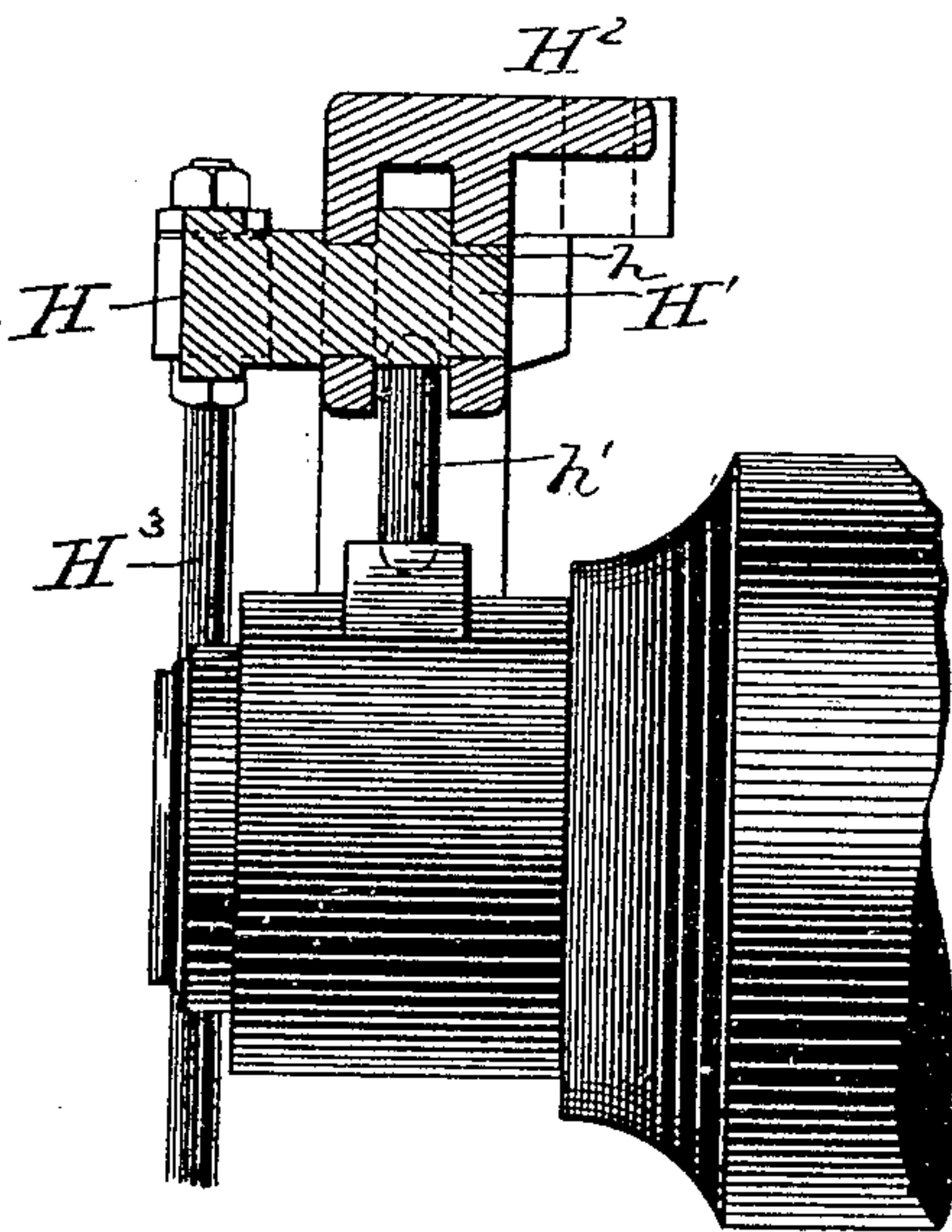


Fig. 5.



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UNITED STATES PATENT OFFICE.

CHARLES MOORE, OF ANSONIA, CONNECTICUT, ASSIGNOR TO THE FARREL
FOUNDRY AND MACHINE COMPANY, OF SAME PLACE.

CALENDERING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 509,930, dated December 5, 1893.

Application filed July 20, 1892. Serial No. 440,626. (No model.)

