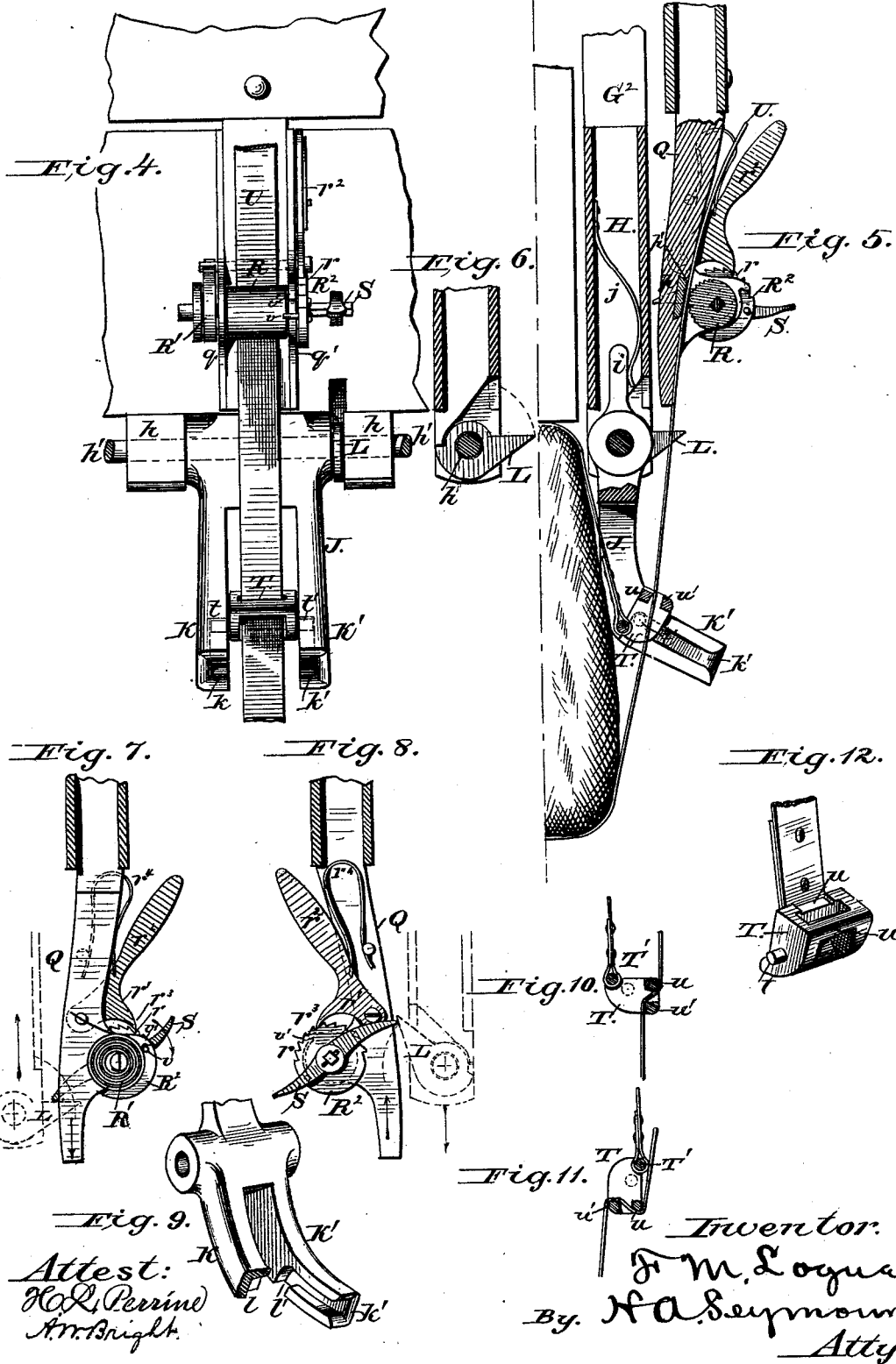


F. M. LOGUE.
Bale-Band Tightener.

No. 214,256.

