

(No Model.)

4 Sheets—Sheet 1.

J. L. SHEPPARD. Band Tightener.

No. 240,856.

Patented May 3, 1881.

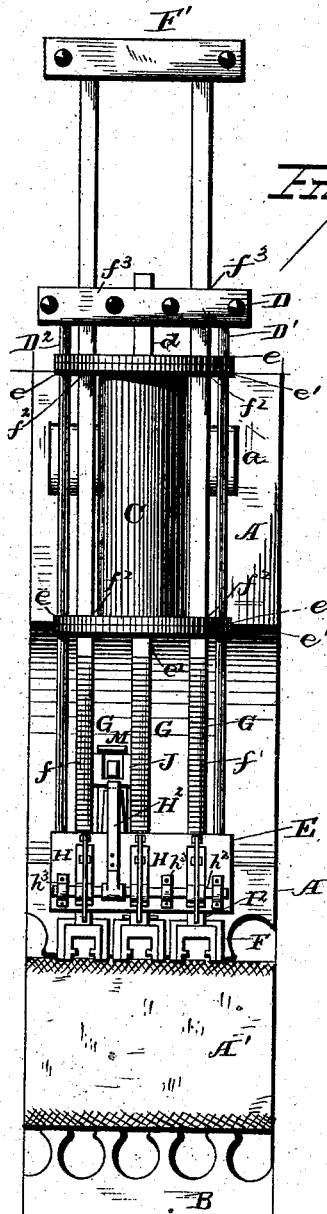


Fig. 1

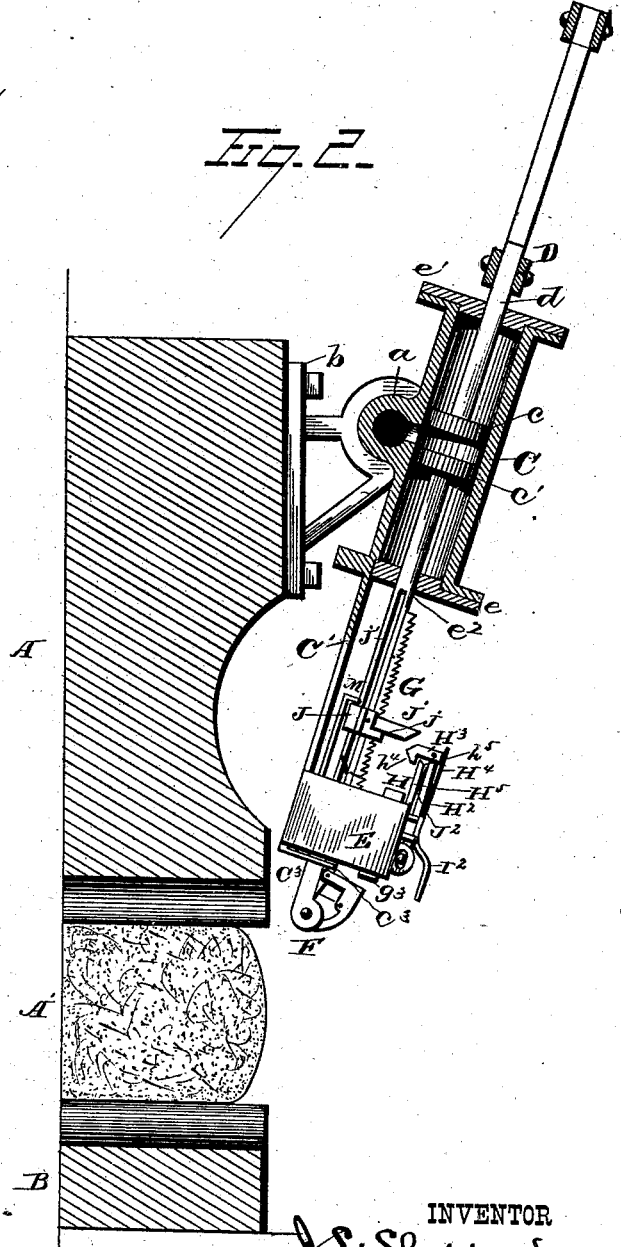


Fig. 2

WITNESSES

