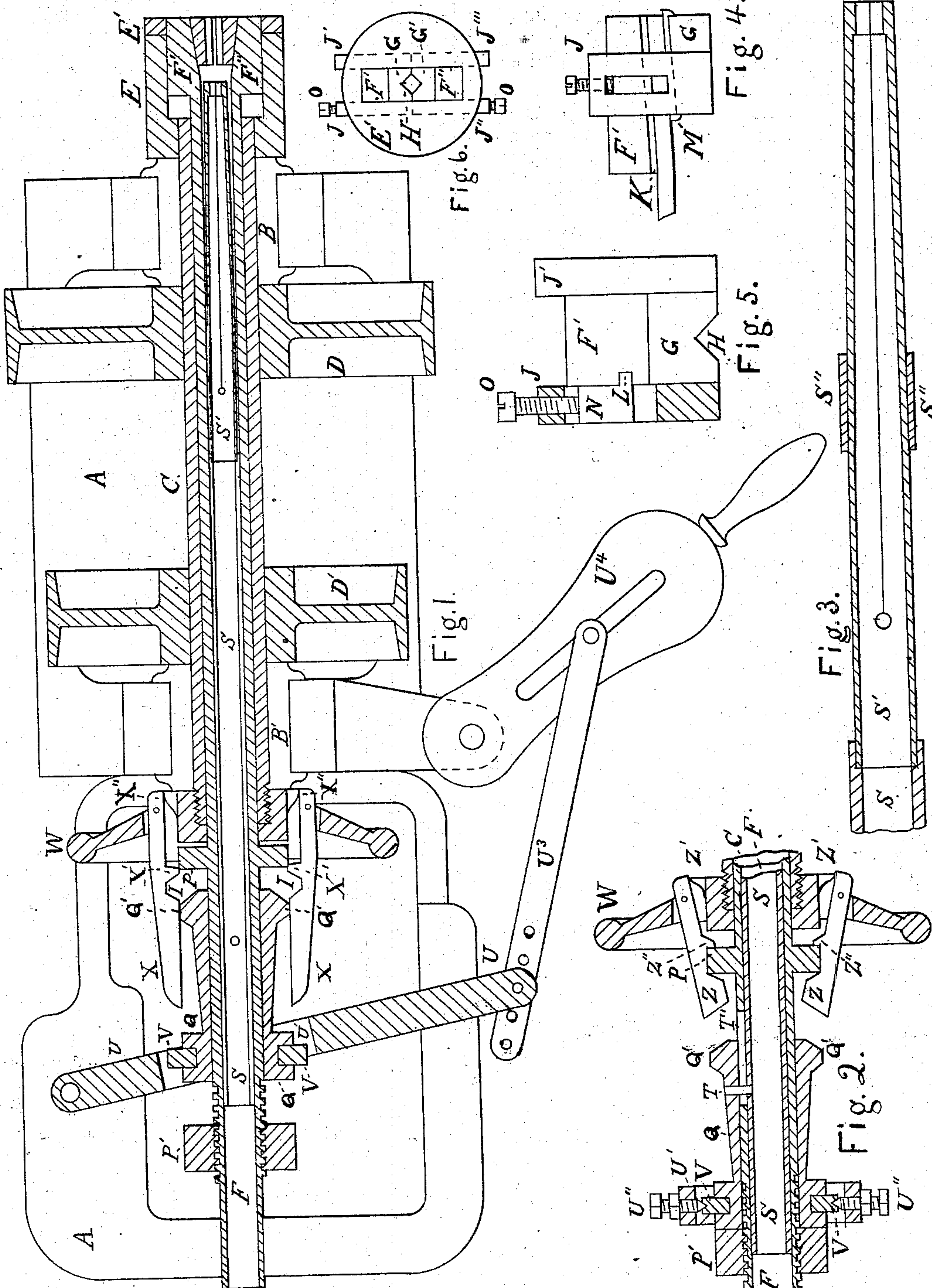


SCREW CUTTING MACHINE.

No. 284,501.

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UNITED STATES PATENT OFFICE.

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SCREW-CUTTING MACHINE.

SPECIFICATION forming part of Letters Patent No. 284,501, dated September 4, 1883.

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To all whom it may concern:

Be it known that I, SAMUEL C. SMITH, of Lowell, in the county of Middlesex and Commonwealth of Massachusetts, have invented certain new and useful Improvements in Machines for Cutting Screws, of which the following is a specification.