Patented April 15, 1879.



UNITED STATES PATENT OFFICE.

FRANCIS M. LOGUE, OF VICKSBURG, MISSISSIPPI.

IMPROVEMENT IN BALE-BAND TIGHTENERS.

Specification forming part of Letters Patent No. **214,256**, dated April 15, 1879; application filed October 17, 1878.

To all whom it may concern:

Be it known that I, FRANCIS M. LOGUE, a resident of the city of Vicksburg, county of Warren, and State of Mississippi, have invented a certain new and useful Improvement in Bale-Band Tighteners; and I do hereby declare the following to be a full, clear, and correct description of the same, reference being had to the annexed drawings, making a part of this specification.

My invention relates to an improvement in bale-band tighteners for cotton or other presses.

The object of my invention is to provide a band-tightener of such construction that all the several bands on a bale may be subjected to a pulling-strain in opposite directions simultaneously, power being imparted by a single steam or hydraulic cylinder attached to the platen of the press.

A further object of my invention is to provide means whereby the free ends of the several bands may be quickly grasped and retained within grippers until the required tension has been exerted on opposite ends of the band, and for readily releasing the ends of the bands and automatically locking the buckles when the bale has been compressed to the desired density.

To these several ends my invention consists, first, in a bale-band tightener, in the combination, with a bar provided with any desired number of buckle-holders and a bar furnished with a corresponding number of band-grippers and suitable connecting mechanism, of apparatus for utilizing the power of steam or equivalent force to impart a simultaneous movement in opposite directions to said bars, whereby the opposite ends of the bands are subjected to a pulling action in opposite directions.

My invention further consists, in a bale-band tightener, in the combination, with a bar provided with buckle-holders and a bar furnished with band-grippers, of a steam or hydraulic actuated piston or pistons and suitable intervening mechanism connecting said bars and piston rod or rods, whereby said piston, (one or more,) being moved in one direction, operates to move said bars in opposite directions simultaneously.

My invention further consists, in a bale-band tightener, in the combination, with a steam or

hydraulic cylinder attached to the platen of a press, of a bar provided with any desired number of buckle-holders, a bar furnished with any desired number of band-grippers, and suitable cross-head, connecting-links, and pivoted levers, for connecting the piston rod or rods and the bars, for imparting movement simultaneously in opposite directions to the two bars, and thus exert strain in opposite directions upon opposite ends of the bands.

My invention further consists, in a bale-band tightener, in the combination, with a bar, of any desired number of buckle-holders, each constructed with outwardly-projecting arms having grooves formed in their opposing faces or edges for the reception of lugs or pintles formed on opposite sides of self-locking turn-over buckles.

My invention further consists, in a bale-band tightener, in the combination, with a bar, of any desired number of pivoted buckle-holders and springs for allowing the holders to yield laterally when strain is exerted upon the same and to move the lower ends of the holders away from the bale when strain is released from the buckle-holder bar.

My invention further consists, in a bale-band tightener, in the combination, with a bar, of any desired number of buckle-holders, each consisting of grooved arms, outwardly turned at their lower ends, said arms provided with grooves in their adjacent sides, and with openings leading from said grooves, through which the buckles may be released when the desired strain has been exerted upon the bands.

My invention further consists in the combination, with a bar provided with buckle-holders and a bar furnished with band-grippers, of frame-work attached to the platen of the press, said frame-work provided with guideways for the reception of the opposite ends of the buckle-holding bar and band-gripper bar.

My invention further consists, in a bale-band tightener, in the combination, with a bar and means for imparting a reciprocating movement thereto, of downwardly-projecting arms, provided with a removable serrated section, and an eccentric-shaft journaled in bearings attached to said arms.

My invention further consists in the several other details of construction and combinations

of parts, as will hereinafter be explained, and pointed out in the claims.

