E. G. LAMSON.

Stone Channelling Machine.

110376

Fig. 9.

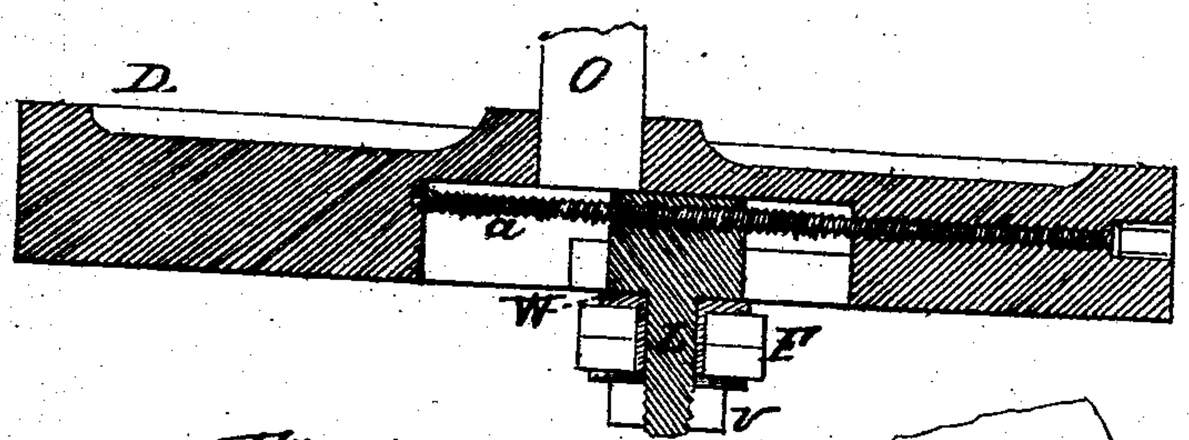

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Fig. 10

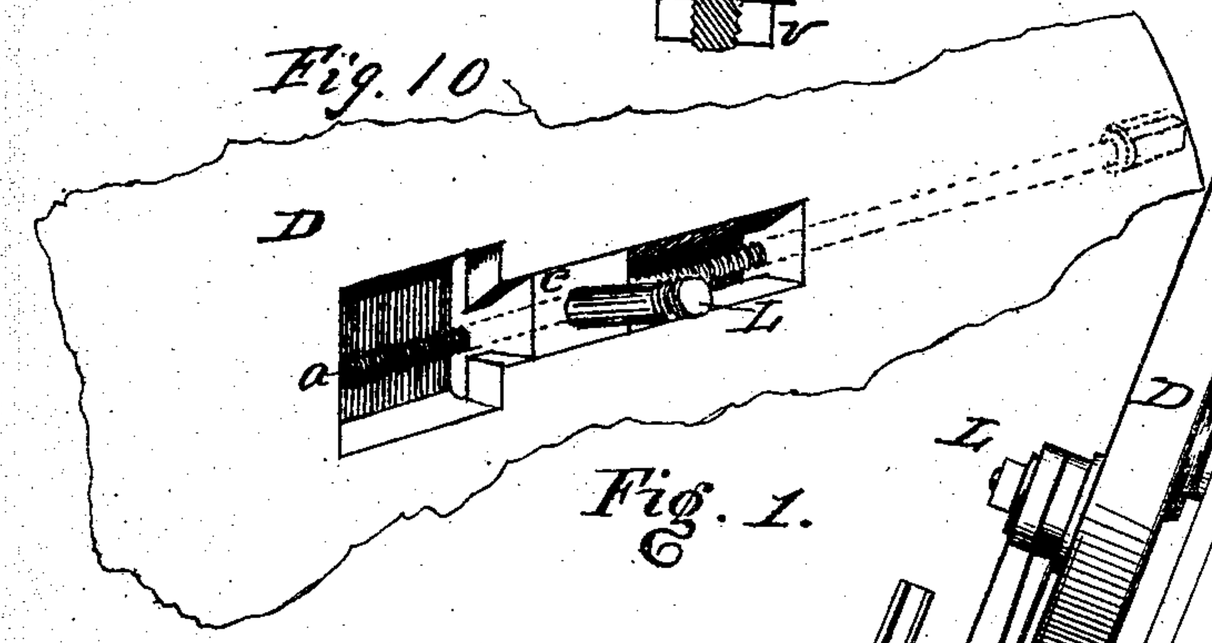

Fig. 1.

