

H. WATERS.  
Die Rolling Machines.

No. 137,984.

Patented April 15, 1873.

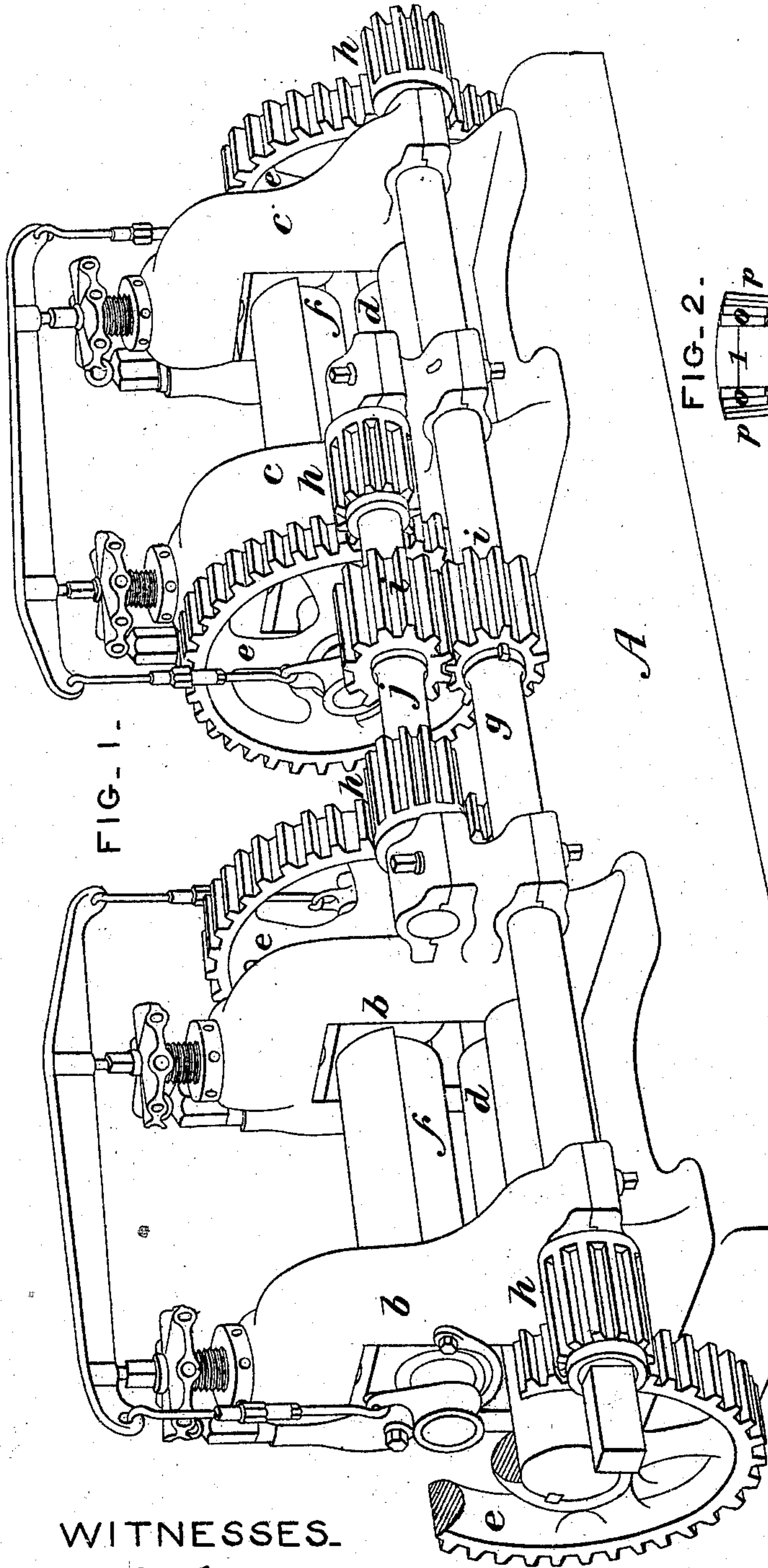
