5 Sheets—Sheet 1.

J. L. SHEPPARD.

Band-Tightener for Cotton-Presses.

No. 227,590. **Patented May 11, 1880.**

Fig. 1.

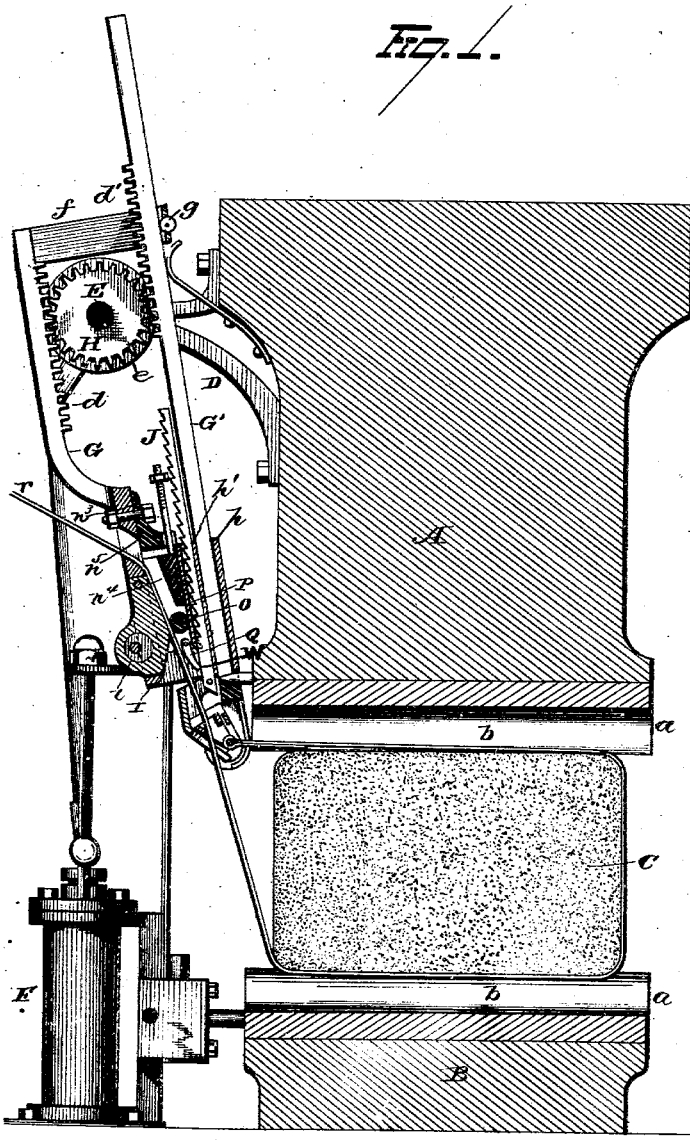
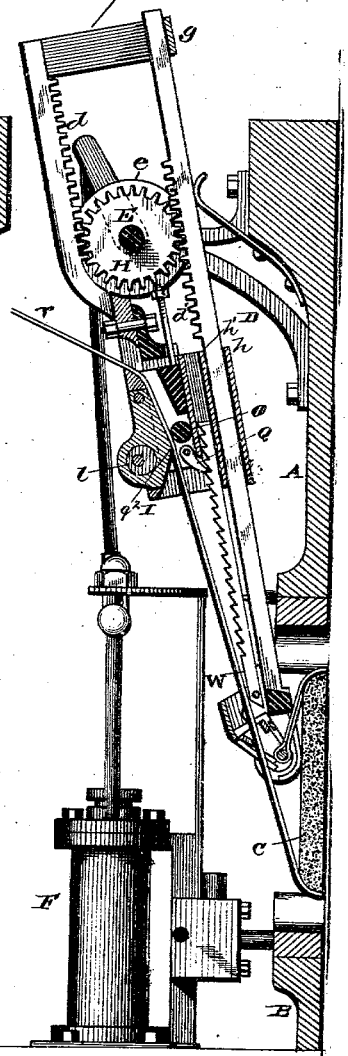


Fig. 2.



WITNESSES

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Fig. 3.