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Fig. 3.

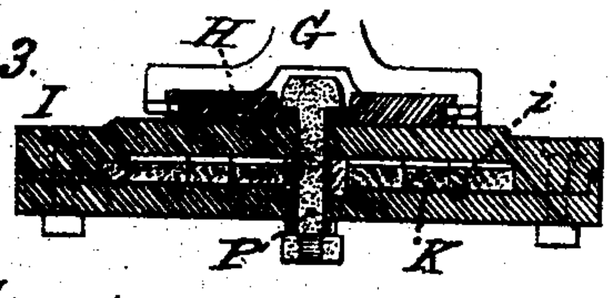


Fig. 4.

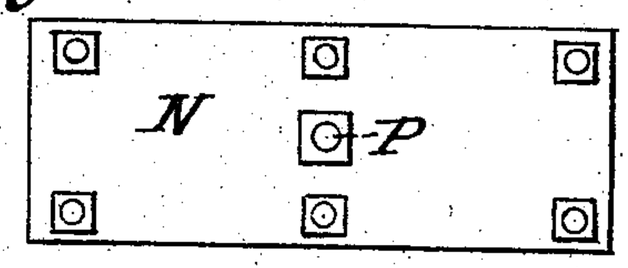


Fig. 5.

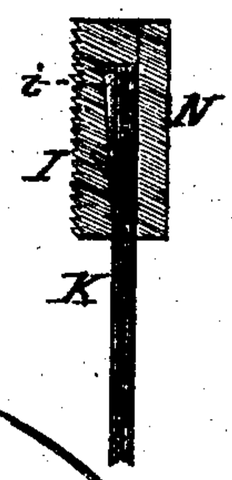


Fig. 6.

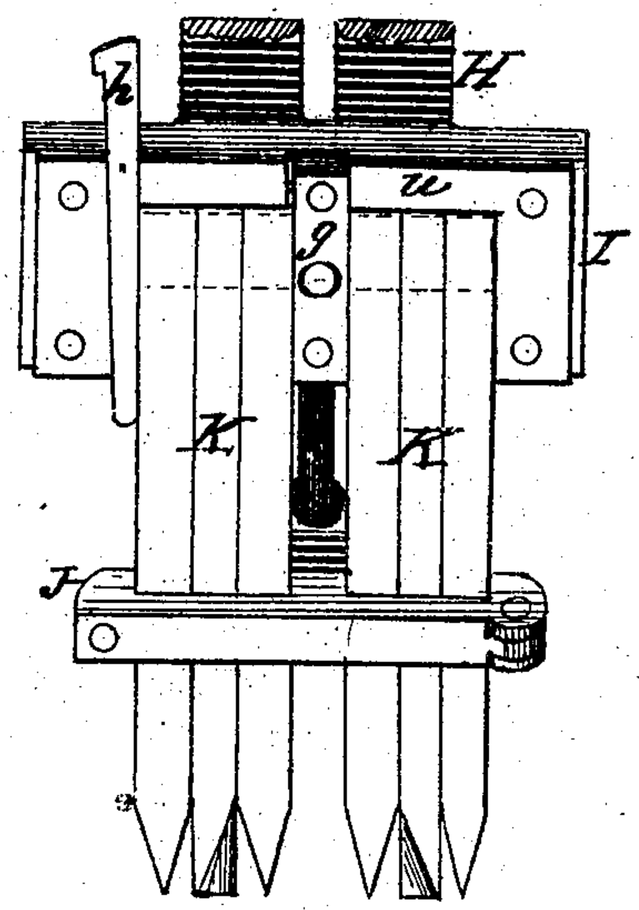


Fig. 2.

