(No Model.)

J. H. ALKER.

MACHINE FOR PUTTING NUTS ONTO BOLTS.

No. 248,685. Patented Oct. 25, 1881.

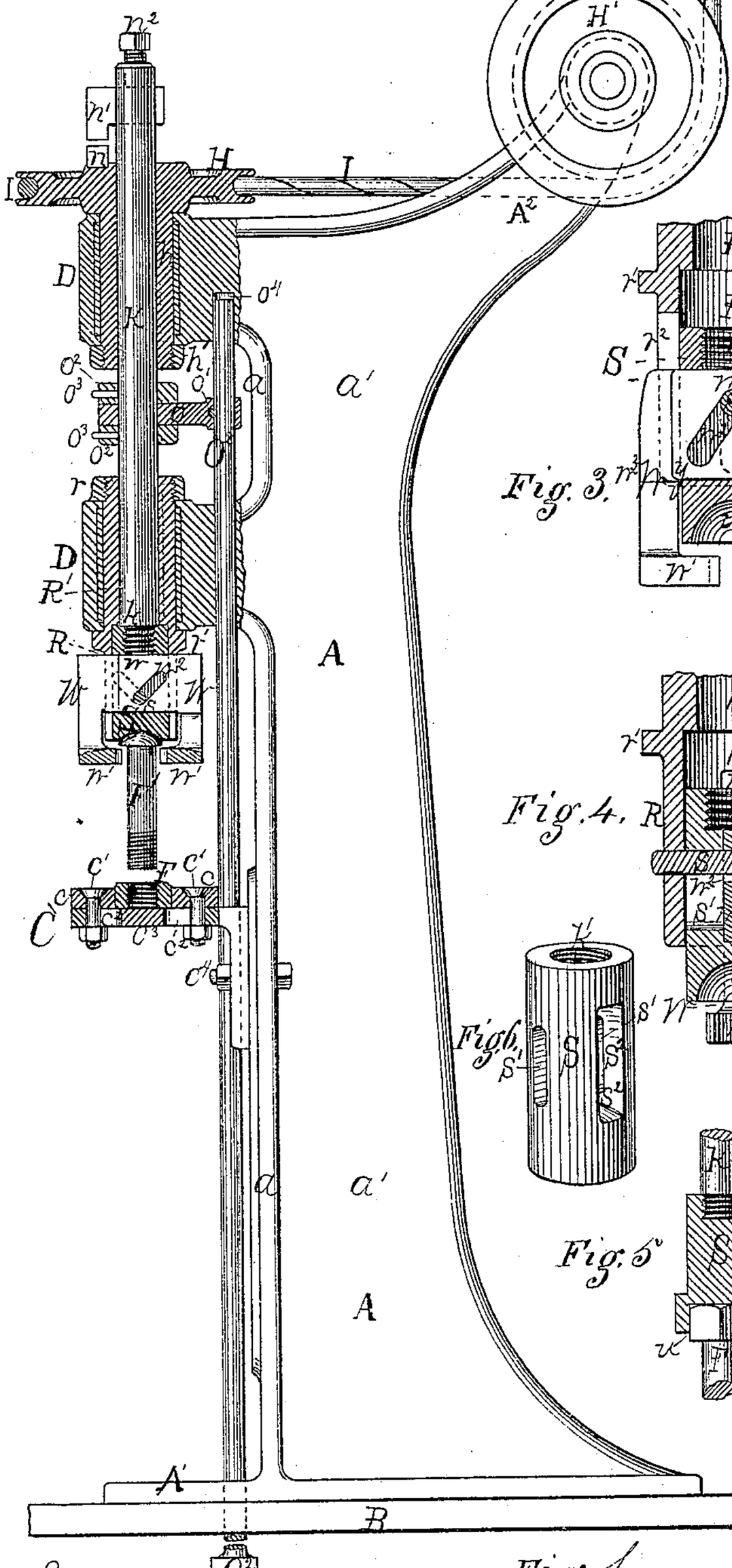

Fig. 1.