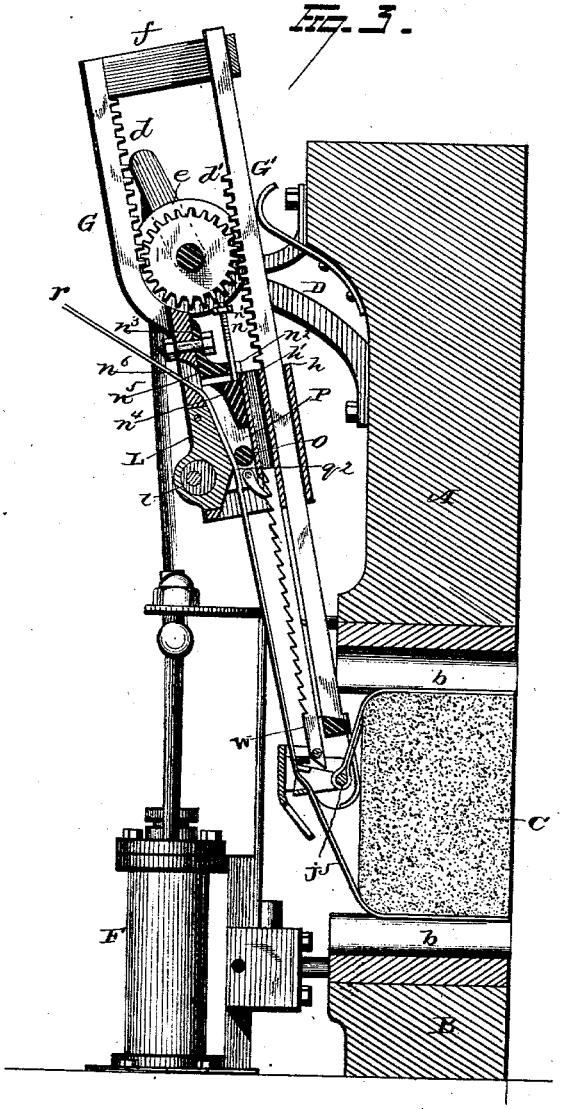


Fig. 4.

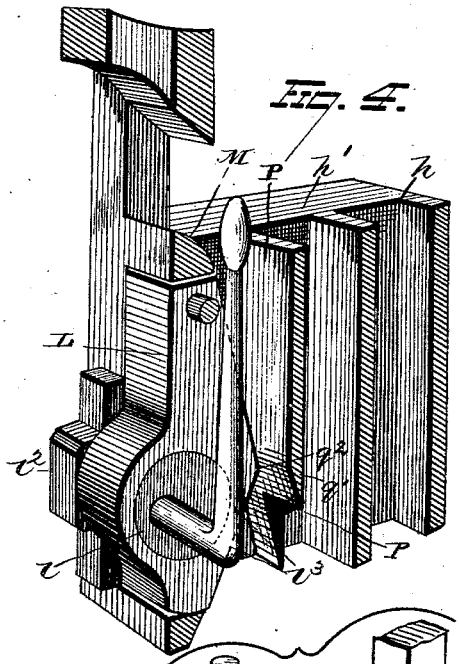
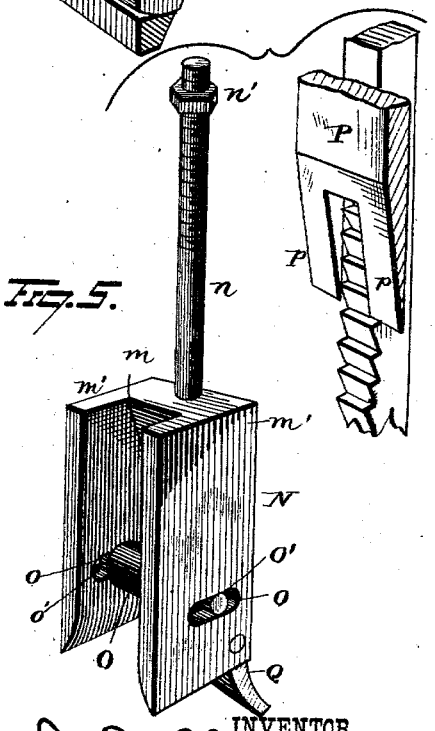


Fig. 5.



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5 Sheets—Sheet 3.

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Fig. 6.