In the accompanying drawings, Figure 1 is a front elevation of my improved band-tightener. Fig. 2 is a side elevation of the same. Fig. 3 is a vertical section taken through line *x x* in Fig. 1. Fig. 4 is an enlarged view, in front elevation, of one of the band-pullers and buckle-holders. Fig. 5 is a vertical section of the band-puller and buckle-holder. Fig. 6 is a detached sectional view, illustrating the construction and arrangement of one of the tripping-levers. Figs. 7 and 8 are reverse views, in side elevation, of one of the band-pullers. Fig. 9 is a view, in perspective, of a portion of one of the buckle-holders, with one of the grooved arms thereof partly broken off to clearly illustrate the form of the groove on the inner side of one of the arms. Figs. 10 and 11 illustrate different positions of the buckle when forming the tie. Fig. 12 is a view, in perspective, of my improved buckle.

A and B represent, respectively, the upper and lower platens of a cotton or other press. C is a steam or hydraulic cylinder, securely bolted or otherwise secured to the front of the upper platen of a compress. Cylinder C is furnished with a valve-chest, *a*, through which steam or other motive agent is admitted to the cylinder by means of the induction-passage *b*.

To a standard, *c*, bolted to the cylinder or other fixed object, is pivoted one end of the hand-lever D, the latter being pivoted intermediate its ends to the outer end of the valve-rod *d*, whereby the position of the valve within the valve-chest *a* may be regulated by shifting the position of the hand-lever D, and thus readily admit and exhaust steam to and from the cylinder C.

The lower cylinder-head is furnished with two stuffing-boxes, E E', within which reciprocate the piston-rods F F', their inner or upper ends being secured to the piston within cylinder C, while their lower ends are attached to the cross-head G by means of the jam-nuts *e e'*.

It will be observed that the lower ends of the piston-rods are screw-threaded for the engagement of the nuts *e e'*, and thus allow of the adjustable connection of the cross-head with the piston-rods. While I have shown the steam-cylinder as being furnished with two piston-rods, I would have it understood that I do not limit myself to this particular construction of parts, as a single piston-rod might be employed, and the ends of the cross-head in such case be constructed to move in guideways, and thus retain the cross-head in horizontal position. Or more than two piston-rods may be employed; or, if desired, more than one steam-cylinder may be used, and, if desired, the valve mechanism so arranged that the valves on all the cylinders (two or more) may be shifted by a single lever-handle.

To the cross-head G are adjustably secured the upper ends of two or more push-rods, G¹ G²,

the upper ends thereof being screw-threaded, and attached to the cross-head by jam-nuts *f f'*. The lower ends of the push-rods G¹ G² are attached to the buckle-bar H, so that the latter is made to move in unison with the cross-head.

Instead of forming the cross-head, buckle-bar, and push-rods in separate parts, and securing them in the manner shown and described, all these parts may be made in single piece, if desired; and by constructing the same of open-work or of a skeleton frame, the desired lightness consistent with the required strength may be secured.

The opposite ends of the buckle-bar H engage in guideways *g*, formed in the frame-pieces I I', which latter are firmly bolted to the front of the platen, whereby the buckle-bar is retained in a horizontal position, and allowed to reciprocate freely in a vertical direction.

The lower edge of buckle-bar H is furnished with bearing-blocks *h*, which support the trunnions or journals *h'*, connected with opposite sides of the buckle-holders J.

The upper ends of buckle-holders are constructed with upwardly-projecting arms *i*, which are received between the plates composing the buckle-bar, and against each of said arms presses a spring, *j*, the latter serving to hold the buckle-holder in its proper position, and yet allow the lower end thereof to yield, for a purpose hereinafter explained.

The lower portion of each buckle-holder consists of two outwardly-curved arms, K K', having grooves *k k'* formed in their adjacent sides, said grooves extending from the outer ends of the arms to the transverse slots *l l'*. On the side of each buckle-holder is journaled a self-acting tripping-arm, L, to automatically release the free end of the band from the puller, as will be hereinafter explained.

