3 Sheets—Sheet 1.

B. F. BERGH.

Machines for Feeding and Driving Nails.

No. 196,108. **Patented Oct. 16, 1877.**

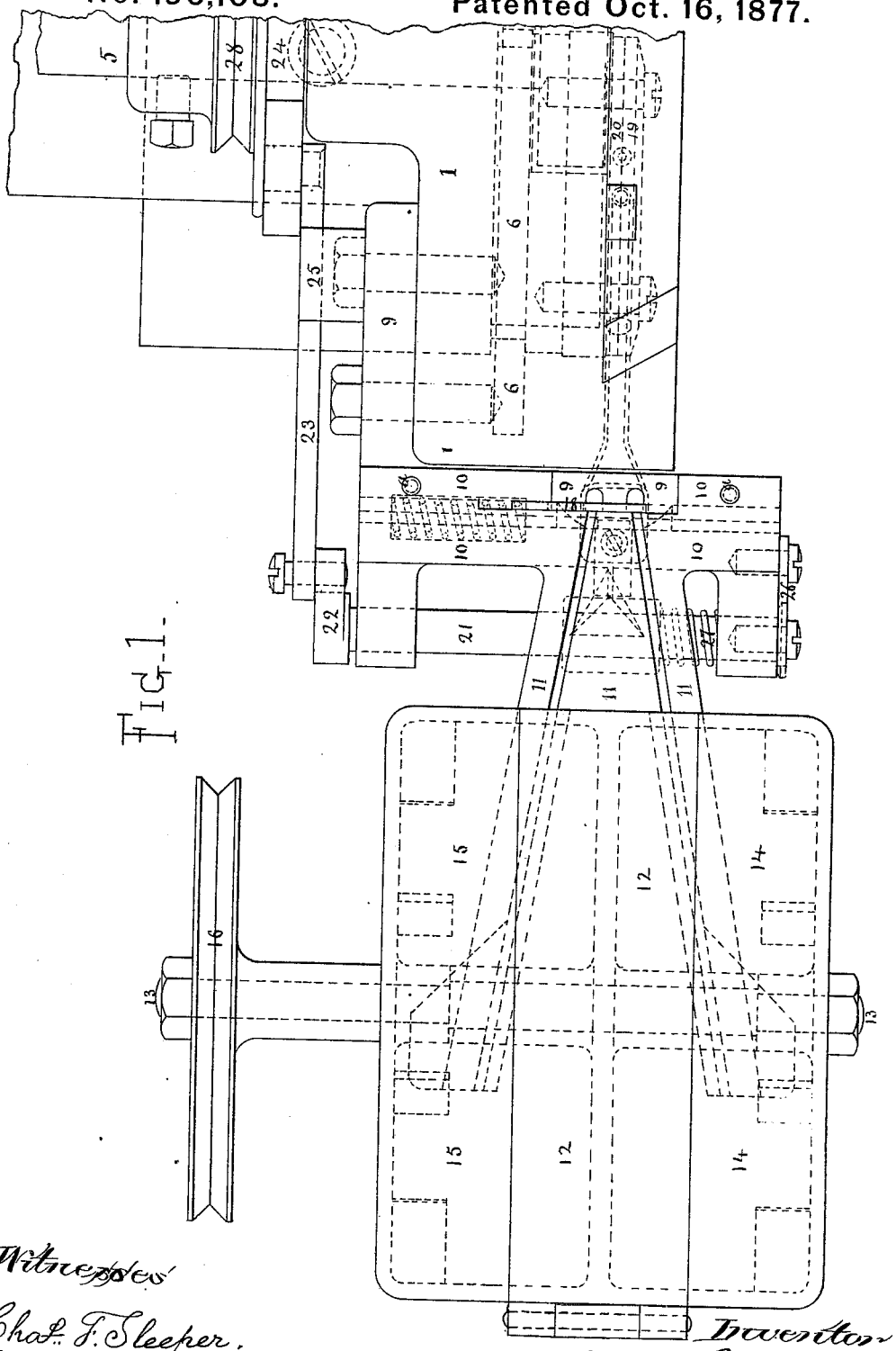

FIG. 1.