E. J. Nottingham
Herman Moran

INVENTOR

J. L. Sheppard.
B. H. Seymour,
ATTORNEY

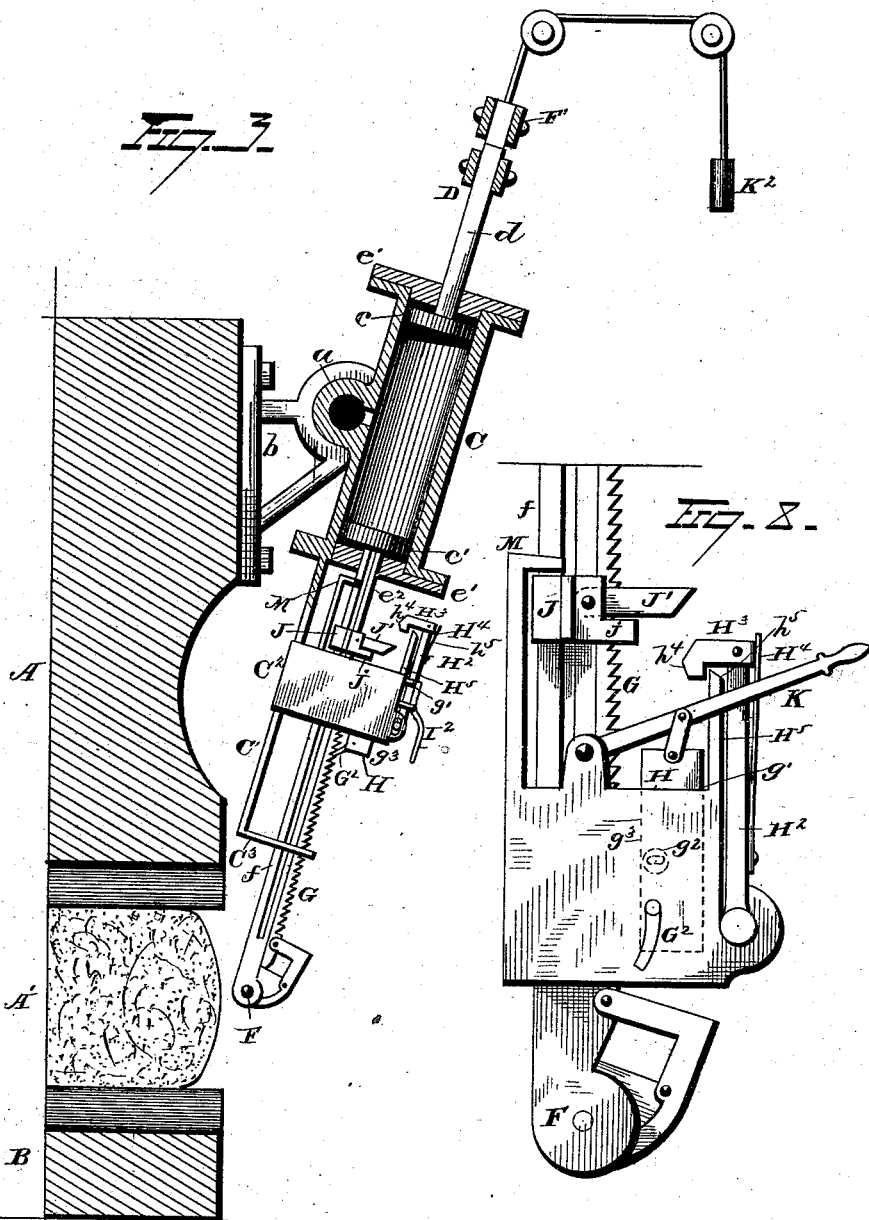
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E. J. Nottingham,
Herman Moran.