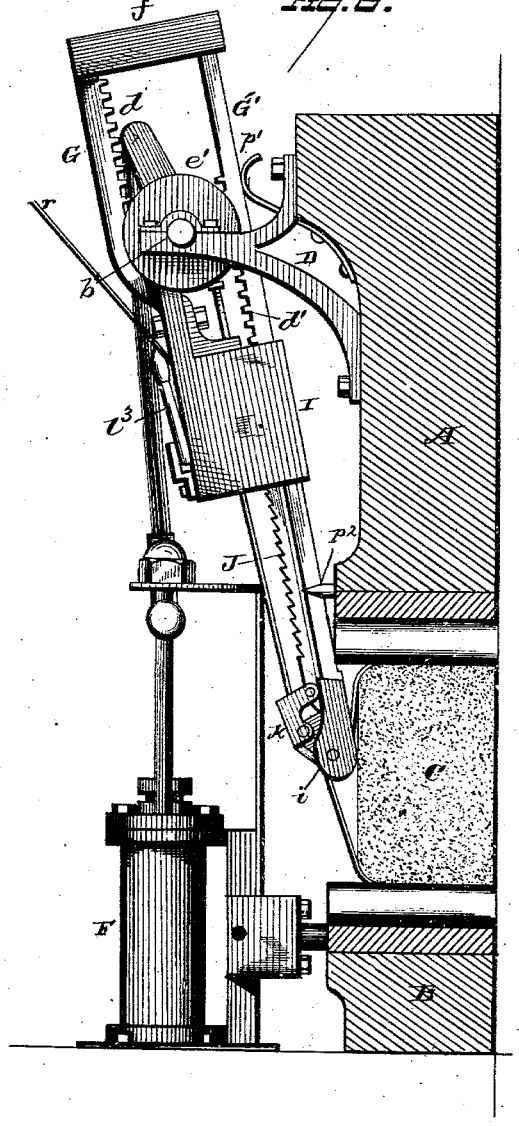


Fig. 7.

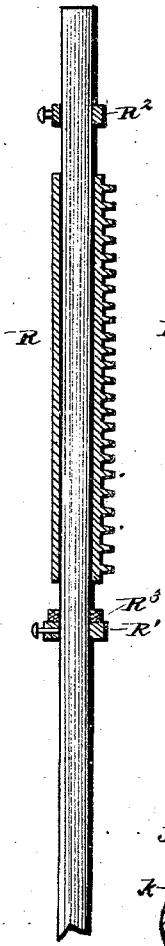
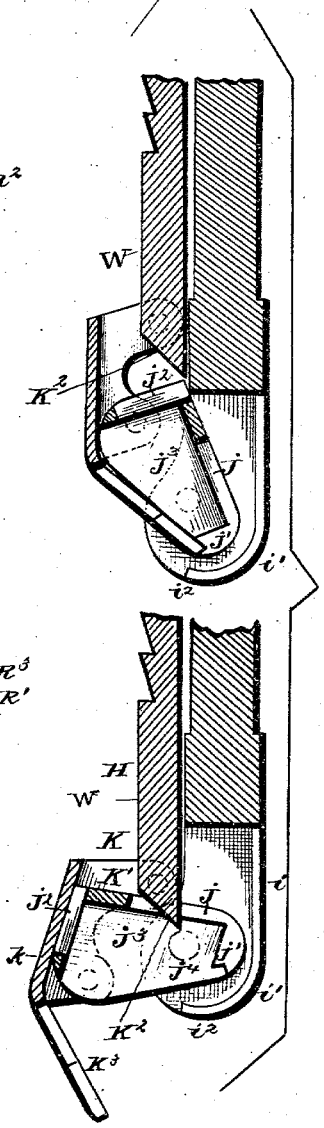


Fig. 8.



WITNESSES

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5 Sheets—Sheet 4.

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Band-Tightener for Cotton-Presses.

