4 Sheets—Sheet 1.

M. L. DEERING.

Barrel-Trussing Machine.

No. 219,228. Patented Sept. 2, 1879.

Fig. 1.

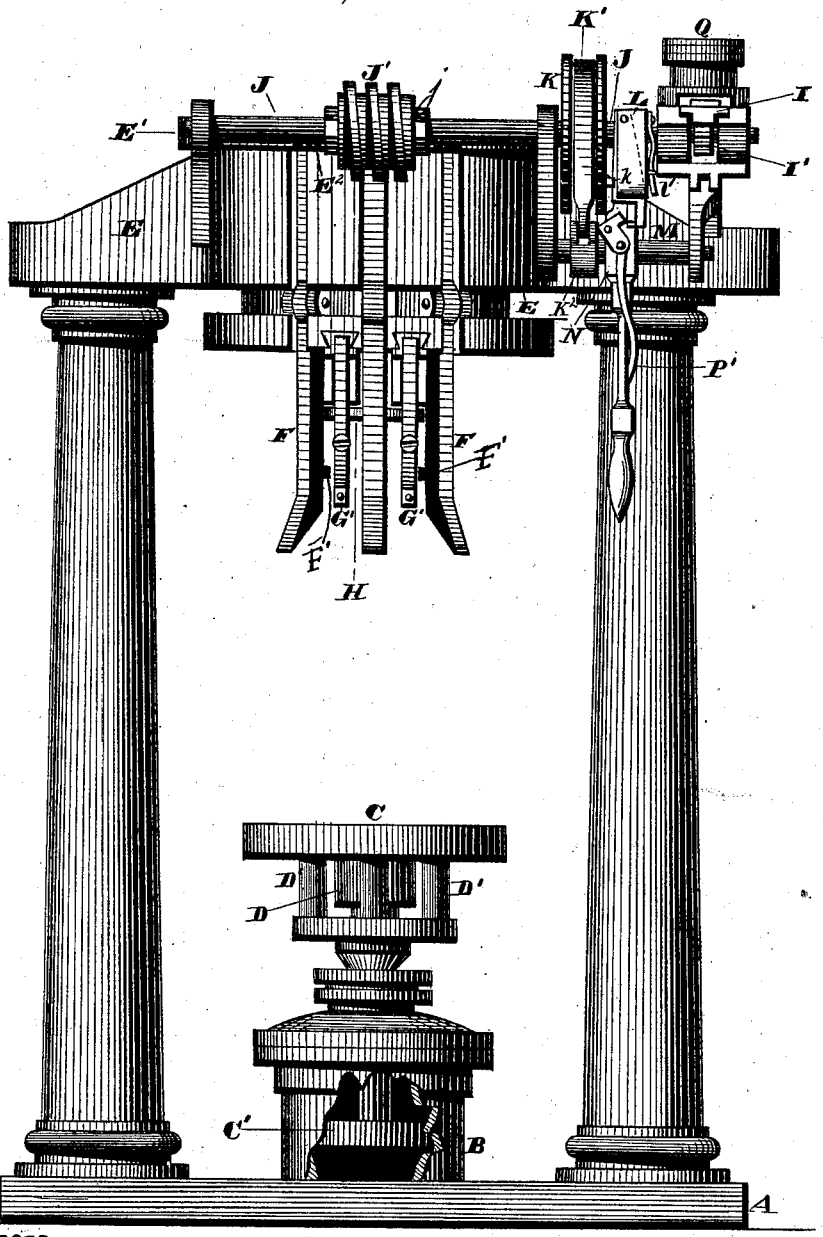

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Fig. 2.