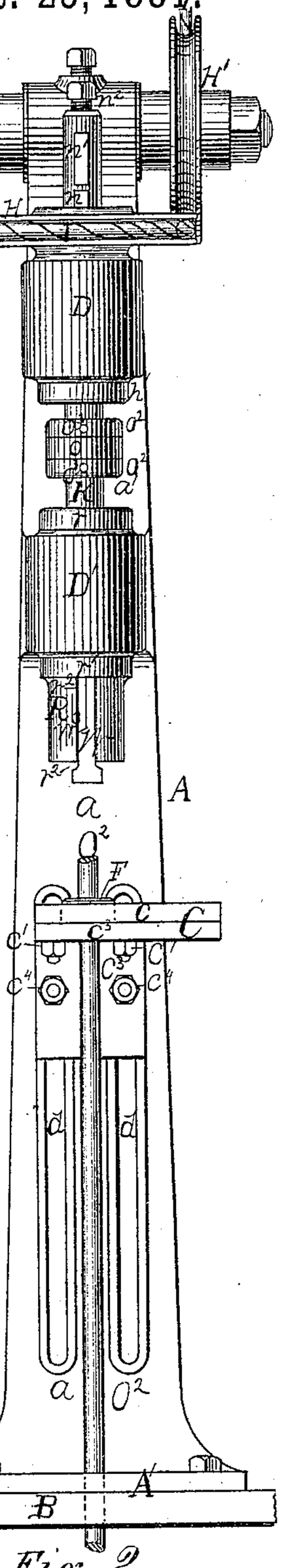

Fig. 2.

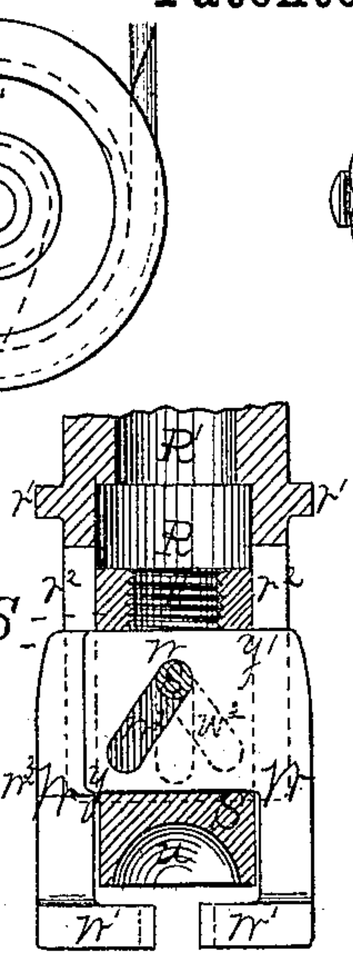

Fig. 3.

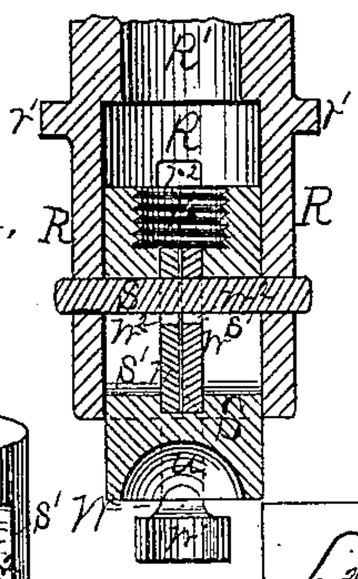

Fig. 4.

Fig. 6.

Fig. 5.

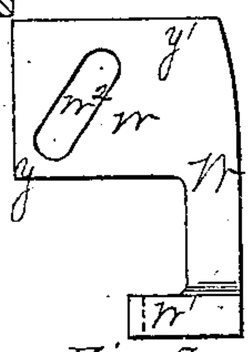

Fig. 7.