INVENTOR
J. L. Shepard,
By H. A. Symon,
ATTORNEY

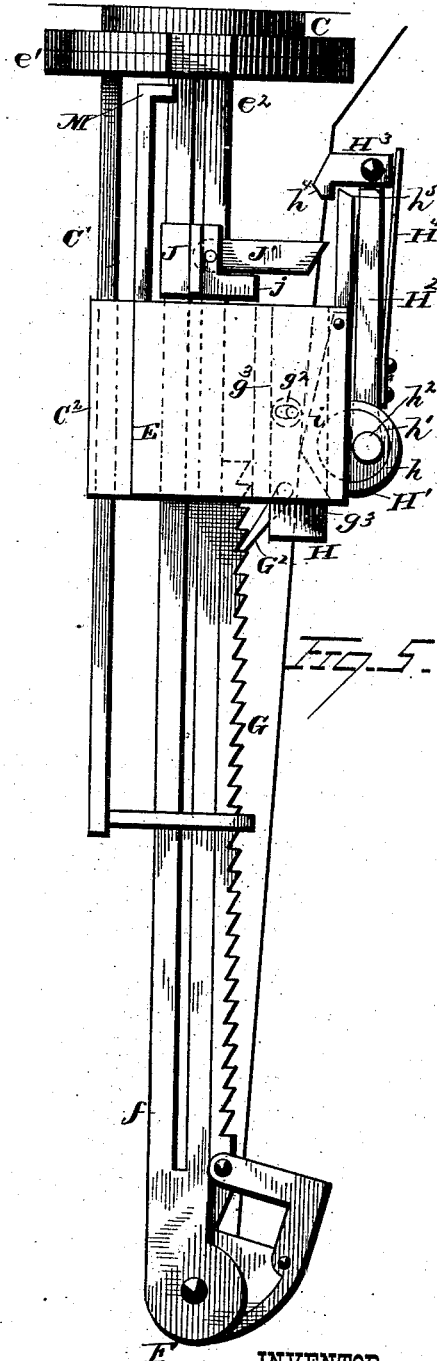
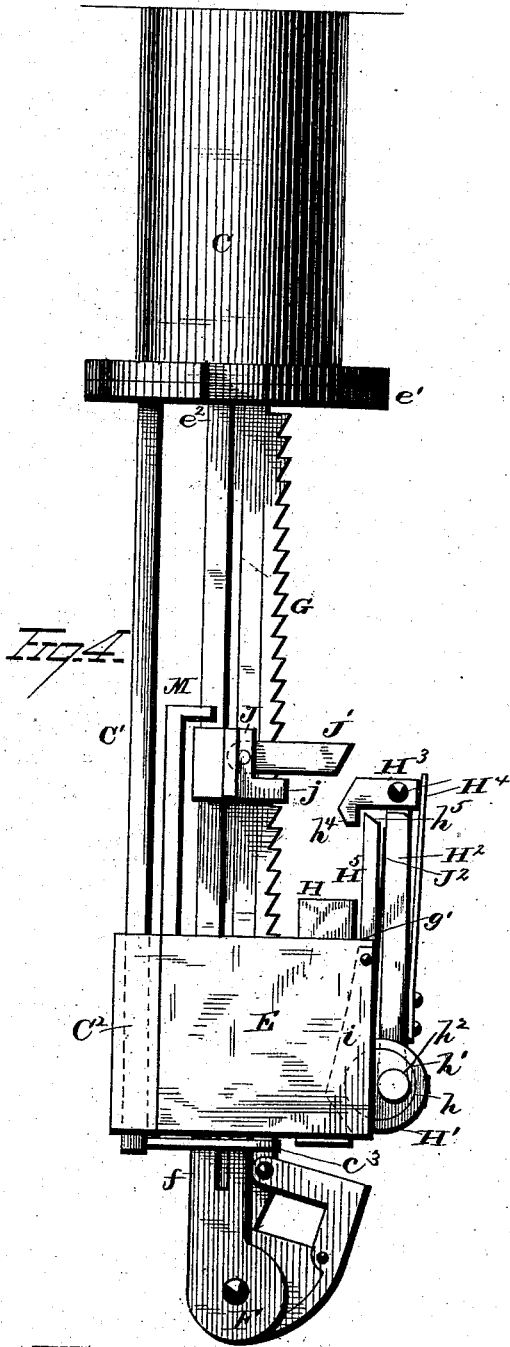
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WITNESSES

E. J. Nottingham
Herman Moran

INVENTOR

J. L. Sheppard.
By *H. A. Symon.*
ATTORNEY

UNITED STATES PATENT OFFICE.