No. 227,590. **Patented May 11, 1880.**

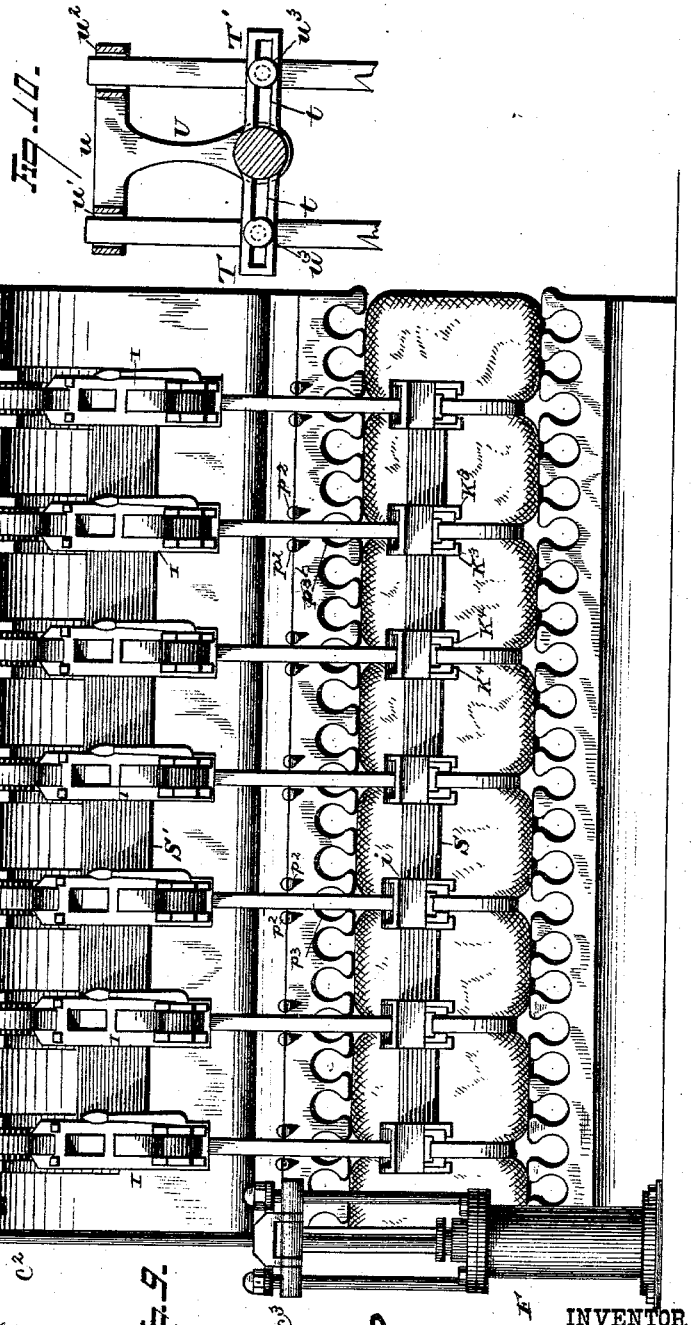

Fig. 7.

Fig. 8.

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Fig. 1.

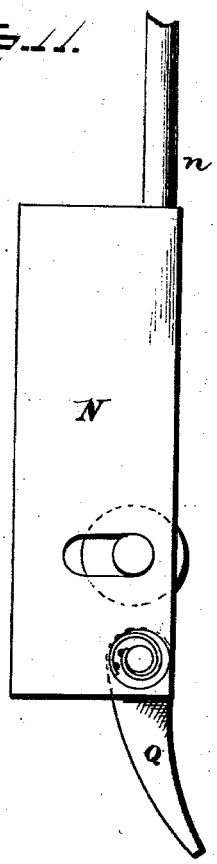
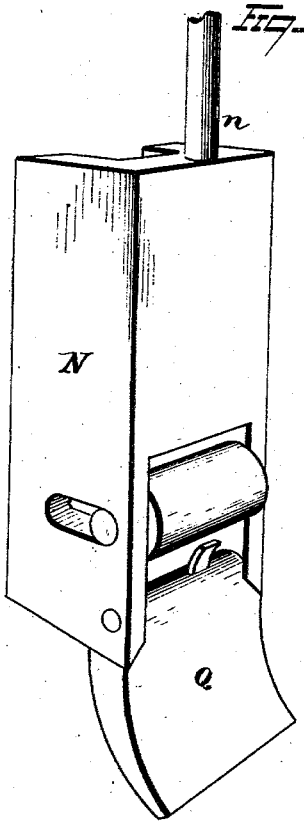


Fig. 2.



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UNITED STATES PATENT OFFICE.

JOHN L. SHEPPARD, OF CHARLESTON, SOUTH CAROLINA.

BAND-TIGHTENER FOR COTTON-PRESSES.

SPECIFICATION forming part of Letters Patent No. 227,590, dated May 11, 1880.

Application filed February 27, 1880.

To all whom it may concern:

Be it known that I, JOHN L. SHEPPARD, of Charleston, in the county of Charleston and State of South Carolina, have invented certain new and useful Improvements in Band-Tighteners for Cotton-Presses; 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 pertains to make and use it, reference being had to the accompanying drawings, which form part of this specification.

My invention relates to an improvement in band-tighteners for cotton-presses, the object being to provide mechanism of such construction and relative arrangement of parts that the opposite ends of all the several bands of a compressed bale may be simultaneously subjected to any desired strain in opposite directions and the buckles automatically locked and the band ends released; and to this end my invention consists in a bale-band tightener of novel construction, as will be hereinafter described, and specified in the claims.