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MACHINE FOR PUTTING NUTS ONTO BOLTS.

SPECIFICATION forming part of Letters Patent No. 248,685, dated October 25, 1881.

Application filed June 13, 1881. (No model.)

To all whom it may concern:

Be it known that I, JOHN H. ALKER, of Pittsburg, county of Allegheny, State of Pennsylvania, have invented or discovered a new and useful Improvement in Machines for Screwing Nuts onto Bolts; and I do hereby declare the following to be a full, clear, concise, and exact description thereof, reference being had to the accompanying drawings, making a part of this specification, in which—like letters indicating like parts—

Figure 1 shows a side elevation, partly in section, of my improved machine. Fig. 2 is a front elevation of the same; and Figs. 3, 4, 5, 6, and 7 are views, to an enlarged scale, of detached portions of the bolt-holding mechanism.

My invention relates to a machine for screwing nuts onto bolts.

Heretofore this work has been performed principally by boys or by so-called "hand labor." In bolt-works of large capacity the wages paid for this particular work amount to a considerable sum, and form an important item in the expense of manufacture.

The purpose of my invention is to provide for doing the greater part of this work by machinery, or, in other words, by the service of one boy in tending the machine to do work heretofore requiring several boys.

The advantages of substituting machinery for hand labor are well understood, and in the present case these advantages are especially desirable.

My improved machine is constructed as follows:

A metal standard, A, constituting the main support of the machine, is bolted or otherwise secured in vertical position by its base A′ to the top B of a suitable bench or other support, of convenient height and sufficient strength. This standard is made by preference of T form in cross-section, having a front or face plate, *a*, and web *a*′. In the front plate, *a*, are made two parallel slots or openings, *d d*, by or through which a nut-holder, C, is bolted to the standard so as to be vertically adjustable thereon. This nut-holder consists of an angle-plate, c^3, one wing or plate of which receives the bolts c^4, which bind it to the standard, while the other or horizontal wing carries two bars, *c*, which are adjustably secured thereon by bolts *c*′, passing through slots c^2, whereby the bars *c* may be separated or brought toward each other, so as to receive between them nuts F of different sizes, and center them or adjust them laterally with reference to the axial line of the bolt F′. The under plate, c^3, supports the nut, and the side bars, *c*, prevent it from turning and afford free space for inserting the nut in its seat or socket and removing it therefrom on the upper side or face of the holder. By adjusting the nut-holder up and down in slots *d* it may be set for bolts of different lengths.

The bolt holding and operating mechanism is constructed and arranged as follows:

Two journal bearings or boxes, D D′, are cast with or otherwise secured to standard A on its front or face side, *a*, such bearings having a common axial line in vertical direction.

In the upper bearing, D, is journaled a sheave-wheel, H, by means of sleeve or hub *h*, which latter is held in place within the bearing by the wheel above and a screw-collar, *h*′, below.

On an extended horn, A^2, of the standard are mounted two idler pulleys or sheaves, H′ H′, (see Fig. 2,) over which a belt or cord, I, runs from any suitable driving-pulley above, to, and around the sheave-pulley H, whereby continuous rotary motion is given to the latter.

In the lower bearing, D′, is mounted and supported the outer shell or case, R, of the bolt-holder by means of an upwardly-extended sleeve, R′, which is held in place within the bearing by a screw collar or nut, *r*, above, and a shoulder, *r*′, below, the bearing. Vertical motion of case R is thus prevented, though it is free to rotate within its bearing D′.