JOHN L. SHEPPARD, OF CHARLESTON, SOUTH CAROLINA.

BAND-TIGHTENER.

SPECIFICATION forming part of Letters Patent No. 240,856, dated May 3, 1881.

Application filed March 25, 1881. (No model.)

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; 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, the object being to provide a machine adapted to impart the desired strain on all the bands of a bale, then automatically tie or fasten the ends of the bands and release them from the machine; and with these ends in view my invention consists in certain features of construction and combinations of parts, as will hereinafter be described, and pointed out in the claims.

In the accompanying drawings, Figure 1 is a view, in front elevation, of my improved band-tightener. Fig. 2 is a view in side elevation, showing the parts of the machine in position preparatory to operating upon the ends of the band. Fig. 3 is a similar view, showing the position of the parts after strain has been exerted upon the bands. Fig. 4 is an enlarged detail view of the mechanism for grasping the ends of the band, the parts being shown in position for commencing the strain upon the ends of the bands. Fig. 5 is a similar view, representing the parts in their position after the desired strain has been imparted to the bands. Fig. 6 shows the position of parts when the free end of the band is released. Fig. 7 is a plan view of the top of the housing containing the gripping devices; and Fig. 8 is a modification.

A is the upper, and B the lower, platen of a press.

A' represents the bale.

C represents a steam-cylinder provided with a hollow trunnion, *a*, which is journaled in a bracket-bearing, *b*, bolted to the front face of the upper platen, whereby the steam-cylinder is free to oscillate backward and forward, its hollow trunnion *a* forming its pivotal bearing. Steam-cylinder C is provided with two pistons,

c c', the upper piston, *c*, having a piston-rod, *d*, attached thereto, the upper or outer end of the piston-rod being secured in any desired manner to a cross-head, D, to the opposite ends of which are secured the upper ends of the pulling-bars D' D². The lower ends of the pulling-bars D' D² are secured to the housing E. In order to retain the pulling-bars against displacement, they may fit into recesses *e*, formed in the opposite sides of the cylinder-heads *e'*. The lower piston, *c'*, has secured thereto a piston-rod, *e²*, which is secured at its lower or outer end to the push-bar F. Guide-rods *f f'* are secured at their lower ends to the opposite ends of the push-bar F, and extend upwardly through the housing E, through openings *f²* in the cylinder-heads, through openings *f³* in the cross-head D, and are attached at their upper ends to a cross-head, F'. Steam-cylinder C is constructed with a downwardly-projecting guide, C', which fits into a guideway, C², in the rear side of the housing E, and thus serves to steady the latter in its movement and lessen the strain on the pulling-bars.

To the lower end of the guide C' is secured a bracket-guide, C³, through which passes the lower piston-rod, *e²*.

Upon the front faces of the three rods *e² f f'* are placed the ratchet-bars G, the lower ends of each one of said bars being pivoted to a buckle holder and turner of substantially the form, construction, and operation shown and described in Letters Patent No. 227,590, granted to me May 11, 1880. It will be observed that in the present case I show the push-bar and buckle holding and turning mechanism as capable of operating upon three bands; but I do not confine myself to any particular number. The ratchet-bars and guide-rods extend upwardly through opening *g* in the housing E, which latter is much the same in its construction as that shown in the patent above referred to.

H is a slide located in an opening, *g'*, in the housing, one slide being used for each one of the ratchet-bars. Slide H has a roller, *g²*, journaled in elongated slots formed in its side walls, the periphery of the roller extending below the bottom *g³* of the slide. The lower ends of the sides of the slide are made outwardly flaring, so as to readily receive the free end of the band. A pawl, G², is pivoted at the

lower side of the slide, near its lower end, the free end of the pawl being forced downwardly by means of a spring.

H' are adjustable wedges, pivoted at their upper ends in slots formed in the front faces of the housing, the lower ends of the wedges being provided with bearings *h*, in which are located the eccentrics *h'*, the latter being secured to a rock-shaft, *h²*, which is mounted in the bearings *h³* attached to the front face of the housing. To rock-shaft *h²* is attached a lever, H², the upper end of which has a hook, H³, pivoted thereto.