The upper ends of the frame-pieces I I' are provided with journal-bearings M, within which are supported the rock-shafts M'. Levers M² are securely attached to the rock-shafts M, and to the inner ends of said levers are pivoted the upper ends of link-rods N N', the lower ends of which latter being pivoted to the outer ends of the cross-head G. Link-rods N N' are preferably made in two parts, *m m'*, the adjacent ends of which are furnished with right and left hand screw-threads, and are adjustably connected by means of the sleeve *m⁴*, having right and left hand screw-threads cut in its opposite ends, the sleeve being held from turning by the jam-nuts *m⁵*. This method of construction enables the link-rods to be lengthened or shortened to secure any desired adjustment of parts.

O O' are pull-rods, the upper ends being pivoted to the outer ends of the rocking levers M², while their lower ends are pivoted to the outer ends of the puller-bar P. Pull-rods O O' are also preferably made in two sections, *n n'*, connected by sleeves *n²*, having right and left hand screw-threads formed therein, said

from the upper end of the cylinder and steam admitted to the lower end thereof, carrying the piston upward. This upward movement of the piston operates to raise the buckle-bar and lower the puller-bar. When the eccentric-shafts are in position for gripping the free ends of the bands the double cam-handles are at right angles to the puller-arm and buckle-bar. A reverse movement to the puller-bar and buckle-bar is now given, whereby the latter is raised and the former lowered, or, in other words, the two bars are caused to move toward each other.

It will be observed that the pullers have not yet released their hold upon the free ends of the bands, and hence the latter bulge outwardly, allowing the buckles to turn partly over, as indicated in Fig. 10, the buckle easily turning on its trunnions, which, as heretofore stated, have their bearings within the grooved adjacent faces of the buckle-holder arms. This partial turning of the buckle forms a short bend in the band, thus increasing its frictional contact on the bars of the buckle. The buckle and puller bars continue to approach each other, and as the tripping-levers L come in contact with the inner ends of the double-cam handles on the eccentric-shaft said levers operate to turn the handles and the eccentric-shafts, and thereby automatically release the free ends of the bands from the puller-arms. The spring-pressed pawl which engages with the segmental toothed disk or wheel on the eccentric-shaft retains the eccentric-shafts in their open positions, to which they have been turned by the trip-lever L. Thus the latter serve to automatically release the free ends of all the bands, and also to automatically shift the pulling mechanism from a closed to an open position, whereby the pullers are all adjusted for the insertion of the bands for the next successive bale. As the free ends of the bands are released from the pullers the strain on the buckles operate to turn them over into the position shown in Fig. 11, thereby completing the tie and securely locking the opposite ends of the band against displacement.

The springs operating in conjunction with the buckle-holders allow the lower ends thereof to yield, thus allowing the trunnions of the several buckles to be released through the open slots cut through from the under side of the buckle-holder arms.

One of the important features of my improvement consists in the fact that both ends of all the bands may be drawn in opposite directions simultaneously, and thus take up all slack band. When tension is only imparted to the free end of the band it is impossible to take up all slack band, as the frictional contact of the band with the bale is so great that it will effectually resist the strain exerted on one end of the band only, and hence it is of great importance that strain be exerted on opposite ends of the band.

It is evident that many slight changes in the construction and arrangement of the parts

of my improved band-tightener may be resorted to without departing from the spirit of my invention, and hence I do not limit myself to the exact construction shown and described.

The bale-tie shown in Figs. 10, 11, and 12 will be the subject-matter of a separate application, and I do not claim it in this; but,

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

1. In a bale-band tightener, the combination, with a bar furnished with two or more buckle-holders, and a bar provided with a corresponding number of band-grippers, of mechanism for moving said bars in opposite directions simultaneously, whereby the opposite ends of the several bands of a bale are subjected to a pulling-strain in opposite directions simultaneously, substantially as set forth.