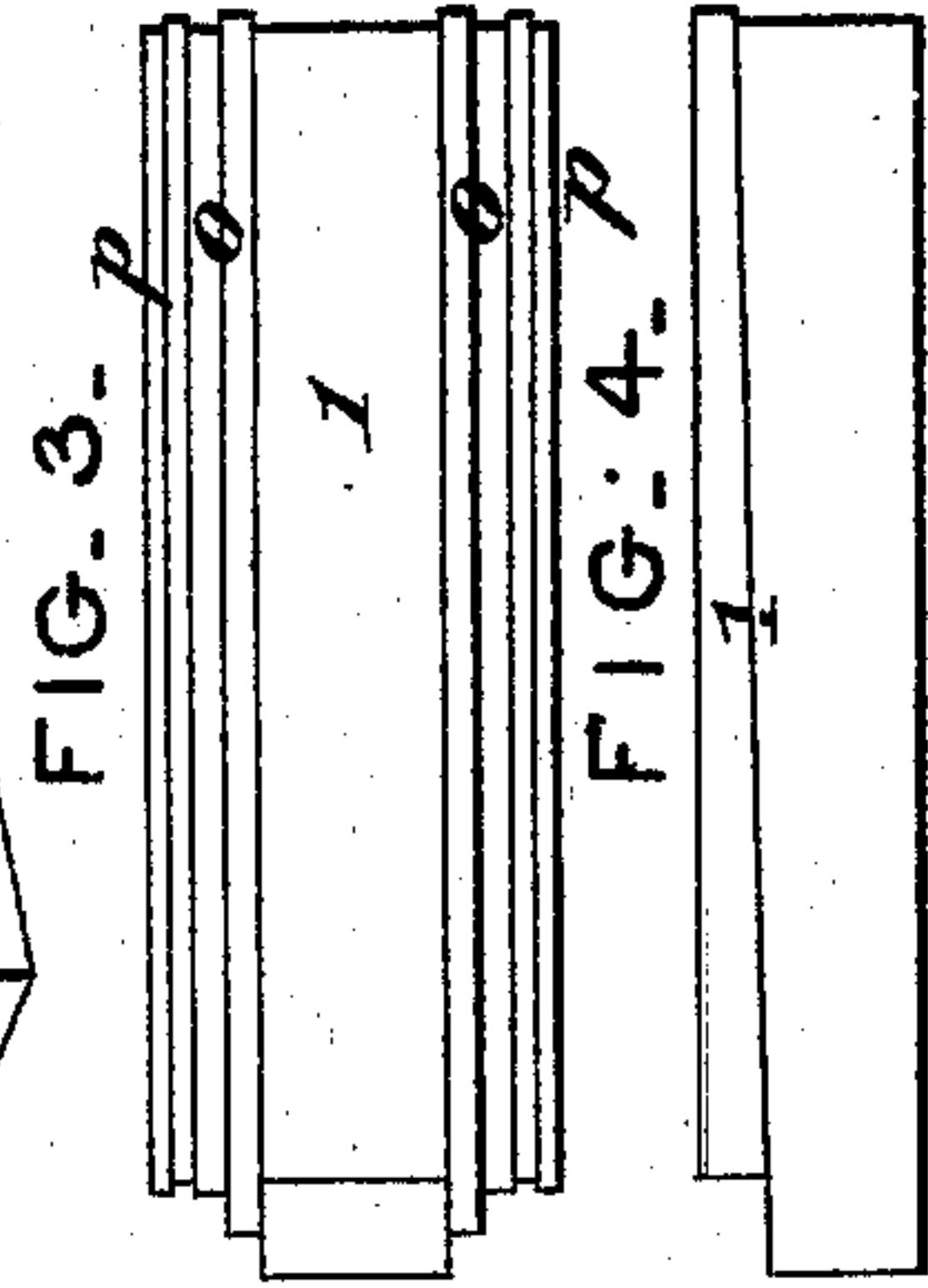
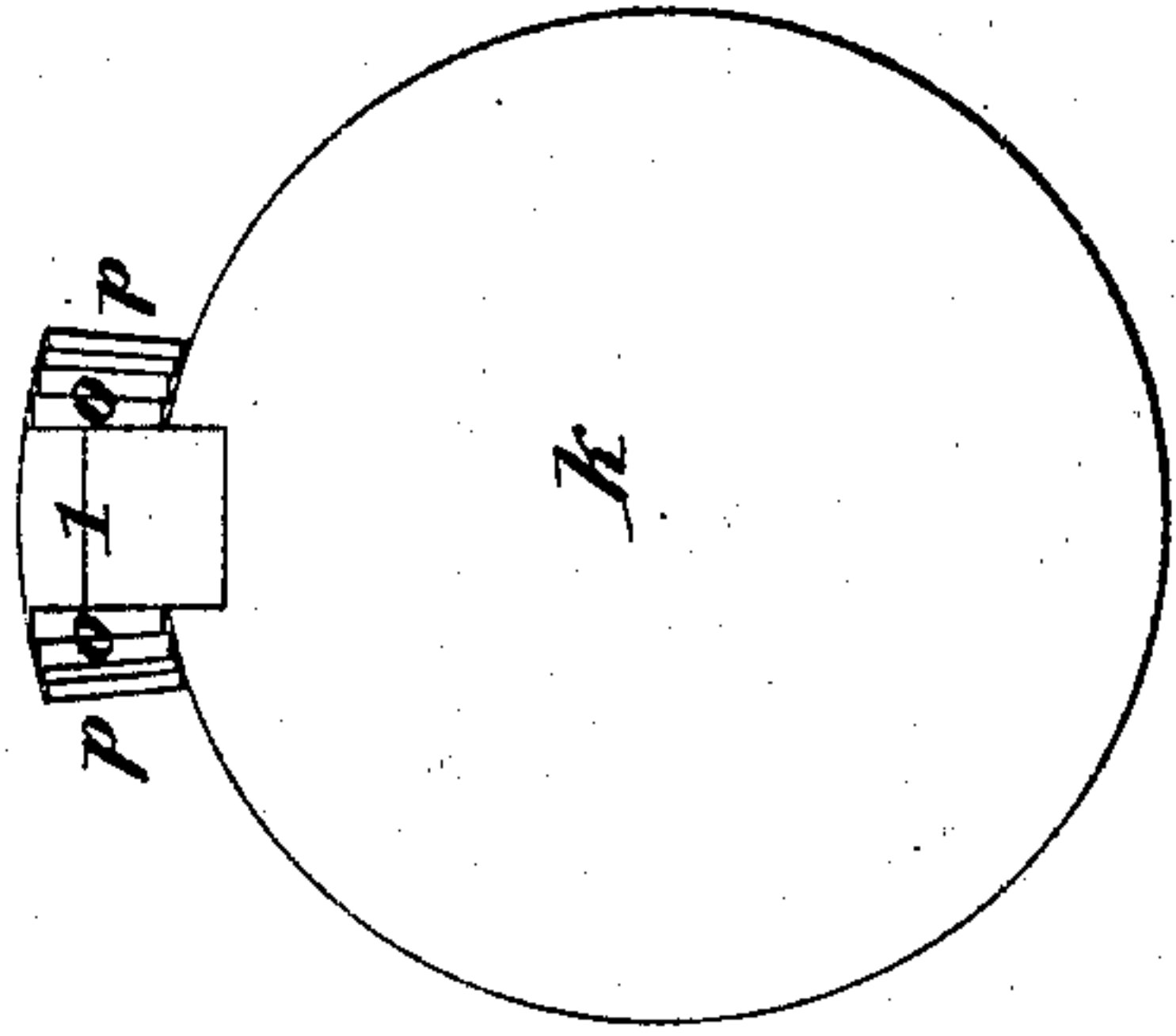


