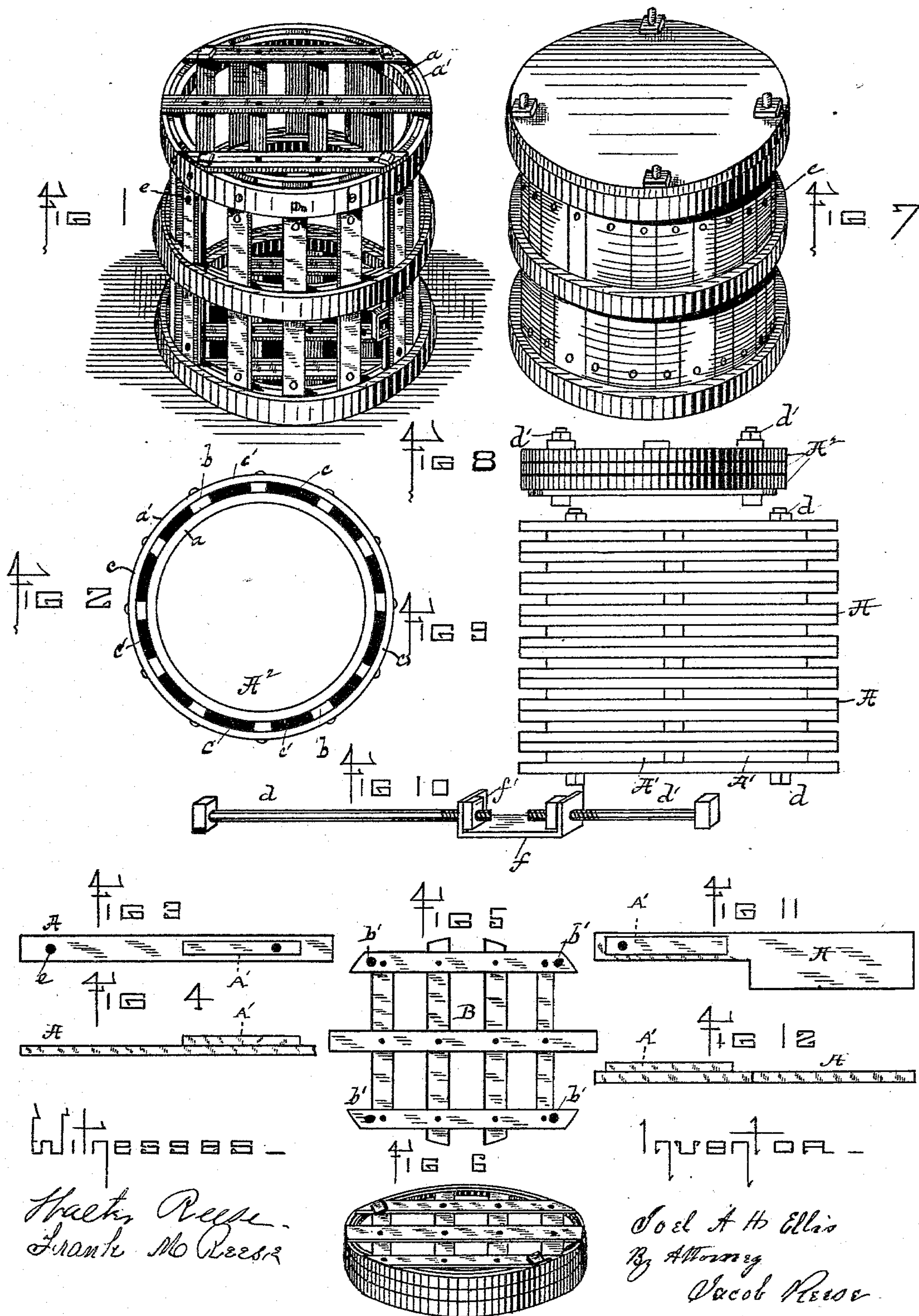


(No Model.)

J. A. H. ELLIS.
KNOCKDOWN CRATE.

No. 296,737.

Patented Apr. 15, 1884.



Witnesses -
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UNITED STATES PATENT OFFICE.

JOEL A. H. ELLIS, OF BEAVER FALLS, PENNSYLVANIA.

KNOCKDOWN CRATE.

SPECIFICATION forming part of Letters Patent No. 296,737, dated April 15, 1884.

Application filed July 18, 1883. (No model.)

To all whom it may concern:

Be it known that I, JOEL A. H. ELLIS, a citizen of the United States, residing at Beaver Falls, in the county of Beaver and State of Pennsylvania, have invented a new and useful Improvement in Knockdown Crates; and I hereby declare the following to be a full, clear, and exact description thereof, reference being had to the drawings forming a part thereof.

My improved knockdown crates are designed to be used for packing earthenware, china-ware, glass, and manufactures of that class. These goods are bulky, and the cost of packages to the ton is comparatively high, owing to their small value per cubic foot.

My invention is designed to reduce the relative cost of packages to the value of goods carried by constructing the crates in such a manner as to furnish a reliable crate for the transportation of goods, and when the crates have arrived at their destination and are emptied they may be knocked down and the different sections thereof bound together in a contracted form of about one-fifth of their bulk, and thus shipped back to the factory for further use. The average back freight on knockdown crates will not be more than one-fifth of the cost of ordinary crates, so that a saving of eighty per cent. is thus secured.