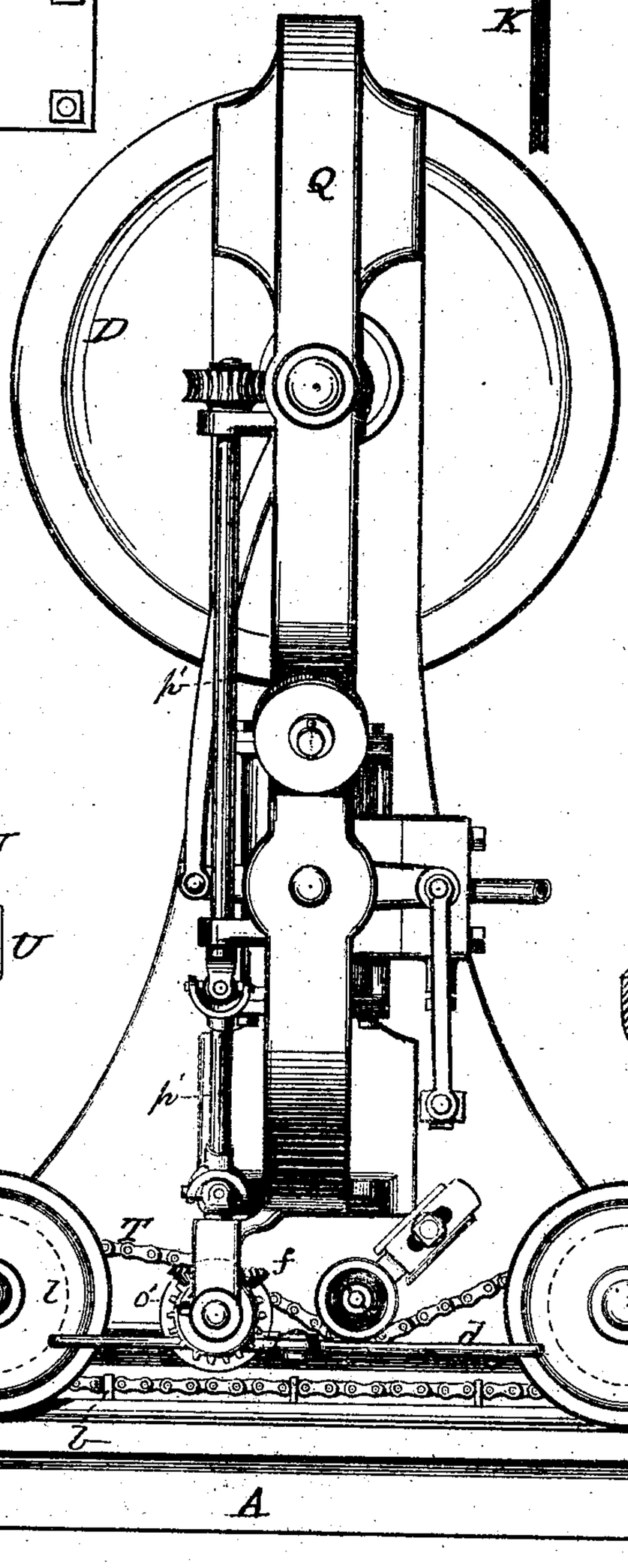


Fig. 7.

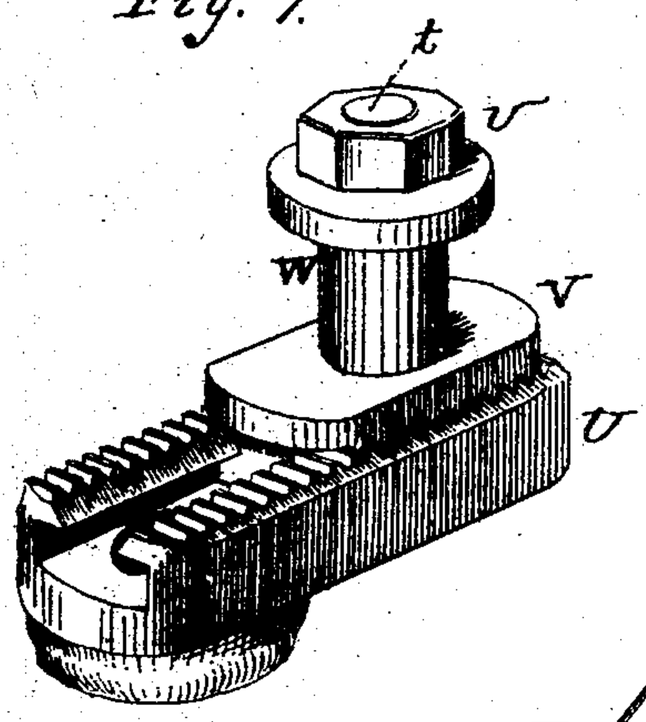
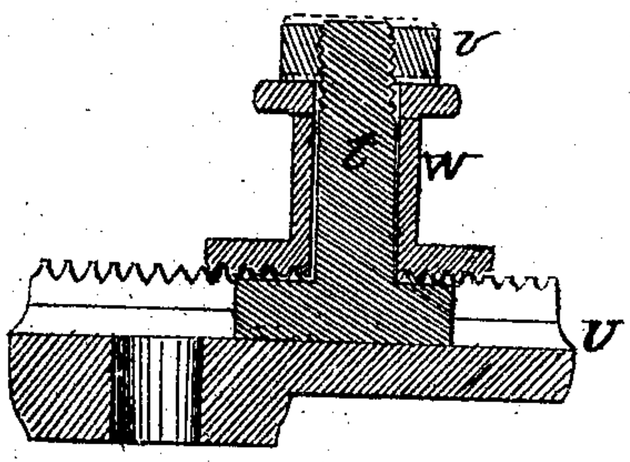