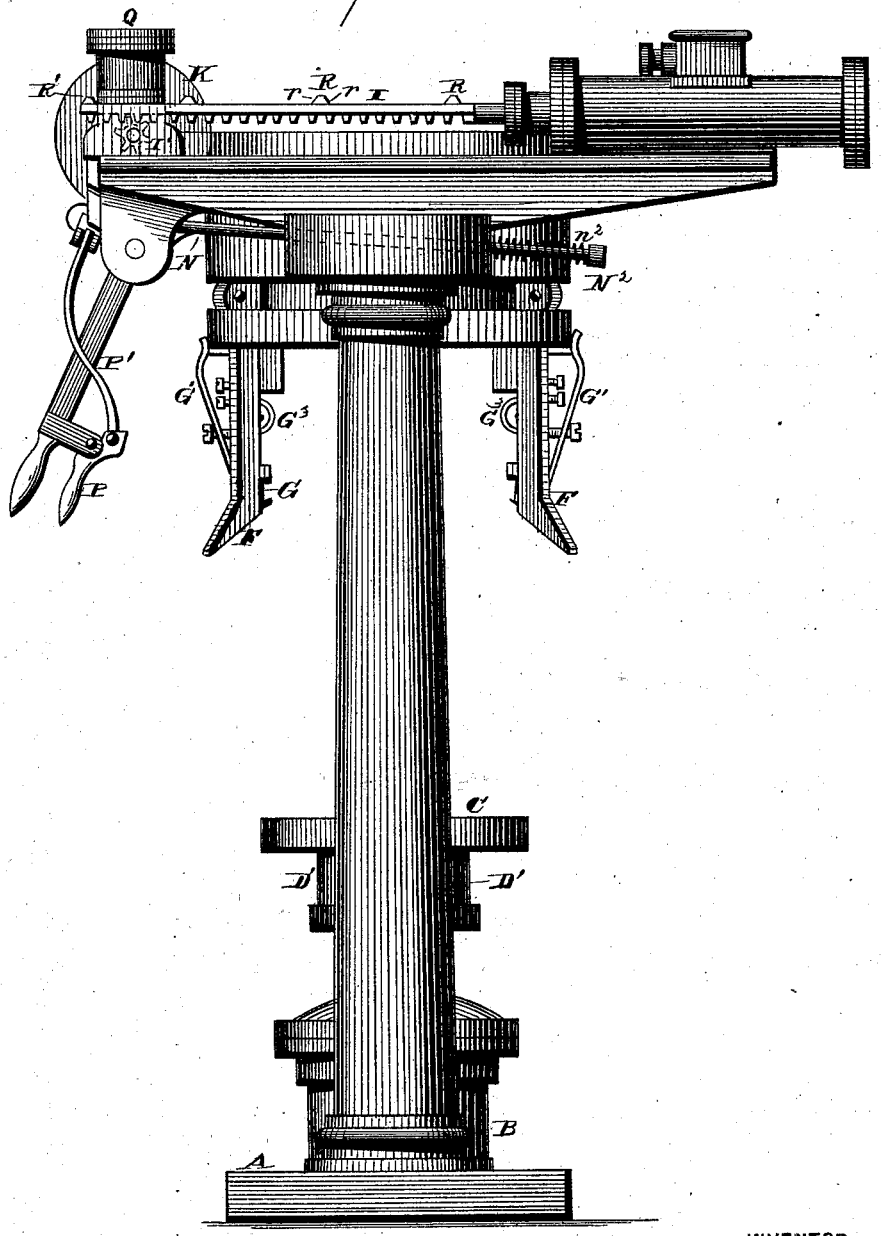

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Fig. 3.

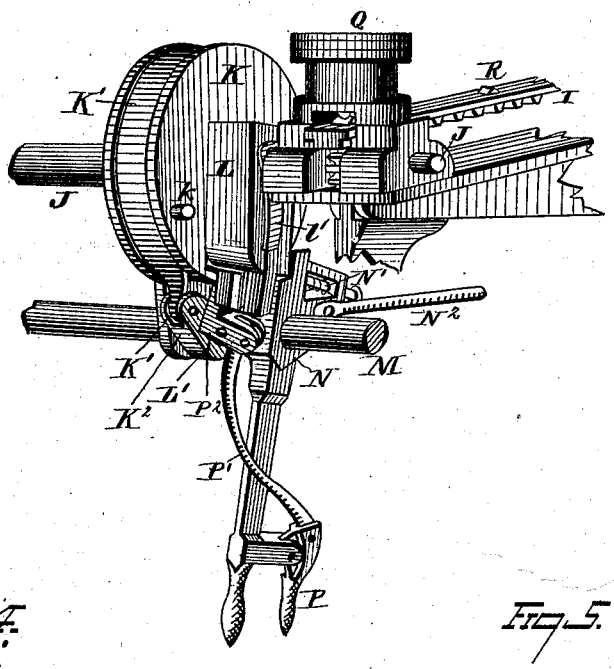


Fig. 4.