In the accompanying drawings, Figure 1 is a vertical section, showing the relative position of the parts of the tightener before strain has been exerted upon the bands. Fig. 2 is a similar view, showing the position of parts after the ends of the bands have been subjected to the desired strain. Fig. 3 is a view in vertical section, showing the relative position of parts after the buckle has been partly turned to form the tie. Fig. 4 is a detached view of the pivoted wedge for griping the free end of the band. In Fig. 5 are represented detached views of the sliding griping device for automatically griping the free end of the band. Fig. 6 is a side elevation, showing the position of parts before the buckle has been upset. Fig. 7 is a detached view of the adjustable and yielding rack-bars. In Fig. 8 are represented detached views of the buckle-holder. Fig. 9 is a view in front elevation, showing a gang or series of band-tighteners adapted to be operated simultaneously. Fig. 10 is a modification, illustrating mechanism for imparting motion in opposite directions to the push and pull bars. Fig. 11 is a view, in side elevation, of the slide. Fig. 12 is a view in perspective, illustrating the spring on the pawl pivoted to the slide.

A represents the upper, and B the lower, platen of a cotton or other press, and C represents the bale. Platens A B have the ordinary channel-bars *a* secured to their opposite faces, thereby forming any desired number of band-openings *b* between said bars. To the upper platen is secured a shaft-hanger, D, in the bearings *b'* of which is supported the main shaft E, which latter extends along the upper platen nearly its entire length. One end of shaft E is furnished with a crank, *c*, to the wrist-pin *c'* of which is journaled one end of a connecting-rod, c^2, the opposite end being pivoted to the slide c^3 of any suitable steam-engine or other motor, F, which latter is provided with valve mechanism of any desired construction to enable steam to be alternately admitted to opposite ends of the steam-cylinder at will and reciprocate the piston, thereby rotating the shaft E in either direction. G is a pull-rod, and G' a push-rod, each being provided at its upper end with racks *d d'*, the teeth of which mesh with the cogs on opposite sides of the cog-wheel H, the latter being rigidly secured to the shaft E and revolved thereby.

Cog-wheel H is furnished with side flanges, *e e'*, which serve as guides for the pull and push rods G G' and prevent their lateral displacement. To the upper end of the pull-rod G is secured a yoke, *f*, the inner end of which receives the upper end of the push-rod G', the yoke serving to retain the teeth or cogs of the rack-bars in perfect mesh with the cogs of the cog-wheel H. To prevent any undue friction in the operation of the rods or bars G G', the yoke may have an anti-friction roller, *g*, journaled therein, and the friction-roller adapted to fit against the rear side of the push-rod G, and, if desired, the roller *g* may be journaled in yielding bearings, which will cause the racks to operate snugly in connection with the cog-wheel. To the lower end of the pull-rod G is secured a housing or frame, I, or the latter may be made integral with the rod or bar G.

Housing I is provided with a guideway, *h*, through which is inserted the push-rod G' and a separate guideway, *h'*, in which is inserted the upper end of a ratchet-bar, J. The lower end of push-rod G' is formed with a wide jaw, *i*, the sides or ears *i' i'* of which are rounded on their lower ends to prevent them from cut-

ting or catching in the bagging, and are preferably furnished with inwardly-curved shields i^2 to prevent the bagging from being drawn or wedged between the ears or parts pivoted thereto. Between the ears i' i' is pivoted a buckle-holder, which is illustrated in an enlarged view in Fig. 8. The back of the buckle-holder is provided with an elongated open slot, j, for the passage of the band, the buckle resting upon the narrow flanges j' j'. The upper end of the buckle-holder is formed with an open slot, j^2, for the passage of the free end of the band, while the sides j^3 j^3 are made tapering from the upper to their lower ends. The lower end of the buckle-holder is furnished with two bearings, j^4 j^4, in which are seated the rounded bearings j^5 on the small end of the buckle. To the outer or free end of the buckle-holder is pivoted the buckle-upsetting device K, the front plate, k, of which is provided with side ears or flanges, K′ K′, which latter are pivoted to the opposite sides of the lower end of the ratchet-bar J, the extreme lower end of the latter being beveled, as at K^2. The lower edge of the plate k is provided with the downwardly-projecting fingers K^3 K^3, having inwardly-projecting flanges k^4 (shown in Fig. 9) formed on their lower ends. The fingers extend rearwardly at an angle, as shown, so that when the push and pull bars are exerting strain on the opposite ends of the bands the fingers will be seated upon the tapering sides of the buckle-holder and retain the buckle against displacement.

L is a wedge, pivoted at its upper end to swing in a slot formed in the outer face or side of the housing I, the lower or free end of said wedge being supported upon an eccentric roller or shaft, l, the journals of which are supported in bearings l^2. One end of the eccentric shaft l has a handle, l^3, firmly attached thereto. By turning the handle outwardly and downwardly the pivoted wedge is moved outwardly, or out of its operative position, while a reverse movement of the handle serves to lock the wedge in proper position for operating on the free end of the band, as will hereinafter be explained.