Fig. 8.



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United States Patent Office.

EBENEZER G. LAMSON, OF WINDSOR, VERMONT.

Letters Patent No. 110,376, dated December 20, 1870.

IMPROVEMENT IN STONE-CHANNELING MACHINES.

The Schedule referred to in these Letters Patent and making part of the same.

To all whom it may concern:

Be it known that I, EBENEZER G. LAMSON, of Windsor, in the county of Windsor and State of Vermont, have invented certain Improvements in Stone-Channeling Machines, of which the following is a specification, reference being had to the accompanying drawing.

My invention relates to machines for channeling or cutting stone in quarries; and

The invention consists in certain improvements in the mechanism, the various details of which are hereinafter more fully explained.

Figure 1 represents a side elevation of my improved machine ready for operation;

Figure 2 is a rear elevation of the same with a portion of the supporting and guiding-frame removed; and

Figures 3, 4, 5, 6, 7, 8, 9, and 10, represent portions of the same, shown more in detail, for the purpose of more fully illustrating their construction.

The general character of this machine, and the manner of supporting and operating it, is the same as that described in the application filed by F. C. Treadwell and myself jointly, and consists, in general terms, of a frame carrying an operating engine and cutters or chisels, which is mounted on a track that is supported in an upright or inclined position on the rock, and along which track the engine propels the machine as it operates to cut a channel or groove, the peculiar character and features of which are more especially described in the application hereinbefore alluded to, and to which reference is made for a more detailed description thereof.

In this machine the invention has reference more especially to the manner of holding, adjusting, and operating the cutters or chisels; in means for adjusting the crank or wrist-pin for varying or regulating the length of the stroke; and in the method or means of feeding the machine to and fro along the track.

The construction of the track, and the manner of constructing and mounting the machine thereon, having been fully described in the joint application to which previous reference has been already made, I will now proceed to point out the special features of the various improvements embodied in this machine.

It has generally been customary in machines of this kind to mount the cutter-bar to which the cutters are attached by clamps so as to run upon guide-bars secured to the standard or upright part of the frame. In this machine I dispense with these guide-bars entirely, and instead I run the cutter-bar H between four stationary guides, G, which project from the front side of the upright frame, these guides being arranged in pairs, two above and two below, as shown in side elevation in fig. 1, each pair of guides being secured to or forming projecting arms of a single bracket, as shown in fig. 3, the edges of the cutter-bar H sliding in grooves cut for it in the inner sides of these arms; or, if preferred, the grooves may be formed in the edges of the cutter-bar, the brackets having corresponding projections to fit therein.

The drills or cutters K are secured to the cutter-bar H in the following manner:

I provide a clamp, which consists of a plate, I, and a face-plate, N, held together by bolts and nuts.

The plate I has its face recessed to receive the upper end of the cutters, as shown in fig. 6, there being a portion of the metal left above and on each side of the recess in which the drills are set, the strip *u* across the upper edge of the plate I serving as an abutment against which the upper ends of the cutters rest to prevent them from sliding up, and the strips on the sides serving to hold the cutters together sidewise, and between which they are held tightly by a wedge, *h*, inserted from above and along side of the cutters, as shown in fig. 6.

To prevent the cutters from being pulled out of the clamp, the recess in the plate I is made inclined, that is, it is made deeper at the upper than at the lower edge, as shown in section in fig. 5; and in this space, on the rear side of the cutters, I place a series of wedges, *i*, one for each cutter, these wedges having their face next to the cutters serrated, so that they will take hold on the cutter and be drawn down along with the latter in case they tend to pull out.