H⁴ is a spring, arranged to press upon the rear end of the hook and allow it to yield slightly, so that its beveled face *h⁴* being forced against the beveled end *h⁵* of the retaining-bar H³, the hook will ride over said bar and be automatically engaged therewith, thereby securely retaining the wedges in operative position. The inclined portion *i* of the wedge extends into the slide, so that the free end of the band is grasped between the roller and wedge, as will hereinafter be explained.

Within the slide-opening is placed a spring, I, the upper or free end of which is provided with a stud, I', to which is pivoted the short arm of a hand-lever, I². The spring serves to retain the slide against displacement, and by depressing the long arm of lever I² the slide is free to drop from its place in the housing.

A block, J, having a catch, J', pivoted thereto, is located between two of the pulling-rods, the latter being provided with side grooves, *j'*, for the reception of the ribs or flanges *j²* on the sides of the block, whereby the block is carried up by its frictional contact with the pulling-bars. The upward movement of the block is restricted by the stop M, in order to insure the release of the band, even should but a little slack band be pulled out. The catch J' is free to turn upwardly, so as to ride over the hook H³, but prevented from downward movement by the flange *j* on the block, so that when the catch is below the hook and is then raised it will engage with the hook and raise it from engagement with the retaining-bar, when the spring J² will operate to throw the lever H² outwardly, and thereby disengage the wedges from the bands and release the latter. The slide may have a lever, K, connected therewith, as shown in Fig. 8, and be raised and lowered to engage or disengage the wedges and free ends of the bands, as desired.

The press is provided with any desired number of the steam-cylinders; but I prefer to use six or seven for operating all the bands on a bale, as the platens are ordinarily provided with twenty-one band-openings, and hence, by employing seven cylinders, each operating push-bars and housings capable of accommodating three separate bands, the machine will allow of the ready adjustment and attachment of all the bands on a bale, regardless of their position when placed in the press.

While I may use the push-bars independently, I prefer to connect the push-bars, or

rather make a push-bar extending the entire length of the platen, so that all the buckle ends of the bands will be forced downward simultaneously. 70

The mechanism for imparting strain to the free ends of the bands will be made to operate independently of each other, in order that any desired strain may be exerted upon each band. 75

The operation of my improved band-tightener is as follows: The position of the different parts of the machine, preparatory to their operation, is indicated in Figs. 2 and 4. The free ends of the bands are passed through the upper platen-openings, around the rear side of the bale, through the lower platen-openings, and up through the buckles placed in the buckle holding and turning devices. The free ends are then forced upwardly between the rollers and wedges. The levers for retaining the slides in their raised position are then depressed, operating to release the spring therefrom and allow the slide to drop, and thus firmly wedge the free end of the band between the roller and wedge. All of the bands on the bale having been adjusted and secured, steam is admitted through a supply-pipe to the hollow trunnions of the steam-cylinders, and enters between the two pistons, forcing them apart. The admission of steam may be regulated by a rotary valve within the trunnions, or by any other form of valve mechanism. The rotary valves may be operated simultaneously, and to admit of such construction they may be attached to a rod passing through the trunnions of all the steam-cylinders, so that by simply turning the rod by a hand-lever all the valves may be opened and closed simultaneously. If it is desired to impart a variable pressure to the two pistons, the cylinders may be provided with a central partition and steam admitted to the opposite sides thereof, the steam-passages leading to the opposite sides of the central partition being governed by separate and independent valves. Upon the admission of steam to the steam-cylinders the pistons are forced apart, as stated, thereby causing the housing E to be raised and the push-bars to be depressed. Thus the opposite ends of the bands are forced in opposite directions, the buckle ends being forced downward, while the free ends are pulled upward through the buckles. When the desired strain has been exerted upon the bands the position of the several parts of the tightening mechanism will be as indicated in Figs. 3 and 5, with all the slack pulled out of the bands. When this point is reached steam is allowed to escape from the cylinders, and the elasticity in the band will operate to pull the housing downward, carrying with it the ratchet-bar, which is connected therewith by means of the pawl pivoted to the slide. The downward movement of the ratchet-bar operates to give the buckle-holder a part revolution, and thus turn the buckle part way over, and thus form a bend in the band. The further downward 80 85 90 95 100 105 110 115 120 125 130

movement of the housing causes the pivoted hook H³ to engage with the catch J', thereby releasing the hook from its retaining-bar, and allowing the spring to throw the lever H² backward and disengage the wedges from the free end of the band, and releasing the latter. The housing will continue to descend by its own gravity and assume its former position.