To all whom it may concern:

Be it known that I, CHARLES MOORE, of Ansonia, in the county of New Haven and State of Connecticut, have invented certain new and useful Improvements in Calendering-Machines; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to that class of machinery used in paper and other manufacturing where the material is passed through calender-rolls for compressing, glossing or finishing, and it consists in open faced housings or frames, a series of bearings secured at one side only to said housing and a series or stack of calender-rolls mounted at their ends in said bearings, whereby any one of the rolls of the series or stack can be removed from and replaced without disturbing the other rolls of the series.

My invention further consists in devices for raising and supporting a roll or series of rolls while the roll immediately below is being removed or replaced.

My invention further consists in improved devices for applying and regulating pressure on the upper of the series or stack of rolls.

My invention further consists in the parts and combinations of parts as will be more fully described and pointed out in the claims.

In the accompanying drawings, Figure 1 is a view in perspective of a machine embodying my invention. Fig. 2 is a view in end elevation of same. Fig. 3 is a view in horizontal section through one of the bearings and the portion of the housing to which the bearings are attached. Fig. 4 is a view in elevation from the rear, showing the upper end of one of the sides of the housing the flexible sling and the means for securing the sling to the screw and housing. Fig. 4^a is a view in end elevation of same, and Fig. 5 is a view in vertical section through the upper end of the housing showing the devices for transmitting pressure to the rolls.

A represents the end frames or housings each having an extension A', at the base, on which are supported the bearing blocks B of the lower calendering roll C. The ends of

rolls C are reduced forming end trunnions and the blocks B supporting said end trunnions are adjustable laterally or sidewise by the screws *a* and *b*, so that the bottom boxes can be adjusted, each end independently of the other.

The front or bearing face D of each end frame or housing A is T-shaped in cross section as clearly shown in Fig. 3, and each bearing box E supporting the rolls F is provided with a flat face *c* for contact with the front face D of the housing A, and with side lips *c*² of a length equal to the thickness of the combined face and guide G of the housing. Thus it will be seen that when the bearing boxes E are in position they not only rest solidly against the outer faces D of the parts G, but the lips *c*² of said boxes overlap the sides of part G and prevent endwise movement. The several boxes E supporting the rolls F are secured against outward displacement by the plates *d* (see Fig. 3), secured to lips *c*² and overlapping the rear faces of the part G of the housing. The calender rolls rest upon one another. Hence so far as vertical bearing is concerned the rolls F support the boxes E, while the latter being secured against outward movement retain the rolls in vertical line. The boxes E are free to slide vertically on the parts G. Hence the weight of the rolls is practically borne by the lower roll C which is the driving roll of the series.

At each end of the machine a rocker lever H is secured or integral with a short shaft H' the latter being mounted in the saddle or cap H² of the housing A. This shaft is provided within the housing with a cam *h* which bears upon the upper end of pitman or thrust rod *h'* the lower end of said pitman or thrust rod resting against the top of the upper of the series of boxes E. The rocker lever H is connected by tension rod H³ to the lever H⁴ pivoted at *h*³ to the housing, and the lever H⁴ is connected in turn by rod *h*⁴ to the lever H⁵ near the pivotal point of the latter. Each lever H⁵ carries a movable weight by means of which the pressure on the rolls can be regulated. The weight on lever H⁵ forces down the free end of the lever and through the intervention of rod *h*⁴, lever H⁴, tension rod H³ and rocker lever H turns shaft H' in a direc-

tion to force pitman or thrust rod h' downwardly. This pressure can be regulated by simply moving the weight toward rod h^4 when it is desired to decrease the pressure, and away from said pitman when it is desired to increase the pressure.

In a stack of calender rolls the lower roll C is the driving roll being connected to a driving shaft (not shown) by a clutch I. I also prefer to provide the center roll of the series with a hand wheel i by which it can be rotated when circumstances require it.