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by J. E. Maynadier
his atty

3 Sheets—Sheet 2.

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Machines for Feeding and Driving Nails.

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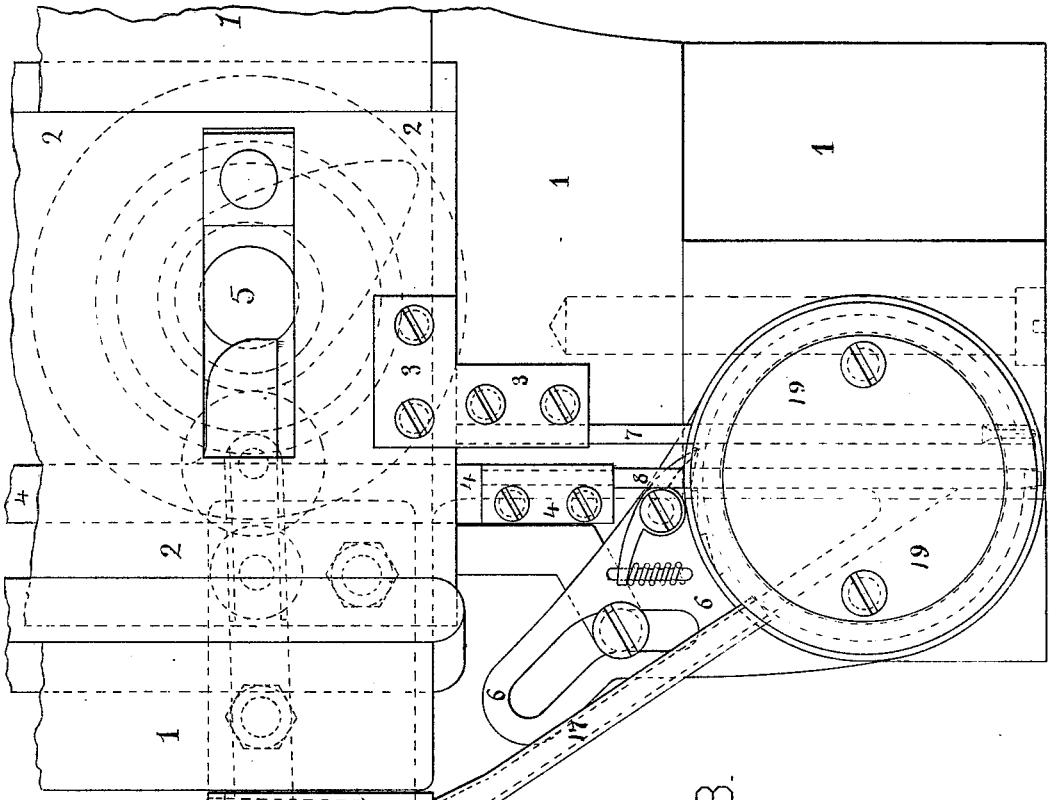

FIG. 2.

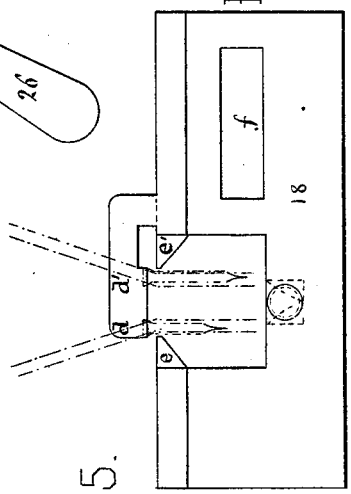

FIG. 3.

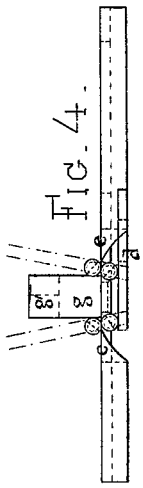

FIG. 4.

FIG. 5.