FIG. 2.



WITNESSES.

*W. B. Crosby.*  
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# UNITED STATES PATENT OFFICE.

HERVEY WATERS, OF NORTHBRIDGE, MASSACHUSETTS.

## IMPROVEMENT IN DIE-ROLLING MACHINES.

Specification forming part of Letters Patent No. **137,984**, dated April 15, 1873; application filed December 8, 1864.

*To all whom it may concern:*

Be it known that I, HERVEY WATERS, of Northbridge, in the county of Worcester and State of Massachusetts, have invented an Improved Rolling-Mill; and I do hereby declare that the following, taken in connection with the drawings which accompany and form part of this specification, is a description of my invention sufficient to enable those skilled in the art to practice it.

To manufacture scythes and other similar articles, mostly by the use of rolls instead of hammers, whereby great saving of labor and material may be obtained, is the immediate object of my invention, while generally the object thereof is to enable to be used with greater safety, accuracy, and facility than ever before that class of rolls which have intermittent working-surfaces, in which are modeled pairs of dies requiring to be matched with considerable certainty while working together in shaping metals.

Prior to the date of my invention, as far as I know, in the use of this kind of rolls it was practiced to gear one roll directly from the other, or else to drive one or both rolls by means of couplings attached to the end or ends of one or both the rolls, or by other indirect means, subject to considerable yielding of the parts when the rolls were submitted to great pressure, whereby the said rolls, although well matched when no strain was on them, would, if submitted to any considerable stress, become considerably disarranged in their relation to each other, thereby greatly injuring the dies of the rolls and producing bad and imperfect work.