Housing I is formed with a guideway, M, in which is placed a trough-shaped slide, N, consisting of the bottom plate, m, and sides m' m'. The upper end of slide N is furnished with a rod, n, screw-threaded at its upper end and provided with an adjusting-nut, n'. The rod n extends through an open slot, n^2, in the removable top n^3 of housing I. The upper end of the floor or bottom of the slide N is inclined, as at n^4, which corresponds and registers with the inclined surface n^5 formed in the removable top n^3, said inclines serving to deflect the free end of the band as it is forced upwardly into the housing, and causing the free end to be guided forward and out through the opening n^6 in the upper end of the housing.

The bottom plate of the slide is cut away at one end to allow the periphery of the roller O, the journals o o of which are located in the elongated slots O′ O′ in the sides of the slide, to extend below the sides and rest upon the partition P, which separates the slide from the ratchet-bar.

The lower end of the sides of the slide are outwardly beveled to enable the free end of the band to be readily inserted therein.

To the lower end of the slide is pivoted a pawl, Q, which is retained in operative position by means of a spring (shown in Fig. 12) attached to its rear end or connected with its pivotal bearings.

Partition P is beveled from a point, q', which is opposite the point q^2 of the pivoted wedge, thereby forming a throat at narrowest portion throughout the length of the guide way in which the slide operates.

The beveled portion of the partition constitutes two inclines, p p, on opposite sides of the teeth of the ratchet-bar.

The pawl Q, pivoted to the lower end of the slide, extends laterally outward on its opposite sides, so that when the slide is forced upwardly in the housing the sides of the pawl will engage with the inclines p p and be disengaged from the teeth of the ratchet-bar.

A spring, p', is secured to the upper platen or shaft-hanger, the free end of the spring being arranged to press against the upper end of the push-bar, and thus force the lower end of the latter inward or toward the bale.

Guides p^2 p^2 are secured to the front side of the upper platen in close proximity to band-opening b in the face of the platen. These guides receive the lower end of the push-bar and retain the tightening mechanism against any lateral displacement.

Having described the construction and arrangement of the several parts of my improved band-tightener, I will now briefly describe its operation.

The bale having been compressed, the tightening mechanism is in the position illustrated in Fig. 1. The buckle having been attached to one end of the band and the free end r of the band having been inserted between the fingers of the upsetting device, forced through the open slot in the back of the buckle-holder, through the band-groove or channel in the upper platen, down around the rear side of the bale, and through the band-opening in the lower platen, and thence upward and through the buckle and into the lower end of the slide-guide way, it strikes the roller journaled in the slide, moves the latter up sufficiently to prevent any wedging action on the band, the inclined chute or band-groove in the upper portion of the housing serving to direct the end of the band through the slot in the front of the housing. The free end of the band is then grasped by one of the hands or workmen and all free slack band pulled out. When the strain is released from the free end of the band the latter is prevented from slipping back by the action of the slide, which falls by its own gravity, causing its roller to tightly jam the pivoted wedge, which latter enters

between the sides of the slide and forms a narrow throat for the passage of the band.

It will be observed that at this stage of the operation the slide is in its lowest position, and the pawl pivoted to the lower end thereof rests upon the smooth portion W, on the lower end of the ratchet-bar. The object of this smooth portion W on the lower end of the ratchet-bar is to prevent the pawl at this stage of the operation from engaging with the teeth of the ratchet-bar in order to allow the slide sufficient movement downward (of its own weight) to admit the roller journaled therein to jam or wedge the band firmly between it and the pivoted wedge. Steam is now admitted to the under side of the piston of the steam-cylinder and operates to force the piston upwardly, thereby revolving the cog-wheel and causing the pull-bar G to be forced upwardly and the push-bar G′ to be forced downwardly. The free end of the band, being firmly wedged between the roller and the wedge, is prevented from slipping, and hence is drawn upwardly with the pull-bar, while the buckle-holder serves to hold the buckle as it is forced downwardly, the buckle being prevented from turning owing to the lateral strain exerted on the buckle. Thus both ends of the band are simultaneously pulled in opposite directions, and this movement is continued until the maximum strain has been exerted.

The buckle is automatically locked during the first part of the reverse movement of the push and pull bars, as follows: By exhausting the steam from the cylinder, thus withdrawing the power applied to the rods, the relax action of the band caused by the expansive force of the bale operates to drive the piston downward and reverse the movement of the main shaft and cog-wheel, thereby causing the push-bar to be drawn upward and the pull-bar to be forced downward. When the desired strain has been exerted on the ends of the band the pawl attached to the slide engages with the teeth of the ratchet-bar, and hence when a reverse motion is imparted to the push and pull rods the pawl operates to lock the slide to the ratchet-bar.