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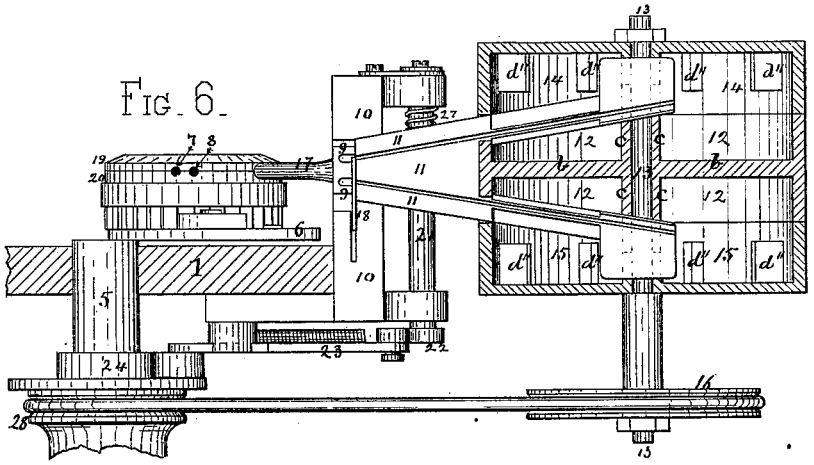
FIG. 6.



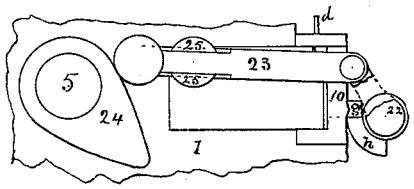


FIG. 7.

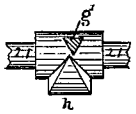


FIG. 8.

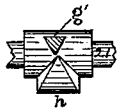


FIG. 9.

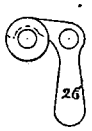


FIG. 10.

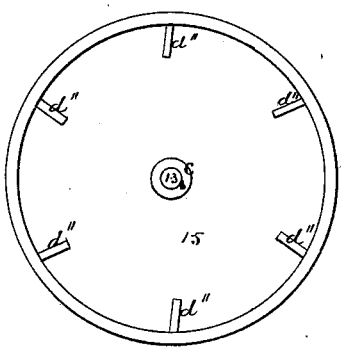


FIG. 11.

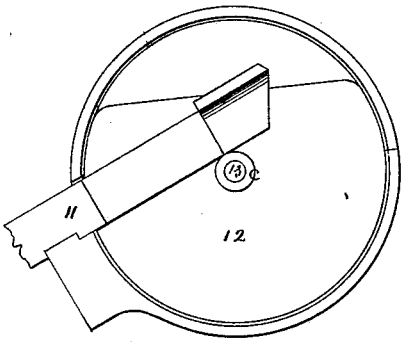


FIG. 12.

FIG. 13.

Witnesses,
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UNITED STATES PATENT OFFICE.

BROR F. BERGH, OF MILFORD, MASSACHUSETTS.

IMPROVEMENT IN MACHINES FOR FEEDING AND DRIVING NAILS.

Specification forming part of Letters Patent No. **196,108**, dated October 16, 1877; application filed March 17, 1875.

To all whom it may concern:

Be it known that I, BROR F. BERGH, of Milford, in the county of Worcester and State of Massachusetts, have invented an Improved Machine for Feeding and Driving Nails, of which the following is a specification:

My invention relates to a machine for selecting and driving two or more sizes of nails, and also to mechanism which is adapted to select and deliver two or more sizes of nails to the action of any suitable driver, and to the means of attaching such mechanism to any of the well-known pegging-machines, in order to convert such machines into nail-driving machines; and my invention consists in the parts, improvements, and combinations particularly pointed out below.

The drawings show a mechanism which embodies all the features of my invention in the best form known to me, and as attached to that kind of pegging-machine known as the "Champion."

1 is the main casting of the pegging-machine; 2, the slide carrying the awl-stock 3; 4, the driver-stock; 5, the main shaft; 6, the feed-cam; 7, the awl, and 8 the driver.