2. In a bale-band tightener, the combination, with a bar provided with a series of buckle-holders, and a bar provided with a corresponding number of band grippers or pullers, of steam or hydraulic actuated mechanism arranged and adapted to impart simultaneous movement in opposite directions to said bars, and thus subject the opposite ends of all the bands on a bale to the desired strain, substantially as set forth.

3. In a bale-band tightener, the combination, with a buckle-bar provided with a series of buckle-holders, of a steam-cylinder, a cross-head connected with said buckle-bar, and two piston-rods attached at their upper ends to a single piston, and at their lower ends to said cross-head, substantially as set forth.

4. In a bale-band tightener, the combination, with a buckle-bar, steam-actuated piston rod or rods, and mechanism forming a direct and rigid connection between the buckle-bar and piston rod or rods, of a puller-bar and pull-rods, pivoted levers, connecting-links, and cross-head, whereby the buckle-bar and puller-bar are caused to move simultaneously in opposite directions, substantially as set forth.

5. The combination, with a buckle-bar provided with a series of buckle-holders, of steam-actuated piston-rods (one or more) and cross-head, adjustably secured to the lower ends of said piston-rods, substantially as set forth.

6. In a bale-band tightener, the combination, with steam or hydraulic actuating apparatus, a buckle-bar provided with a series of independent buckle-holders, puller-bar furnished with a series of independent band-pullers, of adjustable mechanism for connecting said buckle-bar and puller-bar with said steam or hydraulic apparatus, substantially as and for the purpose set forth.

7. In a bale-band tightener, the combination, with a buckle-bar, of a series of independent buckle-holders, each constructed with outwardly-projecting grooved arms for the reception and retention of the buckles, and with upwardly-projecting arms and spring, arranged to press against said upwardly-pro-

sleeve being held in place by the jam-nuts n^3 , whereby the pull-rods may be contracted or expanded in length, as desired. The opposite ends of the puller-bar P engage in guideways o , located in the frames I I', and in front of the guideways for the opposite ends of the buckle-bar. Puller-bar P is furnished with any desired number of puller-arms Q, which project downwardly and inwardly from the lower edge of the bar. In the lower portion of each puller-arm Q is removably secured a block, p , having a serrated face, p' . These blocks are removably secured to the puller-arms, so that when the serrations become dull by reason of long-continued use the blocks may be removed and repaired, or replaced by new ones. Each puller-arm is provided with lugs q q' , which serve as bearings for the opposite ends of the eccentric-shaft R, the latter being serrated on a portion of its periphery, or on that portion of its periphery farthest distant from the axis of the shaft, so that when the band is engaged between the puller-arm and the eccentric-shaft the opposite sides of the band will be held tightly by the serrated face of the removable block and serrated section of the eccentric-shaft.

To one end of the eccentric or cam shaft R is secured one end of a spring, R', the opposite end of which is attached to the puller-arm, said spring serving to revolve the shaft in one direction. The opposite end of the shaft is provided with a disk or wheel, R², having ratchet-teeth r formed on a section of its periphery. r^1 are lever-pawls, each being pivoted to the puller-arm, with the handle r^2 projecting outwardly, and the projection r^3 located to engage with the teeth r , said lever-pawl being retained in engagement with the toothed disk by means of the spring r^4 .

Double cam-handles S are attached to the ends of the eccentric or cam shafts, and operate, in connection with the tripping-arms L, to release the free ends of the bands, as will hereinafter be explained. Each disk or segmental ratchet-wheel R² is furnished with a stop pin, v , which engages with an abutment, v' , formed on one of the bearings for the eccentric-shaft. This stop-pin serves to limit the movement of the eccentric-shaft, so that when the band is gripped between the shaft and serrated block on the puller-arm the double cam-handle on the end of the eccentric-shaft will stand at right angles with the puller-arm and buckle-bar.