My invention consists in the combination of the jaw, a pin, and means for connecting the same to said jaw, and for varying the distance between the same and the gripping-face of said jaw, and the wedge provided with a groove to allow of the jaw being separated from the wedge by a pad of suitable thickness, so as to take in smaller rods; also, in the combination of the jaw provided with a slotted arm, the sliding piece provided with a pin, and the wedge provided with a groove and a screw, that being the specific means of adjusting the distance between said jaw and wedge; also, in the combination of the jaws, the sleeve provided with the groove, the saddles, and the lever, and the tube provided with the collar, and wedges to close the jaws upon the rod; also, in the combination of the split shell and the sliding ring, to regulate the grasping pressure of said shell; also, in the combination of the coupling-pin, the split shell, the sleeve, and the tube provided with a slot, to enable the shell to be moved back and forth within the tube by the motion of the sleeve; also, in the combination of the adjustable collar, the shell, the coupling-pin, and the sleeve, to regulate the amount of the feed motion; also, in the combination of the spring-catch lever, Figure 1, the tube provided with the collar and wedges, and the jaws, to prevent the jaws from being opened while the screw is being cut; also, in the combination of the spring-catch lever, Fig. 2, the tube provided with the collar and wedges, and the jaws, to prevent said jaws being closed by the friction of the sleeve and shell on said tube; also, in the combination of the sleeve provided with an annular projection beveled in the rear, the catch-lever, Fig. 1, provided with a notch, and the tube provided with a collar, to release said collar from said lever; also, in the combination of the sleeve provided with the annular projection beveled in front, the catch-lever, Fig. 2, and the tube provided with the collar, to re-

lease said collar from said last-named lever; also, in the combination of the catch-lever, Fig. 1, means for supporting and adjusting the same longitudinally, and the tube provided with the collar, to adapt the position of said lever to the position of said collar while the screw is being cut, the position of said collar depending on the thickness of said rod; also, in the combination of the wheel provided with a female screw-thread, the spindle provided with a male screw-thread, the catch-lever, Fig. 1, pivoted to said wheel, and the tube provided with the collar, that being the specific means of adjusting the position of said lever to the position of said collar; also, in the combination of the tube provided with the collar, the catch-lever, Fig. 2, and means for supporting and adjusting the same longitudinally to hold the collar back at different points; also, in the combination of the wheel provided with the female screw-thread, the spindle provided with the male screw-thread, the catch-lever, Fig. 2, pivoted to said wheel, and the tube provided with the collar, that being the specific means of adjusting said lever longitudinally to hold said collar back at different points.

In the accompanying drawings, Fig. 1 is a horizontal central section of the pulleys, spindle, tube, sleeve, shell, adjustable collar, hand-wheel, chuck-case, wedges, and jaws, showing also one pair of catch-levers and the frame of the machine. Fig. 2 is a vertical central section of the rear part of the spindle, sleeve, tube, shell, adjustable collar, and hand-wheel, showing also the other pair of catch-levers. Fig. 3 is a longitudinal section of a part of the split shell and sliding ring. Fig. 4 is a side view of the jaw and wedge with a pad between them. Fig. 5 is a larger front-view of the jaw (one arm of the jaw being in section) and wedge, also the piece which carries the pin to hold the jaw against the wedge. Fig. 6 is a front view of the chuck-case with the jaws. In the first four figures the front end is the light end.

Upon a suitable frame, A, are journal-boxes B B', in which runs the hollow spindle C, caused to revolve at different speeds by belts applied to the large pulley D or small pulley D', and prevented from moving endwise by

the position of the pulleys between the boxes, or by other suitable means. The spindle C carries a chuck-case, E, at its front end.

Within the spindle C slides the tube F, provided with two wedges, F' F'', or inclined planes, which have a parallel longitudinal motion in slots formed in the case E, the inner faces of said wedges being inclined outward and forward.

Between the wedges are two jaws, G G', whose inner faces are parallel, their outer faces having the same inclination as the inner faces of the wedges, so that the forward motion of the wedges closes the jaws together. Each jaw has on its inner face a longitudinal V-shaped groove, H, to grasp the square rod from which the screws are made, and also a pair of arms, J J' J'' J''', (one on each side of each jaw,) which extend outward through the case E, on opposite sides of the wedge nearest said jaw and parallel to the face of the chuck-case E. Now, each wedge has a groove, K, cut in one side parallel to its inclined face, into which groove K enters a pin, L, from the arm J of the jaw next said wedge, so that when the tube F is retracted, carrying the wedges back, the jaws will be drawn apart and loosen their hold on the rod from which the screws are being made, so that if the tube F be caused to reciprocate in the direction of its length the jaws will alternately open and close upon the stock, the jaws being prevented from moving forward by the face of the chuck E', screwed to the case E, and from moving backward by the arms J in the case E. The jaws, when nearest together, do not necessarily touch each other, so that to enable the jaws to grasp a smaller rod pads with parallel faces and of the requisite thickness may be placed between the wedges and the jaws, the ends of the pads being turned down over the ends of the jaws, to prevent the pads from sliding on the jaws, as in Fig. 4, in which M represents such a pad; or the pads may be prevented from moving by having ears which enter the slots in the arms J.