To the main casting 1, I secure the piece 9, as shown in the drawings. As this piece supports and determines the position of the selecting and delivering mechanism, it should be adjusted with care, and made of sufficient strength to sustain the mechanism when the boxes are supplied with nails. The piece 10 is secured to this piece 9 by means of the conical pins *a a*, as shown in the drawings. From this piece 10, and firmly secured to it, projects the piece 11. In practice, 10 and 11 are only one casting.

To the piece 11 is secured the cylinder 12, which is open at both ends, and is provided with a partition, *b*, and a sleeve, *c*. The upper part of this cylinder is separate from the lower part, and thus forms a lid or cover, which, when lifted, affords an opening for supplying nails to the mechanism. The partition *b* not only serves to keep the different sizes of nails separate, but also supports the sleeve *c*, which receives the shaft 13. This shaft 13 revolves in the sleeve *c*, and has secured to it at one end the box 14, and at the other end the box 15 and pulley 16. These boxes 14 and 15 are open at that side next the open ends of the cylinder 12, and form, with that cylinder, vessels to receive the nails. They are so secured to the shaft 13 that they revolve with it, and each is provided with shelves *d'' d''*, as shown in the drawings.

The piece 11 is forked, and one part of it enters the vessel formed by the box 14 and cylinder 12, while the other part enters the other vessel formed by the box 15 and cylinder 12. The upper ends of each of these forks are supplied with shelves, and in each is a deep groove, which opens into a nail-channel in the piece 9. These nail-channels in the piece 9 open into a nail-tube, 17.

The operation of this part of the mechanism is thus: As the boxes 14 and 15 revolve, the nails are carried up on the shelves, and fall back as the shelves get above the shelves on the forks of piece 11. Many of the nails, therefore, fall upon these shelves, and many of such as thus fall slip from these shelves into the grooves, the shank of the nail entering the groove. The nail thus hangs by its head, and while thus hanging slides down the inclined surface of the piece 11, so that both grooves are soon filled with nails, and are easily kept filled.

Each of the forks is cut away on its upper surface below the shelves, as shown in cross-section in Fig. 13, so that all the nails which fail to enter the grooves fall off, thus doing away with all danger of clogging the grooves, and also of allowing nails to get out of the receptacles, except through the grooves.

By raising the upper part of cylinder 12 the attendant has ready access to these grooves and to the nail-vessels without stopping the machines.

The speed of revolution of the boxes 14 and 15 need not be great, and should not, of course, be so great as to control the nails by centrifugal force. When the speed is slow it is well to incline the shelves of the boxes, as shown in the drawings.

In practice, the boxes 14 and 15 are each one casting, and when the speed of the pegging-machine is such that these boxes revolve too rapidly, I shift them on their shaft, thus reversing the inclination of the shelves.

Between the pieces 9 and 10 the picker-plate

18 is inserted, the office of which is to prevent the nails from escaping from one of the grooves into the nail-tube, while it delivers them at regular intervals from the other groove, the position of the picker-plate with relation to the two grooves determining which groove shall be closed.

The essential features of this picker-plate, which is shown detached in Figs. 3 and 4, are the check *d* and the picker *e*. The office of the check *d* is to cover the groove, and thus prevent the column of nails from sliding in the groove. When this check *d* is moved sidewise in a direction to uncover the groove, the picker *e* moves with it, as they are rigidly connected, and its point enters between the outermost nail in the groove and the one behind it; and as the motion of the plate continues, the check *d* is drawn clear of the groove, while the picker *e* is drawn across the groove, but behind the outermost nail, which is carried out of the groove by the incline on the face of the picker, and falls through the vertical nail-channel in the piece 9 into the nail-tube 17, through which it falls into the channel between the outer and inner plates 19 and 20, and under the driver 8, when it rests with its point in the awl-hole, (or against the sole, if no awl be used,) ready to be driven by the next descent of the driver.

The groove is closed by the picker *e* during that motion of the picker and check to disengage the outermost nail from the groove; but during the return motion of the picker and check the groove is uncovered by the motion of the picker, but covered by the motion of the check, and the column of nails slides down the groove until the outermost nail is in contact with the check.