T represents my improved turn-over buckle, of the same general form as that covered by Letters Patent No. 205,882, granted me July 9, 1878, said buckle being especially adapted for use in connection with my improved band-tightener.

Having fully described the construction of the several parts of my improved band-tightener, I will now describe its operation when in practical use.

The bale of cotton or other material having been compressed to the desired density, the

several parts of the band-tightener are in the position indicated in Fig. 2 preparatory to imparting a pulling action upon opposite ends of the band. It will be observed that the buckle-bar and puller-bar are located in the same horizontal plane, the puller-bar being situated immediately in front of the buckle-bar, and the lower ends of the puller-arms in close proximity to the lower ends of the buckle-holders. The buckles to be employed have one end of the band secured to the single cross-bar T'. The buckle is placed in the buckle-holder by inserting the lugs or trunnions t t' of the buckle in the grooved faces in the two arms of the buckle-holder. The free end M of the band is then passed through one of the grooves in the upper platen of the press, then down around the bale, and through one of the grooves in the lower platen of the press. The free end of the band is then inserted between the bars u u' of the buckle, which latter is turned back and rests upon the band end to which it is secured.

The double cam-handles attached to the eccentric or cam shafts are revolved in opposition to the force of the springs connected with the shafts, which operation revolves the cam or eccentric shaft, and forms a free opening between the serrated block on the puller-arm and the periphery of the eccentric shaft. The free end of the band is inserted between the eccentric-shaft and puller-arm. The pawl-handle is then moved to release the pawl from the teeth on the disk attached to the eccentric-shaft, and allowing the spring to partly revolve the eccentric-shaft and cause the serrated portion thereof to engage with the outer surface of the free end of the band. Before the eccentric-shaft is allowed to engage with the band the latter is pulled upwardly by hand to take up all the free slack therein. All the several bands of the bale are manipulated in the manner described. Steam is then admitted through the steam-chest into the upper end of the steam-cylinder and above the piston, and operates to force the piston downwardly. The motion of the piston is communicated to the buckle-bar by means of the piston-rods, cross-head, and push-bars, thereby causing the buckle-bar to move downward in unison with the piston. Motion is communicated to the puller-bar by means of the piston-rods, cross-heads, connecting-links, pivoted levers, and pull-rods, thereby causing the puller-bar to be moved in an opposite direction to that of the buckle-bar, so that when the latter is being forced downwardly the puller-bar will be drawn upwardly simultaneously therewith. The buckles being held firmly within the buckle-holders are forced downwardly, thus imparting the desired strain to the buckle ends of the several bands. The free ends of the bands are firmly gripped by the pullers, and are drawn upwardly until the desired tension has been exerted on the same. The parts of the machine being in the position indicated in Fig. 3, steam is then exhausted

jecting arms to retain said buckle-holders in desired position, substantially as and for the purpose set forth.

8. In a bale-band tightener, the combination, with a buckle-bar, of buckle-holders pivoted to the lower edge of said bar, said buckle-holders consisting of two outwardly-curved arms, provided with grooves on their adjacent sides, substantially as set forth.

9. In a bale-band tightener, the combination, with a buckle-bar, of buckle-holders having outwardly-curved grooved arms and transverse slots intersecting said grooves, for releasing the buckles from the holders, substantially as set forth.

10. In a bale-band tightener, the combination, with a puller-bar, of puller-arms provided with removable blocks having serrated faces, substantially as set forth.

11. In a bale-band tightener, the combination, with a puller-bar provided with a series of independent band-pullers for imparting the desired tension to all the bands of a bale simultaneously, of a single steam-cylinder for reciprocating said bar, substantially as set forth.

12. In a bale-band tightener, the combination, with a puller-bar of a series of puller-arms, each having an eccentric-shaft journaled thereon, substantially as set forth.

13. In a bale-band tightener, the combination, with a puller-bar having a series of puller-arms rigidly connected therewith, of eccentric or cam shafts connected with each puller-arm, and springs for turning said shafts in one direction, substantially as set forth.