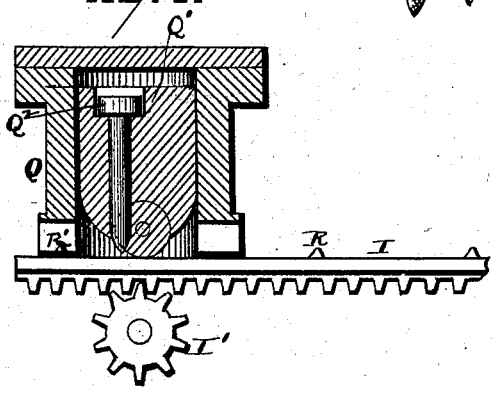
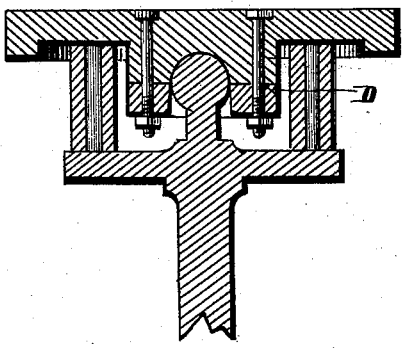


Fig. 5.



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4 Sheets—Sheet 4.

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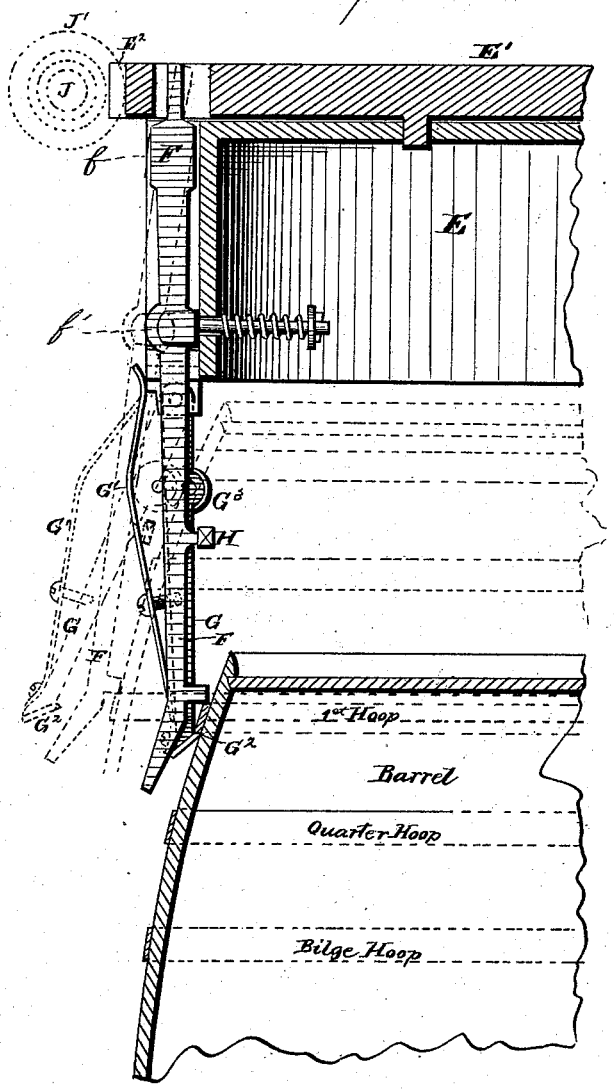
Fig. 5.



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UNITED STATES PATENT OFFICE.

MARK L. DEERING, OF CLEVELAND, OHIO, ASSIGNOR OF ONE-HALF HIS RIGHT TO GEORGE H. HOPPER, OF SAME PLACE.

IMPROVEMENT IN BARREL-TRUSSING MACHINES.

