

together, by sewing or stitching, lapping or interlacing them with thread, or small rope, made of hemp, flax, or other fit materials, or with brass or iron wire, in such manner as to prevent their separating from each other, and so as to cause them to exhibit, as nearly as possible, a flat form, or flat pliable rope.

The method to be taken, of sewing or stitching these ropes together, may be effected by various ways; but the annexed plans of a machine, for the above purpose, will be found useful and expeditious; wherein Fig. 1. (Plate XIX.) shews the plat-form, or ground plan; Fig. 2. a side view; and Fig. 3. a front view, of this machine. Take six, or any other plural number of ropes, *S*, (which should be each of the circumference of about three inches,) of a length and number sufficient for the depth and weight they are intended to lift; and, with the assistance of a man at the small end of the long lever *L*, and the sliding rod *m*, which commands the instrument *o*, pierce a round hole through the middle or centre of all the ropes, in a sloping direction, with an instrument or needle about five-sixteenths of an inch in diameter, if you sew with rope or thread; if with wire, a smaller hole will be sufficient. Then draw back again, by the assistance of the said lever *L*, the piercing instrument *o*, and immediately draw the small rope, thread, or wire *v* (which

(which may be cut into lengths of eight or ten yards each) tight through the said hole. Then, with the assistance of the lever *K*, and the chain *p p*, that works over the roller *a* and round the sheave *q*, draw the ropes the length of half a fitch through the side rollers *f, f, f, f*, (which are intended to squeeze the ropes very close sidewise together,) and the upper and lower rollers *g, g*, (which are intended to hold the ropes at even or equal height,) and then, by the moving of the lever *R*, another hole will be pierced in the opposite side of the ropes, through which hole the said small rope, thread, or wire *v*, must be tight drawn. The first pair of rollers *f, f*, are fixed a little wider than the second pair, to give a more easy and gradual squeeze to the ropes sidewise, observing that the lever *K* must again draw up the rope half a fitch farther, when the lever *L* will again be moved, to take another fitch, and so on until the rope is finished, (as described by *r*,) from one end to the other; taking care to put a knot upon the small rope, thread, or wire, at the ends, when you begin each length. The instrument *k*, which fixes upon the rope by screws, is drawn along by the lever *K* until it reaches the sheave *q*; then it is unscrewed, and moved forward again, and fixed near the rollers *t, t*, as often as occasion requires. The rollers *t, t*, (shewn only in Fig. 2,) through which the rope is drawn after

it is sewed or stitched, are intended to flatten the rope, and prepare it the better for use. The rollers O, O, support the small end of the long levers L and R; and the frame of wood N N N is fixed for the rollers to move upon. One pair of the side rollers *f, f*, that squeeze the ropes together, as well as the frame CC, in which they are placed, is fixed in the frame *d d*: the other pair, with the frame *c c*, (in which they work,) is moveable, to accommodate ropes of fundry breadths; and the iron *b b*, which is screwed at both ends, regulates the moving side-rollers and their frame *c c*. The upper and lower squeezing rollers *g, g*, as well as the frame *b b*, in which they are placed, require a variety of sizes of them, to suit the fundry breadths of flat ropes that may be wanted, and require also to be held steady sidewise, by means of the small chain and rectifying screws *w, w*, to prevent the rollers *f, f*, and *g, g*, from touching each other: these rectifying screws and chain *w, w*, are shewn only on the platform. Fig. 1, as to shew them also on the end and side view would only serve to confuse the drawing. The rectifying screws *i, i*, and *u, u*, are to fix the frame, which contains the upper and lower squeezing rollers, at proper widths, to accommodate ropes of different thickneses. The collar and screw *e*, which goes round the squeezing frame *c c*, is intended to draw and hold the
 frame

frame *c c* close together, at the point near where the piercing takes place; and, in the part of the frame *b b*, over and beneath where the piercing needle or instrument goes through, a little hollow must be made, otherwise the hole so pierced will close up, before the small rope, thread, or wire, can be got through. *l, l, l, l*, are thimbles, with rectifying screws, which move occasionally, to suit the sundry breadths of ropes, and guide the sliding instruments *m* and *n*; and there is a double chain fixed to the working head of the long levers *R* and *L*, one of which chains is to send the instrument forward, and the other to draw it back again. The small holes, marked \square on the back frame *NNN*, are for fixing regulating stops for the long levers *R* and *L*. Fig. 6. shews a contrary view of the sliding instruments *m* and *n*, and also of the aforefaid double chain. By this mode of sewing or stitching, the thread, small rope, or wire, goes through the middle or centre of the rope, and, by taking the stitches very short, is not much exposed to wear. The corresponding capital letters in the plat-form, side, and end view, in the annexed plans, will sufficiently shew and explain the mode of fixing up the wooden frame, to which the squeezing rollers and apparatus are annexed. If the rope is proposed to be sewed or stitched with thread or small rope, it will be well to have it laid softer than ordinary by the rope-maker, and to fix a needle to the work-
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ing end of the thread or small rope used for the sewing, to guide it the better and more expeditiously through the hole of the rope, after it is pierced. To lap or interlace a rope (as distinguishable from sewing or stitching) with thread or small rope, or with brass or iron wire, may be done by the hand, without any apparatus, excepting only that it would be well to draw it through a pair of rollers, after the lapping or interlacing is done, to flatten it for use. A view of Fig. 4, which shews the plat-form, and of Fig. 5, which shews an end view, will sufficiently explain the method of thus lapping or interlacing. By this mode, the small rope, thread, or wire, is exposed upon the outside of the rope, and of course is more liable to wear, which seems to give a preference to the former explained method of sewing or stitching. Having fully explained the nature of the new invention of manufacturing a flat rope, it will be proper to observe, that when it is applied to use, it must lap upon itself, in a niche or groove, that must be fixed upon the rope-wheel of the machine which draws the coals, or other minerals, or water, out of the pits or mines; and, by such application, a great advantage will be obtained in the powers to be applied for lifting the minerals, as a counter-balance will be thereby procured, which, in deep shafts, is of considerable importance. In witness whereof, &c.