The slide is prevented from being moved upwardly as the pull-bar and its housing descends owing to the friction exerted on the roller and pivoted wedge. Thus the ratchet-bar is forced downwardly with the housing on the pull-bar at the same time that the push-bar is being drawn upward. This reverse movement of the ratchet-bar and push-bar serves to tip or rotate the buckle-holder on its pivots, as illustrated in Fig. 3, which has the effect of forming a kink or bend in the band sufficient to turn the buckle completely over and thereby form a perfect tie.

All the handles l^3 can be connected on one lateral bar, which, when the buckles have been turned over, can by a single downward turn release all the free ends of the bands at the same instant.

The housing of the pull-bar continues to move downward, and after the buckle has been turned over the ratchet-bar moves upwardly with the push-bar and carries with it the slide, the latter, as hereinbefore explained, being locked thereto by means of the pawl. As the slide and roller are forced upward with the ratchet-bar the inclined bearings *p p* serve to disengage the pawl from the ratchet-bar, thus allowing the latter to be carried up the entire upward stroke of the push-bar, while the free end of the band is released from the pull-bar. The expansion of the bale serves to turn the buckle completely over and form the tie.

The pivoted wedge may be moved outward by simply reversing the handle connected therewith to enable the free end of the band to be removed from the housing should it get stuck therein by reason of any bends or kinks in the band.

The nut on the screw-threaded rod attached to the slide may be adjusted to regulate the extent of movement of the latter and to prevent the slide from falling out of the housing when the wedge is turned outward on its pivot.

It will be observed that the cog-wheel serves as a pivotal bearing for the push and pull rods and enables the lower ends of the latter to freely move toward or from the platen of the press, and hence accommodate themselves to bales of varying width.

In Fig. 7 I have represented the rack-bars as being adjustably connected with the push and pull rods. It is sometimes desirable to impart a longer stroke to one of the rods than the other, and this result can be readily accomplished by the employment of the adjustable rack-bars shown in Fig. 7. As an illustration of this part of the machine, it will be assumed that it is desirable to give the pull-bar a longer effective stroke than is imparted to the push-bar. Instead of forming the cogs of the rack-bar on the push-bar, they are formed on a sleeve, R, which is made to slip over the push-bar and freely move thereon. Adjustable stops R′ R^2 are secured to the push-bar, and a spring, R^3, or yielding disk, is interposed between the lower end of the sliding rack-bar and stop R′.

It will be understood by referring to Fig. 7 that when the cog-wheel revolves the push-bar will not be forced through its downstroke until the sliding rack on the bar has been moved down so that its lower end strikes the stop R′, which latter may be secured to the push-rod in any desired adjustment, and thus regulate the relative movement of the push and pull rods.

Thus far I have explained my improvement as constructed and adapted for independent application to the several bands of a bale; but I contemplate the employment of any number of the improved band-pullers, as shown in Fig. 9, wherein the lower ends of the push-rods are connected by a transverse plate or rod, S, and buckle-holders provided for each band-opening in the platens of the press. The several housings of the pull-rods are also connected by a transverse plate or framing, S′, and provided

with pulling devices corresponding in number to the several band-openings in the platens.

It will thus be observed that the entire series of push-bars and pull-bars are operated simultaneously in opposite directions.

The engine or steam-cylinder may be located at the side of the press or attached to the front or side of the upper platen.

Fig. 10 represents a modified form of mechanism for operating the push and pull rods.

Instead of employing rack-bars and cog-wheel, the main shaft may be provided with arms T T′, each having elongated slots *t* formed therein.

A suitable frame, U, is journaled upon the shaft, the upper cross-bar, *u*, of said frame being provided with guide-openings $u' u^2$ for the push and pull rods. The push and pull rods are provided with roller-bearings u^3, which are supported within the elongated slots *t* in the arms T T′. When the main shaft is turned the push and pull rods will be forced in opposite directions.

It is evident that slight changes in details of construction and relative arrangement of parts may be resorted to without departing from the spirit of my invention, and hence I would have it understood that I do not restrict myself to the exact construction and arrangement of parts shown and described; but,

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

1. In a band-tightener, the combination, with an actuating-shaft journaled in bearings connected with the upper platen of a press, of a push-rod provided with devices for holding the buckle and a pull-rod provided with devices for griping the free end of the band, said push and pull rods being connected at their upper ends with mechanism attached to said actuating-shaft which allows of a swinging movement of their lower ends toward and from the platen, and by means of which said rods are simultaneously reciprocated in opposite directions by rotating the actuating-shaft in either direction, substantially as set forth.

