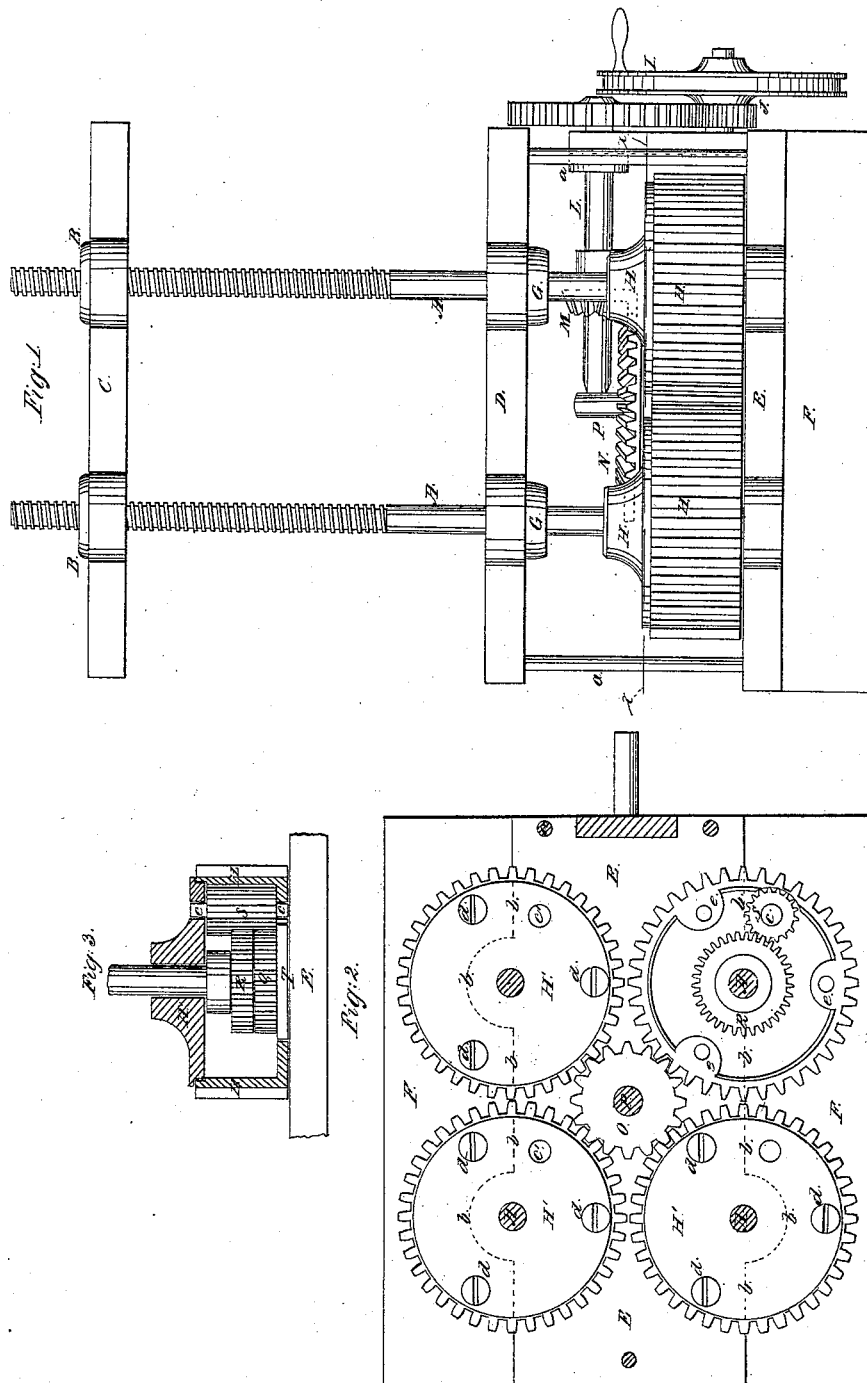


W. B. Leonard,
Cotton Press,

No. 2,960,

Patented Feb. 20, 1843.



UNITED STATES PATENT OFFICE.

W. B. LEONARD, OF MATTEAWAN WORKS, NEW YORK.

IMPROVEMENT IN PRESSES.

Specification forming part of Letters Patent No. 2,960, dated February 20, 1843.

To all whom it may concern:

Be it known that I, WILLIAM B. LEONARD, of Matteawan Works, in the county of Dutchess and State of New York, have invented a new and improved manner of constructing a press for the pressing of articles which it is desired to subject to a high degree of mechanical force, which machine I denominate the "Differential Press;" and I do hereby declare that the following is a full and exact description thereof.

In my press I usually employ four screws, which, while they are used to move the platen or follower, render the constructing of a frame or cheeks unnecessary. The position of this press may be varied, but for most purposes it will be most conveniently situated when the screws are made to rise vertically from the bed-plate, as when thus arranged the platen or follower will be brought down or raised by the revolution of said screws. To the lower end of each of the screws a cog-wheel is firmly attached, and this cog-wheel rests upon another wheel that is of the same diameter with itself. This second cog-wheel is stationary, being firmly fixed to a metallic plate, which constitutes the basis or foundation-plate of the press. These I denominate "differential wheels," and the gudgeon of the uppermost of these wheels is received and has its bearing in the centers of the lower or stationary wheels, which are thus made to constitute the steps of the lower ends of the screws. The two wheels above named, appended to each screw, differ from each other in the number of teeth cut on them, there being one, two, or any other convenient number more on one of them than on the other. In most instances, and more especially where very great power is required, there will be one tooth only more in one of them than in the other. A pinion is made to revolve round these two wheels, by means of suitable gearing, in a manner to be presently described, its teeth being of such length as to cause it to gear into both of them. The effect of this will be to cause the wheel that is attached to the screw to revolve slowly, said wheel being carried, say, to the distance of one tooth in every complete revolution of the pinion around the stationary wheel. The pinion is made to revolve around the wheels above named by inclosing it within a cylindrical box, the periphery of which is furnished with cogs into which a driving wheel or pin-