Thus far I have described a single picker and a single check in combination with a single groove; but a picker and check are used for each groove. It would, of course, be feasible to provide an independent contrivance of this kind for each groove, and to so arrange the actuating mechanism that either of these contrivances could be actuated as a nail was wanted from either of the grooves; but I regard the picker-plate shown in the drawings as a much more perfect contrivance. It is provided with two checks, *d* and *d'*, and two pickers, *e* and *e'*, which are so arranged together that the picker *e* is operative only when moved in one direction, while the picker *e'* is operative only when moved in the opposite direction, and that the motion of the check *d* to uncover its groove, and to bring its picker *e* over that groove, has the effect to carry the check *d'* still farther over its groove, and to carry the picker *e'* away from that groove. For example, in Fig. 4, a motion of plate 18 from left to right will carry the check *d* away from its groove, but vice versa if the plate 18 be moved from right to left.

Any suitable mechanism may be used to actuate the check and picker, whether single or double; but I have devised a mechanism for actuating this double check and picker, which is very simple, compact, and effective. I mount these checks and pickers upon a plate, 18, which is held in proper ways, so that it can move back and forth. A slot, *f*, is formed in this plate, and corresponding cavities are made in the ways 9 and 10 to receive a spiral spring. As this spring cannot move in either direction, any endwise motion of the plate 18 will compress it, whether that motion be to the right or to the left. A pin, *g*, projects from the plate 18, and is provided at its end with a wedge-shaped cam, *g'*, which engages with a similar cam, *h*. If the ridge of the cam *h* be a little to the left of the ridge of the cam *g'*, (calling the picker *e* on the left of plate 18,) then the right side of the wedge-shaped part of cam *h* will engage with the left side of wedge-shaped part of cam *g'*, and the plate 18 will consequently be moved from left to right, thereby compressing the spring in the slot *f*, which will force the plate 18 back to its original position as the cam *h* makes its return motion. When the picker *e'* is to be brought into operation, it is only necessary to move the cam *h* sidewise, so as to bring its ridge a little to the right of the ridge of the cam *g'*, when the left side of cam *h* and the right side of cam *g'* engage together, and the plate 18 is moved from right to left, the spring in the slot *f* being compressed, and acting as before, but in the opposite directions.

Motion is imparted to the cam *h* by means of the shaft 21, which receives an oscillating motion in one direction through the crank 22 and connecting-rod 23 from the cam 24 on the main shaft 5 of the pegging-machine, and in the other direction from a spring. The connecting-rod 23 is supported in ways in the swiveling guide 25, which is secured by a screw to the piece 9.

The cam *h* is shifted by moving the shaft 21 endwise, which is effected by changing the cam-lever 26 from the position shown in Fig. 2 to that shown in Fig. 6, forcing its cam between the bracket on piece 10 and the disk on the end of shaft 21. The spring 27 causes the return movement of shaft 21 when the cam-lever 26 is moved back.

The only change made in the pegging-machine to adapt it for receiving this mechanism consists in taking off those parts which correspond to plates 19 and 20, and substituting those plates which are the same in all substantial respects as the parts removed, except that the plates 19 and 20 are adapted for use with the nail-tube 17, instead of with a strip of pegwood.

The awl used is provided with a shoulder, which makes a countersunk impression in the sole, into which the end of the nail enters, and by which it is properly guided or directed. Another advantage of this shoulder is, that it guides the operator in setting the awl, the distance between the shoulder and the end of the

awl being always less than the thickness of the sole, and thus prevents the point of the awl from being forced through the leather and upon the iron face of the last. I prefer to form this shoulder upon a sleeve, which is placed over the awl, as shown in Fig. 5, the sleeve extending up into, and being nipped by, the jaws of the awl-stock 3.

The main feature of my invention consists in the means for connecting the mechanism for selecting and delivering the nails with the main casting of the pegging-machine.