Axially through the centers of sleeves *h* and R′ is mounted a shaft, K. This shaft receives rotary motion from sheave-wheel H through the engagement of stops *n* and *n*′. The stop *n* is formed on or secured to the upper side of wheel H, and the stop *n*′ is secured in a slot or mortise through the upper end of the shaft, and is bound therein by screw n^2. These stops are brought into and out of engagement by vertical motion of the shaft, which is imparted by the attendant through treadle and spring O O′, rod O^2, and connecting-bar *o*. This connecting-bar encircles the rod and shaft. It is keyed by pin *o*′ to the rod, and collars o^2 o^2 are

bound by screws o^3 to the shaft above and below the bar, whereby vertical movement imparted to rod O^2 will be communicated to the shaft. The rod O^2 passes through suitable openings in the base of the standard, nut-holder, stem of bearing D′, and into a guide-hole, o^4, in the stem of D, as illustrated in Fig. 1.

On the lower end of shaft K is screwed, by threaded pin *k* and socket *k′*, the inner head, S, of the bolt-holder, and both the vertical and rotary motion of the shaft will be communicated to this part of the holder.

The details of construction of outer case, R, and inner head, S, are more fully illustrated in Figs. 3 to 7. These two parts are connected so as to take rotary motion in common by a pin, *s*, passing through both, and in order to allow independent vertical motion of the part S, the pin *s* is passed through an elongated opening or mortise, *s′*, in S, (see Figs. 4 and 6,) the length of such mortise being equal to the extent of vertical movement of the head. In a plane at right angles to mortise *s′* is made a similar but longer opening or mortise, s^2, (see Fig. 6,) and in the plane of this latter opening slots r^2 are made in the two opposite sides of outer case, R, such slots extending from the bottom or lower edge of the case upward to or nearly to the shoulder *r′*, as in Figs. 2 and 3. Within these openings s^2 r^2 are arranged, side by side, the plated or flattened stems *w* of two similar griping-jaws, W, which gripers extend downward on either side of the head and terminate below it in inwardly-bent jaws *w′*. The stems *w* of the gripers are cut away or reduced in thickness on one side, as illustrated in Fig. 2 at w^3, so that the two stems may "lap," filling the opening s^2, (see Fig. 4,) and thereby bringing both jaws in the central plane of the opening, causing them to bear upon directly-opposite sides of the bolt F′. The stems *w* are fitted to move readily in the opening in or out, but without unnecessary looseness or lost motion, and by such movement in or out the jaws *w′* are carried toward or from each other, being guided by the bearings of their stems within the mortise. In order to secure this movement of the jaws slots w^2 are made in the stems, one in each, which incline across the stem from the lower corner, at *y*, outward toward its upper corner, as *y′*. The two plates or jaws W are duplicates, (one being shown in separate view, Fig. 7,) and their stems being inserted within the mortise from opposite sides, the slots w^2 will have a relative inclination in opposite directions to a vertical line, as illustrated by full and dotted lines, Figs. 1 and 3. The pin *s* is passed through both these slots w^2. (See Fig. 4.) The pin is held against vertical movement by the shell or case R, while the jaws W have vertical movement with the inner head, S, and in such movement they will be forced toward and from each other by the action of the pin *s* in the slots w^2; or, in other words, as the head is moved downward by pressure upon treadle O, the jaws will be moved toward each other, as in Fig. 3, and as the head is moved upward by spring O′ the jaws will be separated, as in Fig. 1. The extent of such sidewise motion will depend, in part, upon the inclination between the two slots w^2. In practice I prefer to make it sufficient to clamp the jaws *w′* upon opposite sides of the stem of a bolt, F′, when depressed, and to open them when raised sufficiently to permit free passage of the bolt-head between them for its insertion and removal. The griping-faces of jaws *w′* may be V-shaped or concave, corresponding to the form of the bolt, whether square or round.

In the lower end of head S is made a seat or cavity, *u*, corresponding in form to the bolt-head, whether round or angular.