Specification forming part of Letters Patent No. **219,228**, dated September 2, 1879; application filed June 2, 1879.

To all whom it may concern:

Be it known that I, MARK L. DEERING, of Cleveland, in the county of Cuyahoga and State of Ohio, have invented certain new and useful Improvements in Barrel-Trussing Machines; 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.

This invention is designed as an improvement upon the one patented to me August 21, 1877, No. 194,335; and consists, first, in supporting the platform by ball-and-socket or other universal-joint mechanism, which will permit the platform to yield slightly in any direction; secondly, in providing, in combination with the dependent arms, other depending arms adapted to engage beneath a hoop and support the barrel as the other or driving arms are expanded for the next succeeding hoop; thirdly, in providing means whereby this second series of depending arms or holders may be automatically disengaged as the last hoop is driven, so that in subsequently expanding the driving-arms the barrel will be left completely free upon the platform; fourthly, in providing the shaft of the worm-gear for revolving the head with a brake mechanism for quickly stopping the movement at any instant; fifth, in providing the rack-bar with an air-cushion or other brake mechanism, whereby its stroke may be checked at any instant.

Inasmuch as the general mechanism of this apparatus is described in full in my before-mentioned patent, I will here describe only such parts as are necessary for a clear understanding of my present improvements.

In the drawings, Figure 1 is a front, and Fig. 2 a side, elevation of a machine with my improvements; Fig. 3, an enlarged view of the mechanism at the top of the machine; Fig. 4, a sectional view by vertical plane longitudinally of the rack-bar, showing air-brake; Fig. 5, a sectional view through the platform, showing the universal-joint mechanism. Fig. 6 is a detail.

A is the frame; B, the driving-cylinder; C, the platform suitably connected with the piston C′. Heretofore this platform has been made rigid, or, in other words, in a fixed position upon the end of the piston-rod. If, therefore, the barrel should not be perfectly true at its end, it might, under certain circumstances, cause an undue strain upon one side of the end of the barrel and fail to drive the hoop properly; but I propose to overcome this difficulty by connecting the platform C with the piston-rod by a universal-joint mechanism—as, for instance, a ball and socket, D, and cushions D′.

I do not limit myself in this respect to any particular universal-joint mechanism, the one shown being simply an example of many appliances which might be employed to accomplish the same object, my invention in this respect contemplating, broadly, a universal-joint connection or other yielding attachment of the platform to the piston-rod in order that the platform may conform to the end of the barrel under all circumstances and exert a normal pressure thereon.

E is the head which supports the dependent arms F, and is provided with suitable means for causing the arms to expand at their lower ends around either the bearings *f* or *f′*, my present invention contemplating no special improvement in the said arms F.

G represents another series of arms, which may alternate with the arms F around the whole circumference of the barrel; or the arms G may be located at any suitable intervals around the barrel. The arms G are suitably attached to the head E by a hinge or other yielding attachment, and are held against the surface of the barrel by spring tension—as, for instance, by a spring, G^1. G^2 is a hook or shoulder at its lower end, which latter is beveled beneath, so as to be automatically expanded by the barrel as it rises and impinges against it. G^3 is a roller located at a distance above the hook G^2.

H is a cross-bar or other suitable attachment to the arm F, and projecting therefrom sufficiently far to the sides that as the arm F is sufficiently expanded it will carry with it the adjacent arm or arms G.

The object of the mechanism just described will now be explained: When a barrel with its hoops loosely set is placed upon the platform