A second feature of my invention consists in the construction of the vessel to receive the nails; a third feature, in the construction of the nail-channel; a fourth feature, in the arrangement together of the two pickers and two checks and the two nail-channels, so that the motion of all the pickers and checks in one direction shall cause one picker to act upon one channel, and their motion in the other direction shall cause the other picker to act upon the other nail-channel; a fifth feature, in the mechanism for actuating those pickers and checks; a sixth feature, in the combination of the nail-tube and the driver-guide with suitable nail selecting and delivering mechanism; a seventh feature, in the combination of a short awl with the nail-driving mechanism. The purpose of an awl in this combination is not, as in a pegging-machine, to form a hole for the reception of the fastening, but to center the point of the nail preparatory to driving—that is, to make an aperture deep enough to receive the point of the nail, and to act in conjunction with the grooves (in the plates 10 and 20) by which the rest of the nail is supported to guide each nail in its proper course when driven. This is an important feature of my invention, as without it it is practically impossible to insure the proper centering of nails which do not exactly fit the channel formed by the grooves in the plates 19 and 20—that is, the point of any nail is more likely to rest upon the sole at one side of this channel than centrally with it, and consequently the axis of the nail does not coincide with the axis of the channel.

For the more perfect carrying out of this part of my invention the awl should be shouldered, as shown, the shoulder forming a larger opening in the surface of the sole, and consequently the point of the nail is the more certainly brought into the proper place. The head of the nail fills the depression made by the shoulder.

Another and an important feature of novelty consists in the fact that each roadway opens directly into the nail-tube 17, and consequently no nail is delivered from either roadway until the moment before it is driven. The importance of this feature lies in the fact that the operator can instantly change the length of nail which is presented to the driver, whereas in the only other machine of this class known to me a series of nails lay between the roadway and the driver, and therefore the length of nail presented to the driver was not changed until all of that series were driven, the operator being, therefore, required to change the length of nail, not at the moment the change was required, but at some time before that.

It will also be seen that I attach no moving part to the pegging-machine, except the cam 24 and the pulley 28, which I prefer to cast in one piece. The best manner of arranging the shaft of the boxes 14 and 15 also cost me some study. The sleeve within which this shaft revolves is fast to the partition of the cylinder 12. The shaft is made smaller at each end, and the sleeves upon the boxes 14 and 15 fit this smaller part, so that these boxes can be tightly clamped upon the shaft.

I am aware that I am not the first to combine with two receptacles for receiving the nails in bulk an interchangeable delivery mechanism intended to deliver from either receptacle, according to the length of nails desired, and I therefore disclaim that combination; but I do not mean hereby to disclaim any of the above-described elements of that combination, nor the special combination of those elements shown in the drawings and above fully described.

What I claim as my invention is—

1. The combination of the pieces 9 and 10 and the mechanism for selecting and delivering the nails, substantially as described.

2. The vessel to receive the nails, formed of the two boxes or cylinders 12 and 14, one stationary, the other moving on its axis, and the latter supplied with shelves, all substantially as set forth.

3. The nail-channel, having a shelf at its upper extremity, and triangular in cross-section below the shelf, substantially as and for the purpose specified.

4. The combination, with nail-delivery channels, of the plate 18, provided with the checks *d d'* and pickers *e e'*, adapted, when moving in one direction, to take a nail from one channel, and when moving in the opposite direction to take a nail from the other channel, all substantially as described.

5. The combination of plate 18, bearing the pickers and chucks, with the spring *f*, cam *g'*, and cam *h*, as described.

6. The combination of the driver 8, the plates 19 and 20, provided with grooves for forming the nail-channel and the driver-channel, the nail-tube 17, and mechanism, substantially such as is above described, for selecting and delivering the nails at proper intervals into the tube 17.

7. In combination, a plurality of receptacles for receiving the nails in bulk, a plurality of roadways, each opening directly into the nail-tube 17, and each provided with a check and picker, as shown, and a mechanism for throwing into operation either picker, as may be desired, all arranged together and in rela-

tion to the driver substantially as specified, so that each nail passes from its roadway under the driver before another is delivered from either of the roadways.

8. The combination of the main shaft 5 of the pegging-machine and the cam 24 and pulley 28 with the connecting-rod 23 and pulley 16 of the attachment above described, in the manner set forth.

9. The combination of shaft 13, boxes 14 and 15, cylinder 12, partition *b*, and sleeve *c*, as described.

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Witnesses:
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