In order that the wedges and jaws may be separated by pads, it is necessary that the pins L should be adjustable on the arms J. This is effected by attaching the pins L to pieces N, which slide in slots cut lengthwise in or through said arms J, so that the pins L project into the grooves of the wedges. The pins L are held at the proper distance from the jaws G G' by screws O in the ends of the arms J, which screws thrust upon the pins or the pieces to which said pins are attached. The tube F is given a forward motion in the following manner: The rear of the tube extends back of the spindle, (having a bearing in the frame A,) and said tube, back of the spindle C, is provided with a collar, P, (forged in one piece with or otherwise firmly secured to said tube,) and still farther back with a screw-thread, upon which is screwed the nut or adjustable collar P'.

Upon the tube F, between the two collars

P and P', is placed the sleeve Q, which, being moved endwise, moves the tube forward and back by striking said collars. It will be seen that the distance to which the sleeve slides on the tube may be varied by turning said adjustable collar P'.

Inside of the tube F is a hollow shell, S S', which may be made in two parts screwed together, the front part, S', being smaller and made of steel, and bushed or thickened within at its front end, and then split nearly its whole length. The part S' is small enough to allow the ring S'' (the inner diameter of which is smaller than the outer diameter of said part S') to pass freely between it and the tube F. The split shell is intended to grasp the rod or bar from which the screws are cut, and its grasping pressure is increased or diminished by sliding the ring S'' back or forward on said shell S S' by hand, the sleeve being removed for that purpose. The shell is connected to the sleeve (and therefore moves with the sleeve) by means of the pin T, which passes through a longitudinal slot, T', in the tube F.

It will be seen that (if the jaws be closed, holding the rod) the sleeve can be pushed back with the shell, the shell slipping on the rod, until the sleeve strikes the collar P' and opens the jaws, by drawing the tube F and wedges F' F'' back, and that, the sleeve being then shoved forward, the shell will carry the rod forward through the open jaws until the sleeve strikes the collar P and again closes the jaws; hence, by giving a reciprocating motion to the sleeve, the rod is fed forward by the forward motion of the sleeve, and is held by the jaws while the sleeve is going back.

From the foregoing it appears that the distance to which the sleeve and shell can be drawn back without opening the jaws, or, what amounts to the same thing, the distance which the rod will be advanced at the next forward motion of the sleeve, depends on the position of the adjustable collar P' on the tube F. Motion is given to the sleeve Q by a lever, U, pivoted to the frame, said lever being provided with a yoke or opening, U', through which the sleeve is passed. Pins U'' on opposite sides of the lever U enter saddles or half-rings V, which ride in grooves cut in the sleeve Q, allowing the sleeve to revolve within the yoke of the lever. This lever is connected by a rod, U³, to another lever, U⁴, also pivoted to the frame nearer to the front of the machine for the convenience of the operator. The rod U³ is provided with holes at one end, through any one of which it may be pivoted to the lever U, and at the other end is pivoted to the lever U⁴ by a pivot which slides in a slot in said lever U⁴, and may be set at any required distance from the fulcrum of said last-named lever by a set-nut.

In order that the tube F may not, by being jarred, move backward, and so loosen the jaws when the screws are being cut, a hand-

wheel, W, is screwed on the rear end of the spindle C, and to the hub of this wheel W are pivoted one or more catch-levers, X, Fig. 1, each provided with a detent, X', to catch over the collar when the jaws are closed on the rod, the rear end of each lever being thrown against the sleeve by a spring, X''.

In order that the collar may be released from these levers X, the sleeve Q is provided with an annular projection, Q', which fits into a notch, I, in each of said levers X, said projection Q' being beveled on its rear side, so that when the sleeve is drawn back the lever X is lifted until the detent X' rises above the collar P. The inner side of the rear end of each of said levers X is now parallel with the axis of the sleeve, and extends back so far that it rests on the projection Q' and prevents the detents from catching the collar P, no matter how far back the sleeve is drawn.