It will thus be seen that if the cutters start to work out they will only be wedged the tighter by means of the wedges *i* being drawn down into the narrower space toward the bottom of the clamp. In this way the cutters are made self-tightening downward, and, as they are prevented from working up by the ledge *u* at their upper end, they are held very securely in place.

To enable the operator to adjust the cutters with greater facility than has heretofore been possible, I secure this clamp that holds the cutters to the cutter-bar H by means of a bolt, P, which passes through a hole in the center of the clamp and through a slot in the cutter-bar, this slot extending lengthwise nearly the whole length of the bar H, along its center, as shown in fig. 6, and in section in fig. 3.

The front face of the cutter-bar H is provided with transverse grooves or serrations, and the rear face of the plate I of the clamp is provided with similar and corresponding serrations, so that when the clamp and the cutter-bar are drawn together by means of the bolt P the teeth or serrations of the two interlock, and thus firmly unite the clamp and cutter-bar.

In order to guide the cutters and prevent them from springing apart laterally I secure to the lower

end of the cutter-bar, permanently, a guide, J, which consists simply of a bar arranged transversely across the foot of the cutter-bar, and having in its face recesses in which the cutters slide freely as they are raised or lowered by adjusting the clamp.

If desired, a bar may be secured to this guide J, across the front face of the cutters; but in practice I do not find this necessary.

In order to get room for the central bolt P the cutters K are arranged in two sets, with a space between them, as represented in fig. 6, and this space is filled in the clamp by a loose bar or block, *g*, which has holes for the passage of the bolt P and also the clamping-bolts at the center of the clamp lengthwise, these holes being made larger than the body of the bolts, so that the block *g* may be moved sidewise, and thus permit the single wedge *h* to wedge all the drills firmly against the ledge on the opposite side of the clamp.

It is obvious that by using another wedge on the other side this central block *g* may be made stationary, but I prefen the foregoing plan, for the reason that it permits the cutters to be secured firmly against the solid ledge on the side and across the top of plate I, whereby they are held more accurately in line with the cutter-bar, and are less liable to work loose.

By this method of constructing the cutter-bar and clamp it will be seen that the cutters can be adjusted by simply loosening the nut on the single bolt P and letting the clamp with the cutters drop down, or by raising them up, as may be desired, and then tightening up the bolt again. This can be done in a very brief space of time, and as the cutters have to be adjusted as often as they have cut three or four inches in depth, and as these machines are intended to cut grooves from four to seven feet deep, this facility of adjustment becomes very important.

In machines for cutting channels in stone of this character it is very necessary to have some means of adjusting the stroke of the cutters or chisels; that it to say, to give a harder or lighter stroke, according to the quality and texture of the stone which is to be cut. In my former patents I have shown an adjustable crank or wrist-pin for this purpose, but I have now devised a means of accomplishing this change or adjustment, which I find to be superior to my previous inventions for that purpose.

The adjustable crank is shown in perspective in fig. 7, and in section in fig. 8.

The body of the crank U has a T-shaped groove formed longitudinally in it, as shown in fig. 7, and the outer face of the crank is serrated transversely.

A bolt, *t*, is formed with a rectangular head, to fit and slide in the groove of the crank, and over this bolt is fitted a sleeve, W, which has at its base a flat plate or projecting flange, the under side of which is serrated to correspond with the serrations on the face of the crank U, as represented in figs. 7 and 8.

The head of the bolt *t* being inserted in the groove of the crank, the sleeve W is slipped on, the bolt and sleeve moved to the required position on the crank, where it is secured by means of a nut, *v*, screwed onto the outer end of the bolt, thus locking the parts firmly together. By this means the length of the stroke can be varied at will, and the adjustment, like that of the cutters, can be made by loosening a single nut, and in a very brief space of time.

Where the wrist-pin is attached directly to the balance-wheel, as is sometimes desirable, and as is represented in fig. 1, I modify the plan or means of adjustment, as shown in figs. 9 and 10.

In fig. 10, which is a perspective view of a portion of the wheel D, there is represented a rectangular recess cut into the face of the wheel, at or near the center, from which there extends a slot or groove radially, this groove being cut under on each side so as to make it T-shaped, the head or wider portion equal in width to the recess, as shown in fig. 9, the outer sides of the slot being inclined, as shown.