By my invention I have succeeded in working die-rolls with such accuracy and certainty as to be able to produce thereby from my compound scythe-rod four scythe-plates, two in breadth and two in thickness; and although said plates have thick and thin parts extending throughout their entire length, and quite across the plates near their points, I have been able to match and use the dies upon the rolls with such accuracy as to preserve plane surfaces between the two double plates, the gearing of the rolls working always practically well, notwithstanding considerable variation in the

size of the rolls consequent upon the repairs of the dies.

My invention consists in a peculiar arrangement and construction of a rolling-mill made up of bed-piece, housings, rolls, gears, and driving-shafts, with their fastenings and journal-boxes, and, for a better understanding thereof, reference may be had to Figure 1 of the accompanying drawings with the explanations thereof. This figure shows, in perspective, the construction and arrangement of my plating-mill for scythes.

A is the bed-piece of the mill, upon which are fixed the housings of the rolls, the stands *b b* constituting the housings of the rolls for rolling one end of the scythe-plates, and *c c* the housings of the rolls for rolling the other end of the scythe-plates. *d d* are the bottom rolls of the mill, each having fixed upon its neck a driving-gear, *e*. *f f* are the top rolls, each also having fixed upon its neck a driving-gear, *e*, just like those on the bottom rolls; but, unlike the bottom rolls, the driving-gears are made adjustable upon the top rolls, in a manner and for a purpose which will be hereinafter fully explained. *g* is the primary driving-shaft, having fixed upon it two driving-pinions, *h h*, and one connecting-gear, *i*. *j* is the secondary driving-shaft, having fixed upon it two driving-pinions, *h h*, and one connecting-gear, *i*. All the driving-pinions are alike, and each works into a driving-gear on a roll. Both the connecting-gears also are alike. That on *g* works into and drives that on *j*, and, as represented in the drawing, the several journal-boxes of the driving-shafts *g* and *j* are integral with the several roller-stands. The journal-boxes may, however, be fixed upon the stands with screws. Moreover, the axis of the shaft *g* is nearly in the same horizontal plane with the axes of the bottom rolls, and the axis of the shaft *j* is nearly in the same horizontal plane with the axes of the top rolls; but the top rolls are adjustable perpendicularly, and therefore can not always have their axes in exactly the same horizontal plane with the axis of the shaft *j*, that being fixed. However, considerable adjustment of the top rolls may be made without essentially disturbing the pitch of the gears, because of the large size of



the driving-gears on the rolls, and the specific location of the axis of the driving-pinions, relatively to the location and to the line of adjustment of the axes of the top rolls.

The fastenings of the gears upon the upper rolls, as before stated, are made adjustable for the purpose of being always able to match the rolls properly in the direction of their circumference, and the manner which I prefer to employ is represented in Figs. 2, 3, and 4, Fig. 2 being a cross-section of the fastening; Fig. 3, a plan of the keys and shims reduced to a plane; and Fig. 4, a side elevation of the pair of main keys.

The neck *k* of the roll has a deep key-seat, into which is fitted the largest one of the pair of main keys *l*, and the nave of the wheel has a larger key-seat—so large as to allow the wheel to turn a space equal to the pitch of the teeth of the driving-gear. Within this key-seat, by side of the main keys, is the pair of adjusting-keys *o*. The rest of the space is filled with shims *p*, the adjustments being made as desired to the extent of one tooth of the driving-gear, by changing these shims and side-keys, part or all, from one side to the other of the main keys when necessary. If a greater adjustment is desired, of course it is done by changing the teeth of the gears.

The key-seat in the nave of the wheel is made larger than the keys, and, as is seen in the drawings, the keys are tapered conversely, so that each pair of keys may be driven tight or driven loose at the same end.

When only one set of rolls and housings is used it will still be necessary to have two driving-shafts, with their connecting-gears, working the two rolls, as before, but at the driving end of the shafts, in place of the other roller-stand, there may be substituted, upon the bed-plate, a journal-stand with two bearings properly located, as will be readily seen; and, instead of making the adjustments directly upon the neck of the top roll, I prefer to make them on the secondary driving-shaft, in the nave of the connecting-gear *i* thereupon.

I claim—

The combination of the bed-piece *A*, housings *b b c c*, rolls *d d*, driving-gear *e*, driving-shaft *g*, driving-pinions *h h*, connecting-gears *i i*, and fast and adjustable boxes, when constructed and arranged substantially as shown and described.

HERVEY WATERS.

Witnesses:

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