In operation the workman places a nut, F, in holder C with one hand, and with the other hand passes the head of a bolt, F′, between the open jaws *w′* into the seat *u*. Then, by pressure upon treadle O, he depresses shaft K, thereby locking or engaging stops *n n′*, griping jaws W upon the bolt, and pressing the end of the bolt into the nut F. The interlocking of stops *n n′* causes the shaft and bolt to rotate, and as the bolt rotates it is screwed into the nut, thereby drawing the nut upward out of its seat or socket in holder C. As soon as the nut is clear of the nut-holder the screwing-on operation ceases, as the nut is then free to rotate with the bolt. For this reason I prefer to make the bars *c* of the nut-holder of about the same thickness as the nut, so that the nut may be screwed onto the bolt "full" or its full thickness. This being done, the workman releases treadle O, when spring O′ lifts shaft K, disengages stops *n n′*, opens jaws W, and permits the bolt and nut to fall.

It sometimes happens that the thread on the bolt or nut is not properly cut, so that the two will not run together readily. For this reason I adjust the tension of belt I with a view to obtaining sufficient driving power to rotate the bolt when the nut runs on properly, but to slip or fail to rotate the bolt if the nut runs on hard. If the machine is thus stopped the workman knows the cause at once, and removes the bolt and nut for the threads to be recut.

If desired, a suitable spout may be secured to the bench to convey the bolts to kegs as they fall from the machine.

The bolt-holder above described is designed especially for round-headed bolts, like track-bolts, large quantities of which are made and used. With bolts having square or other angular form of heads the inner head, S, and jaws W may be replaced by a similar head, S′, Fig. 5, having an angular socket or seat, *u*, in its lower end. In such case rotary motion may be imparted to the bolt without the use of jaws W. I prefer, however, in ordinary cases to employ the griping-jaws substantially as herein shown and described, as they assist in aligning the bolt and hold it in place until the work-

man wishes to release it, which is often desirable.

By arranging the machine to hold the bolt vertically instead of horizontally, as heretofore, I employ the force of gravity in doing work which has heretofore been done in this class of machines by mechanical devices—for example, in directing the bolt to the nut and in discharging the bolt and nut. I also economize space, simplify the construction of the machine, and render it more convenient and easy of operation, which are very important factors in machines of this class, which are usually operated by unskilled laborers and in crowded manufacturing establishments.

I claim herein as my invention—

1. In a machine for screwing nuts onto bolts, a vertically and rotary moving bolt-holder adapted to hold the bolt in a vertical position, such holder having clamping-jaws W, arranged as described, to clamp the bolt on the downward movement of the holder and release it on the upward movement, in combination with a nut-holder arranged under the bolt-holder, and having a nut-receiving cavity therein open on its upper side, substantially as and for the purposes set forth.

2. The standard A, having slots *d* in its face-plate *a*, in combination with nut-holder C, having angle-plate c^3, adjustable bars *c*, binding-bolts c^4, and a bolt-holder adapted to hold the bolt in vertical position over the nut-holder, such bolt-holder consisting of inner rotary and endwise-movable head, S, outer rotary case, R, pin *s*, and jaws W, substantially as set forth.

3. In a machine for screwing nuts onto bolts, a bolt-holder having, in combination, an outer rotary case or shell, R, an inner rotary and longitudinally-moving head, S, with mortises s' s^2 therein, as described, coupling-pin *s*, and jaws W, having in their stems inclined pin-slots w^2, substantially as and for the purposes set forth.

4. The combination of standard A, a nut-holder adjustably mounted on such standard, rotary and endwise movable shaft K, inner head, S, attached to and movable with the shaft, rotary case or shell R, coupling-pin *s*, and griping-jaws W, substantially as set forth.

5. The combination of standard A, having secured thereon a nut-holder, C, and bearings D D′, sheave-wheel H, shaft K, with stops *n n′*, mortised head S, supported by and movable with the shaft, rotary sleeve or case R, pin *s*, jaws W, and suitable means for giving to the sheave-wheel and shaft rotary motion, and to the shaft endwise motion, intermittently, at the will of the operator, substantially as set forth.

In testimony whereof I have hereunto set my hand.

JOHN H. ALKER.

Witnesses:
R. H. WHITTLESEY,
C. L. PARKER.