Figure 1 of the drawings is a perspective view of my improved open knockdown crate. Fig. 2 is a plan view of the hoop of same. Fig. 3 is a plan view of the staves of same. Fig. 4 is a side view of Fig. 3. Fig. 5 is a plan view of the heads of Fig. 1. Fig. 6 is a perspective view of hoops and heads. Fig. 7 is a perspective view of my closed knockdown crate; Fig. 8, a side view of heads and hoops when ready for return shipment. Fig. 9 is a plan view of staves when ready for return shipment. Fig. 10 is a view of the bolts and connecting-irons. Figs. 11 and 12 are views of staves for closed crates, such as Fig. 7.

In the manufacture of these crates, the hoops A^2 are made of an inner and outer section, $a a'$, respectively, and the two riveted together, with intervening blocks, b , to keep the inner and outer sections at proper distance from each other, as shown in Fig. 2.

The staves A for an open crate are made of strips of wood, provided upon one side with cleats A' , said cleats being in length equal to

the distance desired between the middle and one of the end hoops, as shown in Figs. 3 and 4, and the heads B are constructed of strips of wood of suitable length, crossed at right angles and secured together by suitable bolts, as shown in Fig. 5. Said heads are also provided upon the ends of the outside upper strips with bolt-holes b' , through which pass the bolts which secure together the various parts of the crate. Said bolts are eight in number, four of which (marked d) are of about twice the length of the remaining four, (marked d' .) Said bolts are connected, in the manner hereinafter described, by an open-sided link, f , and nuts f' .

In describing the method employed in setting up, knocking down, and packing for returning the crates, I shall call the openings $c c'$ between the inner and outer sections of the hoops "mortises." These mortises are made so as to permit the staves to pass through them as far as the cleats A' . Four of these mortises c are longer than the rest, in order to leave room for the bolts.

To set up the knockdown crate, remove the bolts $d d'$ from the bundles of staves and hoops, and pass the four long bolts through the holes b' in one of the heads, and lay it down with the bolts standing upright. Place one of the hoops on the head, with the bolts passing through the long mortises c in the hoop. Set up two staves in long mortises opposite each other, and pass a short bolt through the hole c near the top of each stave. Put another hoop on these staves, taking care that they pass through long mortises, and let the hoop rest on these two bolts. Put a stave in each alternate mortise by entering the end in the top hoop first, and slipping it up through and dropping down into the mortise in the lower hoop, taking care to have the cleats on the staves on the lower end and inside the crate. Take out the short bolts in the two staves. Drop the hoop down to the middle of the staves, where it will rest on the ends of the cleats. Drop in the balance of the staves, with the cleats above the middle hoop. Take the four connecting-irons f and attach one of them to each of the four bolts that are standing in the mortises by passing the bolt through one of the bent ends and putting on the nuts. Then put on the top hoop, placing the long mortises above those in the other hoop. Raise

up one side of this hoop, and enter the staves on one side only at first over one of the long bolts and connecting-irons. Fasten this side down by taking a short bolt and passing it
 5 down through the long mortise in the top hoop, where the staves are entered, and through the hole in the upper end of the connecting-iron, and turn on the nut below. The balance of the staves can then be easily entered into the
 10 hoop, and the three remaining short bolts put in through the top hoop and connecting-irons, as before. The crate is then ready for packing. When packed, take out the short bolts, put on the head, and fasten by putting the short bolts through the head, hoop,
 15 and connecting-irons, and screw them down firmly.

In packing the crates it is well to slightly overfill them, so that the contents may be
 20 pressed down by screwing down the bolts, thus preventing the contents from becoming loose and getting broken, as in hogsheads or casks, in handling and rolling about. To open the crates, take out the short bolts, remove the
 25 head and top hoop, take out each alternate stave, remove goods down to the middle hoop, lift it off and take out the remaining staves, and remove the balance of goods. The crates may then be packed for return shipment as
 30 follows: Pass two long bolts through the holes in the staves, reversing them so that the cleats will be opposite each other, as shown in the engraving. String the four connecting-irons on the two remaining long bolts. Pass the
 35 four short bolts through the holes in one head, and lay it down with the bolts standing upright. Lay the hoops on the head, so the bolts will pass through the four long mortises in them. Put the bundle of connecting-irons in-
 40 side the hoops, and tie securely to the head. Put on the remaining head and screw all the

nuts down tight, thus making the crate into two bundles, as shown in Figs. 6 and 9.

I have provided the bolts in two pieces of different lengths, in order that the long bolts
 45 may be of proper length for clamping all of the staves in one pack, and the short bolts of proper length for clamping the heads and hoops in one pack, as shown in Figs. 6 and 9.

It will be observed that the cleats A', Figs. 50 3, 4, 11, and 12, are so placed that the end of the stave may pass into the mortise of the hoop. By this arrangement the cleats occur between the middle and end hoops, and when the crate is screwed together they serve to hold the
 55 hoops firmly in position.

When closed crates are desired, I make the staves of the form shown in Figs. 11 and 12, which, when put together, form a closed pack-
 60 age, as shown in Fig. 7.

What I claim, and desire to secure by Letters Patent, is—

1. A hoop for barrels, casks, or crates, which consists of an inner section, *a*, and an outer section, *a'*, said sections riveted together and
 65 provided with intermediate blocks, *b*, having stave-openings between them, substantially as and for the purposes described.

2. In knockdown crates, the staves A, provided with lateral cleats A', said cleats adapted to hold the hoops in their proper relative
 70 positions, substantially as and for the purposes described.

3. In knockdown crates, the combination, with the heads, staves, and hoops, of the bolts
 75 *d d'*, the connecting-iron *f*, and the nuts *f'*, substantially as and for the purposes set forth.

JOEL A. H. ELLIS.

Witnesses:

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