but neceſſary, becauſe the ſtirrup, chains, and the ſtage on which the load is placed, weigh ſome hun­dreds.

The outer pin *b* is 14 inches, and the inner one *c* is ſeven inches, diſtant from the great nail which reſts in the sheers. The other arm is about 10 1/2 feet long, formed with an obtuſe edge above. On the inclined plane on each side of the ridge is drawn the ſcale of weights adapted to the inner pin *c.* The ſcales corre­ſponding to the outer pin *b* are drawn on the upright ſides. The counterpoiſe slides along this arm, hang­ing from a ſaddle-piece made of braſs, that it may not contract rust. The motion is made eaſy by means of rollers. This is neceſſary, becauſe the counterpoiſe is greatly above a hundred weight. This ſaddle piece has like two laps on each side, on which are engraved ver­nier ſcales, which divide their reſpective ſcales on the arm to quarters of a pound. Above the ſaddle is an arch, from the ſummit of which hangs a little plum­met, which ſhows the equilibrium of the steelyard to the weigher, becauſe the ſheers are four feet out of the houſe, and he cannot ſee their coincidence with the needle of the steelyard. Lastly, near the end of the long arm are two pins *d* and *e,* for ſuſpending occasionally two eke weights for continuing the ſcale. Theſe are kept hanging on adjoining hooks, ready to be lifted on by a little tackle, which is alſo hooked immediately above the pins *d* and e*.*

The ſcales of weights are laid down on the arm as follows. Let the eke-weights appropriated to the pins *d* and *e* be called D and E, and call the counterpoiſe C. Although the stirrup with its chains and ſtage weigh ſome hundreds, yet the length and size of the arm OP gives it a preponderancy of 300 pounds. Here, then, the ſcale of weights muſt commence. The counterpoiſe weighs about 125 pounds. Therefore,

1. When the load hangs by the pin *b,* 14 inches from the centre, the diſtance from one hundred to ano­ther on the ſcale is about 11 inches, and the firſt ſcale (on the side of the arm) reaches from 300 to 1200. In order to repeat or continue this, the eke-weight E is hung on the pin *e,* and the counterpoiſe C is brought back to the mark 300 ; and the two together balance 1100 pounds hanging at *b.* Therefore a ſecond ſcale is begun on the side of the arm, and continued as far out as the firſt, and therefore its extremity marks 2000 ; that is, the counterpoiſe C at 2000 and the eke-weight E at *e* balance 2000 hanging at *b.*

2. To continue the ſcale beyond 2000, the load muſt be hung on the inner pin *c.* The eke-weight E is taken off, and the eke weight D is hung on its pin *d.* The general counterpoiſe being now brought cloſe to the ſheers, it, together with the weight D at *d,* ba­lance 2000 pounds hanging at *c.* A ſcale is therefore begun on one of the inclined planes a-top, and conti­nued out to 4000, which falls very near to the pin *d,* each hundred pounds occupying about five inches on the arm. To complete the ſcale, hang on the eke- weight E on its pin *e,* and bring back the counterpoiſe to the ſheers, and the three together balance 3800 hanging at *c.* Therefore when the counterpoiſe is now ſlid out to 4000, it muſt complete the balance with 5800 hanging at c.

It required a little consideration to find out what proportion of the three weights C, D, and E, would make the repetitious of the ſcale extend as far as poſ­ſible, having very little of it expreſſed twice, or upon two ſcales, as is the caſe here. We ſee that the ſpace correſponding to a single pound is a very ſenſible quan­tity on both ſcales, being one-ninth or an inch on the firſt two ſcales, and one twentieth on the laſt two.

This very ponderous machine, with its massy weights, cannot be easily managed without ſome aſſiſtance from mechanics. It is extremely proper to have it ſuſceptible of motion out and in, that it may be protected from the weather, which would ſoon deſtroy it by rust. The contrivance here is very effectual, and abundantly simple.

When the steelyard is not in uſe, it is ſupported at one end by the iron-rod F, into which the upper end of the ſheers is hooked. The upper end of this rod has a ſtrong hook E, and a little below at *a* it is pierced, with a hole, in which is a very ſtrong bolt or pin of tempered steel, having a roller on each end cloſe to the rod on each fide. Theſe rollers rest on two joiſts, one of which is repreſented by M N, which traverſe the building, with juſt room enough between them to al­low the rod F to hang ſreely down. The other end O of the steelyard rests in the bight of a large flat hook at the end of a chain W, which hangs down between the joiſts, and is ſupported on them by a frame with rollers IT. This is connected with the rollers at G, which carry the ſheers by means of two iron-rods, of which one only can be ſeen. Theſe connect the two ſets of rollers in ſuch a manner that they muſt always move together, and keep their diſtance invariable, This motion is produced by means of an endleſs rope HI ZLKVH paſſing over the pulleys I and K, which turn between the joiſts, and hanging down in a bight be­tween them. It is evident that by pulling on the part LZ we pull the frame of rollers in the direction GH, and thus bring the whole into the houſe in the position marked by the dotted figure. It is alſo plain, that by pulling on the part LK we force the roller frame and the whole apparatus out again.

It remains to ſhow how the load is raiſed from the ground and weighed. When the steelyard 13 run out for uſe, the upper hook E juſt enters into the ring D, which hangs from the end of the great oaken lever BCA about 22 feet long, turning on gudgeons at G about 5 feet from this end. From the other end A deſcends a long iron-rod SR, which has one side formed into a toothed rack that is acted on by a frame of wheel-work turned by an endleſs ſcrew and winch Therefore when the hook E is well engaged in the ring D, a man turns the winch, and thus brings down the end A of the great lever, and raiſes the load two or three inches from the ground. Every thing is now at liberty, and the weigher now manages his weights on the arm of the steelyard till he has made an equilibrium.

We need not deſcribe the operation of letting down the load, diſengaging the steelyard from the great lever, and bringing it again under cover. The whole of this ſervice is performed by two men, and may be done in ſucceſſion by one, and is over in five or six minutes.

The moſt compendious and economical machine of this kind that we have ſeen is one, firſt uſed (we have heard) for weighing the riders of race-horſes, and af­