C, and steam introduced into the cylinder beneath, the barrel will rise, press aside or expand the arms F and G until the chine-hoop comes against the under edges of the shoulders F′, at the same time the hook or shoulder G^2 will have sprung in beneath the lower edge of the hoop. The further upward motion of the platform forces the barrel through the hoop until it has reached its proper place. The arms F are then slightly expanded by turning the cap-plate E^1. This expansion of the arms F is only sufficient to permit them to clear the first hoop as the barrel is forced farther up between them. When the arms F are thus expanded, the barrel will be held in position and prevented from falling by the arms G and their hooks G^2. The further upward motion of the barrel will then cause the quarter-hoops to engage with the shoulders F′ and that hoop will be drawn in position by forcing the barrel through it, and at the same time the shoulders G^2 of the arms G will engage beneath the hoop and hold it, when the arms F are again expanded to clear this quarter-hoop. By the further motion of the barrel upward the last or bilge hoop will engage beneath the shoulders F^1, and be driven into position in like manner; but in so doing the barrel will press against the rollers G^3, which will force outward or expand the arms G, so that the shoulders G^2 will not engage beneath the bilge-hoop. After the bilge-hoop shall have been forced to its position, the pressure of the arms F will alone support the barrel and hold it suspended. Therefore, to release the barrel, the arms F are still further expanded. This expansion, however, brings the bar H against the arms G, so that they are prevented from springing in against the barrel, and the barrel is, therefore, left entirely free upon the platform C. It may then be dropped down, the barrel reversed, and the hoops driven upon the other end in like manner.

I is the rack-bar, and I′ the pinion, through the medium of which the cap-plate E^1 is rotated for the purpose of expanding or retracting the arms F. The pinion I′ is secured to the shaft J, and the worm-gear J′ meshes with the teeth E^2 on the plate E^1.

K is a brake-wheel suitably located upon the shaft. K^1 is a strap, preferably of metal, embracing the said brake-wheel, so as to exert a frictional resistance upon its surface. L is a block or frame attached to the shaft J and moving loosely thereon. L′ is a pawl pressed against or near to the surface of the side of the wheel K by a suitable spring, l'. k is a stud or projection from the side of the wheel K. M is a shaft, to which is rigidly attached the cross-head K^2, to which the ends of the brake-strap are attached. N is a lever likewise rigidly attached to the shaft M. The upper end of this lever N projects behind the block or frame L, and serves as a stop against the further backward movement of the block L. N^1, at the upper end of the lever, is a spring-cushion for removing the shock or jar that would otherwise be occasioned by the block L striking the lever N. N^2 is a shaft, which is provided with a spring, n^2, and serves also as a cushion to stop the further backward movement of the block L. P is another hand-lever attached to the lever N, and by a suitable connecting-rod, P^1, caused to operate a bell-crank or trip, P^2, which trip is adapted to force back, at the will of the operator, the pawl L′.

The operation of this part of the mechanism is as follows: When it is desired to expand the arms F, steam is admitted to the upper cylinder, and the operator seizing the lever N and the lever P with the same hand, he forces the lever into such position as to release the brake-strap K^1 from the surface of the brake-wheel K; also, at the same time, the lever P, by means of the trip P^2, forces back the pawl L′, so that the stud k may pass by the pawl. The rack I will then, by operating upon the pinion I′, turn the shaft J, with its worm-gear, and thereby rotate the plate E^1. When sufficiently rotated, in order to instantly stop the further rotation of the plate and expansion of the arms, the operator releases the lever P, and the spring N^2 tightens the brake-strap K^1 upon the brake-wheel K. The stud k will then strike against the pawl L′, and the motion of the shaft J be stopped. The jars will then be received upon the spring-cushions N^1 and N^2.

In order that the motion of the rack-bar I may be checked at suitable intervals corresponding with the different hoops, I provide an air-cylinder, Q, having a piston-head, Q^1, and an air-valve, Q^2. The piston is adapted to rest upon the bar I, and upon the bar, at suitable intervals, are placed elevated surfaces with inclined sides, so that as the piston moves forward to a point nearly far enough for one expansion of the arms the inclined surface or approach r causes the piston to rise upon the surface R. The air-valve Q^2, being closed by pressure from within, and the inclosed air reacting upon the upper side of the piston Q^1, exerts great strain down upon the bar I, and, by clamping it within its guides, checks its further motion. It should be observed that the steam remains on the piston in the upper cylinder, its motion being simply stopped by the brakes and stop k.

When it is desired to again expand the arms, the bar I is permitted to start forward by simply loosening the pawl L′, so as to permit the stud k to pass, and at the same time loosening the brake-strap K^1. As the piston descends on the opposite incline, the valve-stem will strike the upper surface and be raised from its seat, thus establishing an equilibrium within, and remaining open until the incline passes beyond the valve-rod, thereby permitting the bar to move freely until it reaches another of the inclines R. On the backward stroke of the bar I, the valve-stem being the first part raised, the brake does not operate until at the end of the stroke the elevation R′, having no incline to lift the valve,

applies the air-brake and cushions the bar I at the end of its stroke.