14. In a bale-band tightener, the combination, with a puller-bar having a series of puller-arms rigidly connected therewith, of springs for turning said shafts in one direction, and stop mechanism for restricting the movement of said shafts, substantially as set forth.

15. In a bale-band tightener, the combination, with a puller-bar provided with a series of independent band-pullers for imparting the desired strain to all the free ends of the bands on a bale simultaneously, a buckle-bar provided with a series of independent buckle-holders, and suitable mechanism for moving said bars in opposite directions simultaneously, of mechanism for automatically releasing the free ends of all the bands simultaneously, substantially as set forth.

16. In a bale-band tightener, the combination, with spring-actuated eccentric-shafts connected with the puller-arms, and double-cam handles attached to said shafts, of tripping-arms pivoted to the buckle-bar, substantially as set forth.

17. In a bale-band tightener, the combination, with a puller-bar provided with a series of puller-arms having removable serrated-faced blocks, of eccentric or cam shafts having serrations on a portion of the peripheries thereof, substantially as set forth.

18. In a bale-band tightener, the combination, with a puller-bar having a series of pull-

er-arms rigidly connected therewith, of eccentric or cam shafts, with springs for turning the same in one direction, and segmental toothed disks attached to said shafts, and spring-pressed lever-pawls for retaining the shafts in an open position, substantially as set forth.

19. In a bale-band tightener, the combination, with the puller-arm having lugs attached thereto, of eccentric or cam shafts provided with disks having ratchet-teeth formed on a portion of the periphery thereof, and lever-pawls and springs for retaining said eccentric or cam shafts in desired position, substantially as set forth.

20. In a bale-band tightener, the combination with a puller-bar provided with a series of independent band-pullers, of a buckle-bar furnished with a series of independent buckle-holders, the latter constructed with outwardly-projecting arms, grooved on their inner edges and adapted to yield laterally, substantially as set forth.

21. In a bale-band tightener, the combination, with a puller-bar provided with a series of band-pullers, of a buckle-bar furnished with a series of laterally-yielding and grooved buckle-holders, substantially as set forth.

22. In a bale-band tightener, the combination, with frame-pieces attached to the front of the platen, said frame-pieces provided with guideways, of a puller-bar and buckle-bar, the opposite ends of which are retained within said guideways, substantially as set forth.

23. In a bale-band tightener, the combination, with a steam-cylinder attached to the platen of the press, of puller-bar and buckle-bar and intervening mechanism whereby said bars may be moved in opposite directions simultaneously, and also be moved one in rear of the other, so that the puller-arms shall be in close proximity with the buckle-holders, substantially as set forth.

24. In a bale-band tightener, the combination, with a bar provided with mechanism for imparting strain to all the free ends of the bands on a bale simultaneously, of a bar provided with mechanism for imparting strain to all the buckle ends of the bands on a bale simultaneously, substantially as set forth.

25. In a bale-band tightener, the combination, with a bar provided with mechanism for imparting strain to all the free ends of the bands on a bale simultaneously, and a bar provided with mechanism for imparting strain to all the buckle ends of the bands of a bale simultaneously, of steam apparatus and intervening mechanism for moving said bars in opposite directions simultaneously, substantially as set forth.

26. In a bale-band tightener, the combination, with mechanism for imparting strain in opposite directions to the opposite ends of all the bands on a bale simultaneously, of mechanism for automatically releasing the opposite ends of the bands simultaneously when

strain is released from the bands, substantially as set forth.

27. In a bale-band tightener, the combination, with mechanism for imparting strain in opposite directions to the opposite ends of all the bands on a bale, of mechanism for automatically locking the free end of the band to the buckle while the free end is yet re-

tained within its griper, substantially as set forth.

In testimony whereof I have hereunto signed my name.

F. M. LOGUE.

Witnesses:

J. W. M. HARRIS,
PETER FINNEY.