The push-bars may be raised to their normal position by means of a counter-weight, K², or by admitting steam to the opposite side of the piston, or by other means. By the employment of the oscillating cylinders the push-bars are allowed a lateral movement, so as to accommodate themselves to bales of varying widths.

From the foregoing it will be observed that any desired strain may be imparted to all the bands on a bale and the bands automatically tied and released.

For operating the band-tightening mechanism I may use steam, water, or compressed air. If desired, the heads of the steam-cylinders may be dispensed with, as they simply serve as guideways, and in lieu of the heads guideways might be cast on the sides of the cylinder, near its opposite ends. Again, all the cylinders may be connected with each other, either at their trunnions or other parts there-whereby form a battery or sheet of cylinders.

It is evident that many slight changes might be resorted to in details of construction and relative arrangement of parts 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 the platen of a press, of a cylinder provided with a hollow trunnion supported in a bearing attached to the platen of the press, and mechanism connected with said cylinder for imparting strain to the opposite ends of the band, substantially as set forth.

2. In a band-tightener, the combination, with the platen of a press, of a power-cylinder provided with a hollow trunnion and supported in an adjustable position on the steam-supply pipe, substantially as set forth.

3. In a band-tightener, the combination, with an oscillating cylinder connected with the platen of the press, of two pistons, one connected with devices for pulling on the free ends of the bands, and the other piston connected with devices for downwardly forcing the buckle ends of the bands, substantially as set forth.

4. In a band-tightener, the combination, with an oscillating power-cylinder and two separate pistons, of a housing, cross-head, and pulling-bars connected with one piston, and a push-bar, guide-rods, and cross-head connected with the other piston, substantially as set forth.

5. In a band-tightener, the combination, with an oscillating power-cylinder, of a push-bar provided with one or more devices for holding and turning the buckles, substantially as set forth.

6. In a band-tightener, the combination, with an oscillating cylinder and two pistons located therein, of mechanism for simultaneously imparting strain to the opposite ends of the bands, substantially as set forth.

7. In a band-tightener, the combination, with an oscillating cylinder and two pistons located therein, of mechanism for imparting strain to the opposite ends of the bands and automatically turning the buckle to fasten the ends of the band, substantially as set forth.

8. In a band-tightener, the combination, with an oscillating cylinder and two oppositely-moving pistons, of mechanism for imparting strain in opposite directions to the opposite ends of the bands, and automatically fastening the band ends and releasing them, substantially as set forth.

9. In a band-tightener, the combination, with an oscillating cylinder provided with a depending guide, of a housing constructed with a guideway adapted to receive the guide on the cylinder, substantially as set forth.

10. In a band-tightener, the combination, with the housing and slide, of a spring and lever for retaining the slide in place, substantially as set forth.

11. In a band-tightener, the combination, with the housing and adjustable wedges, of a rock-shaft provided with eccentrics, and a lever provided with a hook adapted to engage with a retaining-bar, substantially as set forth.

12. In a band-tightener, the combination, with the adjustable wedges, rock-shaft, eccentrics, and lever, of a retaining-bar and a spring-pressed pivoted hook on the free end of said lever, substantially as set forth.

13. The combination, with the adjustable wedges, rock-shaft, and lever, of a spring for throwing the lever backward when released from the retaining-bar, substantially as set forth.

14. The combination, with the lever for retaining the wedges in place, of a pivoted releasing-catch adapted to release the lever and disengage the wedges from the free end of the band, substantially as set forth.

15. In a band-tightener, a cylinder provided with guideways at opposite ends for the rods connected with the mechanism, for imparting motion in opposite directions to the ends of the bands, substantially as set forth.

In testimony that I claim the foregoing I have hereunto set my hand this 21st day of March, 1881.

JOHN L. SHEPPARD.

Witnesses:

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