2. In a band-tightener, the combination, with an actuating-shaft journaled in bearings connected with the upper platen of a press, of a push-rod and a pull-rod respectively located on opposite sides of said shaft, and connected therewith by mechanism which permits the lower ends of said rods to be swung toward and from the platen, and by means of which said rods are simultaneously reciprocated in opposite directions by rotating the actuating-shaft in either direction, and suitable devices connected with the push-rod for automatically turning the buckle and locking the band therein, substantially as set forth.

3. In a band-tightener, the combination, with an actuating-shaft journaled in bearings connected with the upper platen of a press and a cog-wheel secured to said shaft, of pull and push rods provided with rack-bars which engage with the cogs on opposite sides of the cog-wheel, whereby said cog-wheel serves as a pivotal bearing for said rods and permits their lower ends to be moved toward and from the bale, and also to impart a simultaneous movement in opposite directions to the pull and push rods when it is rotated in either direction, substantially as set forth.

4. In a band-tightener, the combination, with an actuating-shaft journaled in bearings connected with the upper platen of a press and a cog-wheel secured to said shaft, of a pull-rod provided with a rack-bar which engages with the cog-wheel and with devices for griping the free end of the band, a push-rod provided with a rack-bar which engages with said cog-wheel and with devices for retaining a turn-over buckle when strain is exerted thereon, and to automatically upset the buckle at the proper time, said push and pull rods being connected with a single cog-wheel, which latter serves as a pivotal-bearing for their upper ends, and also serves to impart to them simultaneous movement in opposite directions when rotated in either direction, substantially as set forth.

5. In a band-tightener, the combination, with an actuating-shaft journaled in bearings connected with the upper platen of a press, and a cog-wheel secured to said shaft, of pull and push rods provided at their upper ends with rack-bars which engage with said cog-wheel, the latter serving as a pivotal bearing for said rods, and also to impart a simultaneous movement to said rods in opposite directions, the push-rod provided with devices for holding the buckle and the pull-rod furnished with a wedge-shaped abutment, and a gravity-slide provided with a roller for griping the free end of the band, substantially as set forth.

6. In a band-tightener, the combination, with a rotary shaft journaled in bearings secured to the upper platen of the press, and cog-wheel attached thereto, of a pull-rod provided with a suitable housing at its lower end and a rack-bar at its upper end, and a push-rod provided with a rack-bar at its upper end and its lower end located in a guideway in said housing, substantially as set forth.

7. In a band-tightener, the combination, with an actuating-shaft and cog-wheel secured thereto, of push and pull rods, each provided with rack-bars the teeth of which mesh with the teeth of the cog-wheel and connected with each other above and below said cog-wheel, substantially as set forth.

8. In a band-tightener, the combination, with the push rod having a buckle-holder pivoted to its lower end, of a buckle-upsetting device pivoted to the buckle-holder, a ratchet-bar pivoted to the upsetting device, and mechanism connecting the ratchet-bar with the griping devices for holding the free end of the band, substantially as set forth.

9. In a band-tightener, the combination, with a ratchet-bar pivoted at its lower end to a buckle-upsetting device, of a slide provided with a pawl which engages with said ratchet-

bar and is automatically disengaged therefrom, substantially as set forth.

10. In a band-tightener, the combination, with the pull-bar, of a pivoted wedge and an eccentric shaft, substantially as set forth.

11. In a band-tightener, the combination, with the pull-bar provided with a wedge-shaped band-griping surface within a band-slot, of a slide provided with a roller journaled in elongated bearings, substantially as set forth.

12. In a band-tightener, the combination, with the ratchet-bar and inclined bearings within the guideway of the frame or housing of the pull-bar, of a slide provided with a pawl which engages with ratchet-bar and is automatically disengaged therefrom, substantially as set forth.

13. In a band-tightener, the combination, with the push-rod, of a buckle-holder pivoted to its lower end, and a buckle-retaining device pivoted to the buckle-holder and provided with fingers, which prevent the release of the buckle until the desired time, substantially as set forth.

14. In a band-tightener, the combination, with a cog-wheel secured to a shaft journaled in bearings connected with the upper platen of a press, of a push or pull rod provided with a sliding rack-bar which engages with said cog-wheel, substantially as set forth.

In testimony that I claim the foregoing I have hereunto set my hand this 23d day of February, 1880.

JOHN L. SHEPPARD.

Witnesses:
W. B. MINOTT,
J. C. DILLINGHAM.