A crank-pin, L, having a body, *c*, corresponding in size and form with the slot, and having flanges on its sides to engage in the under-cut portions of the groove, is inserted in the recess and slid along into the slot.

A collar, W, is then slipped over the protruding stem of the pin, and on this collar the elastic pitman is pivoted, a nut being screwed onto the end of the pin against the outer end of the collar, which presses the inner end of the collar against the face of the wheel, on each side of the slot, and at the same time drawing the flanged head of the wrist-pin tight against the under side of the projecting lips of the groove, and thereby locking the wrist-pin firmly in place.

As a means of adjusting the wrist-pin, and to assist in holding it from slipping in the slot, I place a screw-rod in the slot in such a position that it passes through the head of the wrist-pin or bolt, the ends of this screw-rod having bearings in the wheel D.

By loosening the nut on the end of the wrist-pin and turning this screw, the wrist-pin can be moved to or from the center of the wheel, and thus the stroke can be lengthened or shortened at will.

For the purpose of feeding the machine along on the track I secure on the side of each of the bearing-wheels V a grooved wheel, *l*, around which passes a sprocket-chain, T, as shown in fig. 2.

This chain also passes over and engages with a sprocket-wheel, *o'*, located between the bearing-wheels, which sprocket-wheel carries on its side a bevel-gear wheel, *e'*, to which motion is imparted by a bevel-wheel, *f*, mounted on the lower end of a rod, *p'*, which is driven by connection with the main shaft O of the engine, as shown in fig. I.

On the same shaft with the wheel *e'* is mounted another wheel, *e*, (see fig. 2,) and a sliding clutch, *c*, on the shaft, serves to engage the shaft with either of the wheels *e* or *e'*, and thus to turn the sprocket-wheel and the chain T in one or the other direction at will.

On the lower rail A of the truck or frame is located, at suitable intervals, a series of forked studs, *b*, so arranged that the chain T will engage in them, and thus, as the chain is moved, it takes hold on these spurs, and thus feeds the machine along.

At each end of the rail is located a stud or pin, R, as shown in fig. 2, and the fork that moves the clutch *c* is secured to a lever, *d*, which is pivoted at its center, and so arranged that, as the machine approaches the end of the track, the lever will strike against the stud R, and thus automatically change the clutch and reverse the feed, thus causing the machine to reverse its movement and travel in the opposite direction.

By these means the machine can be kept traveling back and forth the length of the track, without stopping the operation of the cutters, until it becomes necessary to adjust the cutters, which as previously explained, can be done in a very brief period.

By these various improvements I am able to produce a very superior machine; one that is much lighter than those generally used, that can be adjusted in much less time, and in which the stroke can be readily varied, as desired, and the cutters let down to the extreme lower end of the cutter-bar, thereby cutting to a much greater depth with the same length of cutters than any similar machine heretofore made.

It should be observed that the adjustable crank and the manner of mounting the cutter-bar, and of securing the cutters to the clamp, and also the adjusting of the cutters on the cutter-bar, are all equally applicable to the various machines heretofore patented to me, as well as other machines of this character.

Having thus fully described my invention,

What I claim is—

1. A clamp for holding the chisels or drills of a stone-channeling machine, consisting of the recessed plate I, provided with the side and top ledges *u*, and the plate N, united to its face by bolts, thus forming a socket in which all the chisels or drills have a solid bearing on their ends and sides, substantially as described.

2. In combination with a clamp constructed as herein described, the serrated wedges *i*, arranged to lock the chisels in the clamp, as set forth.

3. The slotted cutter-bar H, provided with serrations on its face, in combination with a clamp provided with corresponding serrations, the said bar and clamp being united by a bolt, substantially as described.

4. The adjustable crank, consisting of the slotted arm U, crank-pin *t*, and collar W, all constructed and operating substantially as described.

5. The chain T, arranged on the machine in such a manner that, when motion is imparted to said chain by the operating mechanism, it shall engage with the studs *b* or equivalent devices attached to the supporting rail or frame, for the purpose of feeding the machine along, substantially as described.

6. The stationary guide J, secured to the lower end of the cutter-bar for holding and guiding the cutters, substantially as described.

7. In combination with the stops R, or their equivalents, the pivoted lever *d*, connected to the clutch *c*, for automatically shifting the feed-works and reversing the motion or travel of the machine, substantially as described.

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Witnesses:
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L. W. HAWLEY.