In Fig. 1 I have shown one of the rolls removed and suspended in a position in front of the machine. To remove any one of the rolls it is first necessary to slightly elevate all of the rolls above the one to be removed and hold them elevated until the roll has been removed and replaced, or if it is not intended to replace the roll at once, the suspended rolls can be lowered and thus close the space formerly occupied by the removed roll. In any event it is first necessary to elevate the rolls above the one to be removed so as to relieve the pressure on the latter, and hold them elevated while the roll is being removed. This is accomplished by the flexible slings or yokes J. These slings or yokes J each consist of a wire, hemp or other flexible rope or chain secured at one end to the lower end of screw rod K or other equivalent device. This rod K passes through an opening in the seat k integral with the saddle or cap, and through the screw threaded hub of the hand wheel L which latter rests on said seat k .

The free ends of the slings are passed under the reduced ends or trunnions of the roll next above the roll to be removed and are then carried upwardly over the grooved saddle H^2 , and from thence to the rear of the rolls. The rope is then drawn taut, and clamped against the side of housing by the clamp N. After both slings have been thus secured the hand wheels L are turned in a direction to elevate the rolls F above the one to be removed. Ropes or chains O are then attached to the ends of the roll to be removed and to a hook or block suspended from a crane or derrick or other movable or stationary support, and are drawn taut to prevent the roll from falling. After these preliminary steps have been taken, the plates d are removed leaving the roll with its boxes thereon supported by the ropes or chains O and free to be removed. After the roll has been removed, the upper rolls can be lowered until the space formerly occupied by the roll removed has been filled by the roll next above or they can be held by the slings until the roll has been replaced.

From the foregoing it will be seen that by making an open housing, or a housing adapted to engage one side only of the boxes, it is comparatively little trouble to remove any one or more of the rolls, and by removing the rolls from the front instead of from one end or the top they are less liable to be injured during the operation.

It is evident that slight changes might be resorted to in the form and arrangement of the several parts described without departing from the spirit and scope of my invention and hence I do not wish to limit myself to the exact construction herein set forth, but,

Having fully described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In a calendering or like machine, the combination with open faced frames or housings each having an approximately T-shaped guide, of boxes recessed to embrace the front face and sides of said guides, removable plates secured to the boxes and overlapping the rear face of the guides and rolls mounted at their ends in said boxes.

2. In a calendering or like machine, the combination with the open faced frames or housings each provided on its open face with T-shaped guides, of bearings each recessed to embrace the front and sides of said guides, plates secured to said bearings and overlapping the rear faces of said guides, rolls mounted in said boxes and means for imparting a downward pressure on the boxes carried by the upper roll.

3. In a calendering or like machine, the combination with the main frame or housing having T-shaped guides, of rolls, and journal boxes constructed to receive and form bearings for said rolls, said boxes having cheeks thereon which embrace the sides of the guides, removable plates in rear of the guides and means for securing said plates to the cheeks whereby to hold the boxes removably in place on the guides, substantially as set forth.

4. In a calendering or like machine, the combination with open faced housings, a series of boxes secured to each housing but free to slide vertically thereon, and rolls mounted at their ends in said boxes, of flexible slings each secured at one end to a screw, the said slings adapted to be passed under the roll, or lower roll of the series, to be elevated around the rolls above the lower roll, and up and over to the rear face of the housing and a clamp for clamping the free end of each sling to the housing, substantially as set forth.

5. In a calendering or like machine the combination with open faced housings or frames, a series of boxes secured to said housings but free to slide vertically thereon, and rolls mounted in said boxes and prevented from lateral displacement thereby, of flexible slings adapted to be passed between the ends of any two adjacent rolls of the series, and means for raising the series of rolls so encircled by the slings and thereby permitting of the removal of the roll below such suspended roll or rolls.

6. In a calendering or like machine, the combination with open faced housings, a series of boxes free to move vertically but held

against lateral displacement, and rolls mounted on said boxes, of a shaft in each housing, means actuated thereby for forcing the boxes of the upper roll downwardly, a pair of rocker
5 levers, tension rods connecting the rocker levers together, a weighted lever and rods connecting the weighted lever to one of the rocker levers, substantially as set forth.

In testimony whereof I have signed this specification in the presence of two subscribing witnesses.

CHARLES MOORE.

Witnesses:

MELVILLE C. HITCHCOCK,
WILLIAM H. FOSTER.