There are one or more other catch-levers, Z Z, also pivoted to the hub of the wheel W, and forced by springs Z' against the collar P. Each of these levers Z is provided with a catch, Z'', which drops in front of said collar, (after the jaws are opened, as above explained,) and prevents the tube F from being moved forward (and closing the jaws) by the friction of the sleeve and shell on said tube while the rod is being fed forward until the sleeve strikes the collar P. These levers are disengaged from said collar P by the projection Q' on the sleeve (said projection being beveled in front) striking between the rear ends of said levers and the tube F, said levers Z being also beveled on the inside at the rear.

The thickness of the rod operated upon determines the amount of opening between the closed jaws, so to speak, and therefore the distance to which the tube and its wedges can be crowded forward, so that on changing to heavier work it may be necessary to move back the levers X, in order that their detents may fall behind the collar P, instead of striking on the periphery of the same. On the other hand, on changing to lighter work, the detents of the levers X may fall too far behind the collar P, and allow so much play between said collar and said detents that the levers X would be ineffectual to prevent the opening of the jaws. So, also, the levers Z may be too far forward to prevent the jaws from closing on a thick rod before the rod has been fed forward sufficiently by the split shell. All this is provided for by having the hub of the wheel W (to which both kinds of catch-levers are pivoted) screw-threaded on the inside and screwed onto the spindle C, so that by turning said wheel on said spindle all of said catch-levers are carried forward or back to their proper places.

It is not intended that the collar should strike the hub of the wheel, but the collar is stopped by the resistance offered by the jaws to the forward motion of the wedges. This enables the jaws to hold the rod notwithstand-

ing slight variations in rods of nominally the same size. The collar P' and the wheel W, respectively, are prevented from accidental turning on their screws by set-screws, which enter them radially and thrust against screw-threaded saddles placed on the tube F and spindle C, respectively.

The rod is introduced to the machine through the rear end of the tube F and pushed forward until said rod projects in front of the open jaws, when the motion of the hand-lever will feed it forward, as may be required. When the spindle revolves, it carries with it the chuck-case containing the jaws and wedges, and therefore the tube and the sleeve and shell, connected with each other by the coupling-pin through a slot in the tube.

The tools for forming the screw are placed in a turret constructed as usual and operated in the usual manner.

I claim as my invention—

1. The combination of the jaw G, the pin L, and means for connecting the same to said jaw and for varying the distance between the same and the gripping-face of said jaw, and the wedge F', provided with a groove, K, as and for the purpose specified.

2. The combination of the jaw G, provided with a slotted arm, J, the sliding piece N, provided with a pin, L, and the wedge F', provided with a groove, K, and the screw O, as and for the purpose specified.

3. The combination of the jaws G G', the sleeve Q, provided with grooves, the saddles V, the lever U, and the tube F, provided with the collar P and wedges F' F'', as and for the purpose specified.

4. The combination of the split shell S S' and the sliding ring S'', as and for the purpose specified.

5. The combination of the coupling-pin T, the shell S S', the sleeve Q, and the tube F, provided with the slot T', as and for the purpose specified.

6. The combination of the adjustable collar P', the shell S S', the coupling-pin T, and the sleeve Q, as and for the purpose specified.

7. The combination of the spring catch-lever X, the tube F, provided with the collar P and wedges F' F'', and the jaws G G', as and for the purpose specified.

8. The combination of the spring catch-lever Z, the tube F, provided with the collar P and wedges F' F'', and the jaws G G', as and for the purpose specified.

9. The combination of the sleeve Q, provided with the annular projection Q', beveled in the rear, the catch-lever X, provided with the notch I, and the tube F, provided with the collar P, as and for the purpose specified.

10. The combination of the sleeve Q, provided with the annular projection Q', beveled in front, the catch-lever Z, and the tube F, provided with the collar P, as and for the purpose specified.

11. The combination of the catch-lever X,

means for supporting and adjusting the same longitudinally, and the tube F, provided with the collar P, as and for the purpose specified.

12. The combination of the wheel W, provided with a female screw-thread, the spindle C, provided with a male screw-thread, the catch-lever X, pivoted to said wheel, and the tube F, provided with the collar P, as and for the purpose specified.

13. The combination of the tube F, provided with the collar P, and the catch-lever Z, means for supporting and adjusting the same longitudinally, as and for the purpose specified.

14. The combination of the wheel W, provided with a female screw-thread, the spindle C, provided with a male screw-thread, the catch-lever Z, pivoted to said wheel, and the tube F, provided with the collar P, as and for the purpose specified.

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