The amount of expansion of the arms F at any time, in order to escape a hoop, is usually from a quarter to half an inch, and the elevations R on the bar I may be located at corresponding intervals, so that it shall automatically apply its air-brake Q^1 Q^2 just before it is necessary to stop the expansion.

In this way the strain of the bar upon the pinion I′ is in a large degree modified, and the liability of breaking the cogs is largely obviated.

In the employment of the yielding platform I do not limit myself to its use with a cylinder, whether of steam, air, or water, for it is clearly applicable to a plunger operated by lever mechanism.

By feathering the worm-gear J′ upon the shaft J and providing nuts *j*, or other suitable setting mechanism, the worm may be adjusted longitudinally on the shaft. It is apparent that by so doing I may adjust the starting-point of the arms F to any desired circumference of barrel, the adjustment usually being effected by a very slight longitudinal shift of the worm.

What I claim is—

1. In a barrel trussing and hooping machine, the combination, with the plunger which supports the platform, of a platform connected with the plunger by a yielding or universal-joint connection, substantially as and for the purposes described.

2. The combination, with the plunger, of a platform united with the plunger by a ball-and-socket joint, substantially as and for the purposes described.

3. The combination, with the plunger, of a platform connected therewith by universal-joint mechanism, and provided with cushions D′, substantially as and for the purposes described.

4. The combination, with a vertically-moving platform and expanding driving-arms secured to an independent head above the platform, of arms which depend from said head, and are provided with hooks or shoulders adapted to engage beneath a hoop and support the barrel while said driving-arms are being expanded, substantially as set forth.

5. The combination, with the driving-arms, of the arms G, provided with the hooks or shoulders G^2, held against the barrel by spring tension, and adapted to engage beneath the hoop, substantially as and for the purposes described.

6. The combination, with a vertically-moving platform and expanding driving-arms secured to an independent head above the platform, of arms which depend from said head, and are provided with projections or rollers adapted to maintain said depending arms disengaged from the barrel while the bilge-hoop is being driven, whereby the barrel is released when said driving-arms are expanded after the bilge-hoop is driven, substantially as set forth.

7. The combination, with the arm G, of an arm, F, and projection H, adapted, upon expanding the arms F after driving the bilge-hoop, to prevent the arms G from springing in and engaging with the other hoops as the barrel is released, substantially as and for the purposes described.

8. The combination, with a vertically-moving platform and expanding driving-arms secured to an independent head above the platform, of arms depending from said head and provided with hoop-engaging devices, together with springs which press said depending arms laterally inward, substantially as set forth.

9. As a means of quickly stopping the rotation of the plate E, the brake mechanism K K^1, the spring pawl and stop L′ *k*, and levers N and P, substantially as and for the purposes described.

10. The combination, with the brake-wheel having a lateral stud, and the block loosely connected with its journal-shaft, of the pawl which works in an opening in said block, and the lever pivoted below the latter, said lever being provided with spring mechanism adapted to receive the concussion caused by said stop striking the pawl, substantially as set forth.

11. The combination, with the stop *k* and pawl L′, of the lever N and cushions N^1 N^2, substantially as and for the purposes described.

12. The combination, with the rotary cap-plate, the worm-shaft, and the rack-bar, of the air-brake mechanism adapted to check the movement of said rack-bar, substantially as set forth.

13. The combination, with the bar I, of elevations R and air-brake mechanism Q^1 Q^2, whereby, in the forward motion of the bar, it will automatically apply the air-brake when the arms shall have been sufficiently expanded to clear the hoop, substantially as and for the purposes described.

14. The combination, with the rotary cap-plate which expands the driving-arms and has a worm-gear, of the worm longitudinally feathered on the rotary shaft, and the clamping-nuts which secure said worm in any determined position, substantially as set forth.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

MARK L. DEERING.

Witnesses:
JNO. CROWELL, Jr.,
W. E. DONNELLY.