ion is made to gear, so as to carry said cylindrical box with its contained pinion around the two differential wheels above described. The four screws usually employed to move the follower of the press are each similarly combined with differential wheels, a revolving pinion, and a cylindrical box having cogs on its periphery, and the same driving wheel or pinion which gives motion to one of said boxes gears into and gives motion to the whole of them, be their number greater or less.

In the accompanying drawings, Figure 1 is a side elevation of my press. Fig. 2 is a top view of the lower part thereof in the line *x x* of Fig. 1. Fig. 3 shows the interior of one of the cylindrical boxes with its contained differential wheels and pinion, one side of the box being supposed to be removed for that purpose.

A A, Fig. 1, are two of the screws, which work through boxes or female screws B B in the platen or follower C, and serve to draw it down toward or to raise it from the bed-plate D of the press. E is the base or foundation plate, which may rest upon sills of wood F. The collars G G, which are firmly fixed to the shafts of the screws A A, bear and revolve against the under side of the bed-plate D. *a a* are pillars which connect the bed and the base-plates together.

H H are the two cylindrical boxes appertaining to the two screws A A, and the four boxes appertaining to the four screws are shown in the top view, Fig. 2, the top of one of the boxes being removed for the purpose of showing one of the differential wheels and the pinion contained within it.

I is a wheel, to which the motive power may be applied, and this may be turned by a winch, a band, or otherwise. To the wheel I is attached a pinion, J, which drives the cog-wheel K and its shaft L. Upon this shaft there is a bevel-pinion, M, that gears into a horizontal bevel-wheel, N. This bevel wheel is in one piece with the spur-wheel O, Fig. 2, which spur-wheel gears into the teeth on the peripheries of the four cylindrical boxes H H, and gives motion to them. The bevel-wheel N and the spur-wheel O revolve freely on a fixed shaft, P, made fast at its lower end to the base-plate E. The sizes of the respective wheels and pinions may be varied, so as to differ in their relative proportions, and the power of

the press may be regulated by this means, as well as by the differential action of the two wheels caused by the pinion gearing into them, which, with the manner of arranging them, I will now more particularly describe.

The three plates C, D, and E may each be of the same form and size. The form in which I usually make them is shown in Fig. 2, where E E is the base-plate, its sides being shown in part by the dotted lines *b b*.

In Fig. 3, Q and R are the differential wheels, which rest on each other, and differ from each other in the number of teeth which they contain; but their difference in this respect must be small, this being necessary both from the object of the press and from the manner of its action, as the pinion S is to gear into both of them. The lower wheel, Q, is made fast to the base-plate E, and between it and said plate there is a smooth collar, T, which serves as a center round which the cylindrical box H revolves, there being an opening in the bottom of said box to receive said collar. The pinion S has its pivots *c c'* in the bottom and top of the box H, and is of course carried round with it. The tops H' of the boxes H are confined in place by screws *d d*, tapped into the studs *e e*, which are cast with the boxes. The wheel R, as before remarked, is fastened permanently to the screw A, and carries it round, the lower end of said screw passing through the wheel, so as to form an axis or gudgeon, which is received within an appropriate opening in the center of the stationary wheel Q. The respective parts of my press being combined and arranged in the manner herein described, it is then ready to be applied to the purpose intended, its action being as follows:

Motion being given to the wheel I by any suitable means, the spur-wheel O will, by means of the intermediate gearing above described, cause the boxes H H to revolve round their axes, and these will carry with them the pinions S S, which gear into the differential wheels Q R, and, supposing these wheels to

differ one only in the number of their teeth, the wheels R will, in each orbicular revolution of the pinion S, be made to revolve to a distance corresponding with this difference. Thus, if the wheel R has thirty teeth, it will require thirty revolutions of the boxes H H to give to the screws A A one entire revolution on their axes. The accumulation of power in the press will of course depend not only upon this differential motion, but also upon the gearing of the parts intermediate between the first mover and the cylindrical boxes H H.

Having thus fully described the nature of my differential press, and shown the manner in which the same operates, what I claim therein as new, and desire to secure by Letters Patent, is—

1. The manner in which I have constructed, combined, and arranged the cylindrical boxes H, the differential wheels Q R, the pinions S, and the screws A, so that they shall, by their particular arrangement, co-operate in producing the effect described, which arrangement is to be made substantially in the manner above set forth.

2. I do not claim the operation of the differential motion generally, this having been before known and used for various purposes; but I limit my claim in this particular to the manner and the combination in which I have applied it, and this I claim whatever may be the number of cylindrical boxes and their appendages which may be employed, and without limiting myself to the particular arrangement of the gearing intermediate between the first mover and the cylindrical boxes, and by which these boxes and their contents may be actuated.

This improvement may also be applied to raising and moving heavy bodies—such as buildings, vessels, pile-driving, &c.

W. B. LEONARD.

Witnesses:

JOSIAH CARVER,
HENRY SCHENCK.