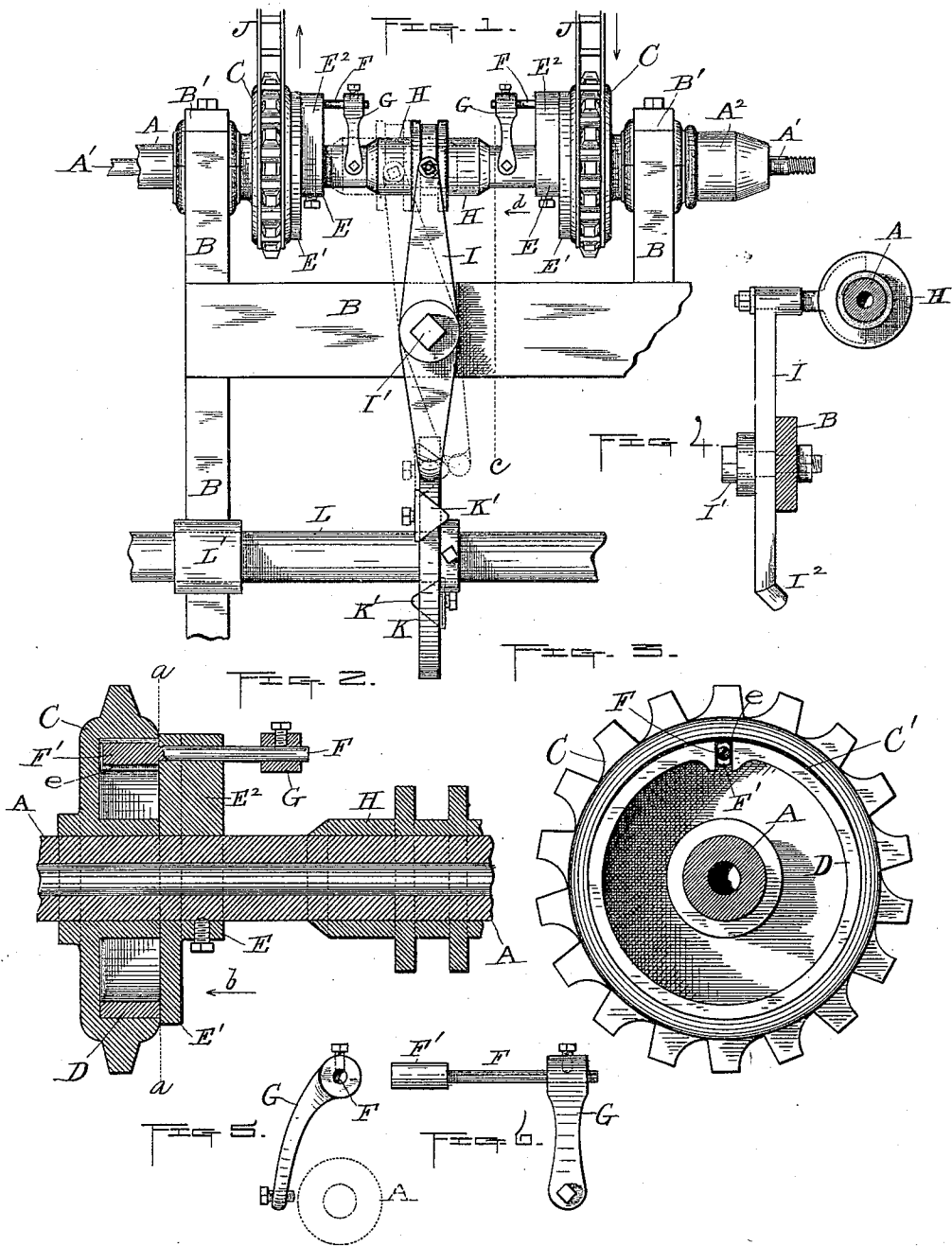


(No Model.)

F. CURTIS, Jr.
FRICTION CLUTCH FOR SCREW MACHINES.

No. 466,224.

Patented Dec. 29, 1891.



Witnesses,
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UNITED STATES PATENT OFFICE.

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FRICION-CLUTCH FOR SCREW-MACHINES.

SPECIFICATION forming part of Letters Patent No. 466,224, dated December 29, 1891.

Application filed July 2, 1891. Serial No. 398,245. (No model.)

To all whom it may concern:

Be it known that I, FRANK CURTIS, JR., of the city and county of Worcester, and State of Massachusetts, have invented certain new and useful Improvements in Friction-Clutches for Screw-Machines; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, forming a part of this specification, and in which—

Figure 1 represents a side view of so much of a screw-machine as is necessary to illustrate my invention applied thereto. Fig. 2 is a central longitudinal section, upon an enlarged scale, of part of the usual hollow "live-spindle" of the machine, also showing a vertical section of one of my improved friction sprocket-wheels, the cam-spindle for operating its friction-ring, and part of the shipper-cone, as will be hereinafter more fully specified. Fig. 3 is a transverse section through said live-spindle and friction-ring spindle, taken at the point indicated by line *a a*, Fig. 2, looking in the direction of arrow *b*, showing also a side view of my said improved friction sprocket-wheel and its ring. Fig. 4 is a transverse section upon the same scale as Fig. 1, taken on line *c* of said figure, looking in the direction of arrow *d*, showing a side view of the shipper-lever with its fork connected with the shipper-cone on the main spindle; and Figs. 5 and 6 are detached side and front views, respectively, upon the same scale as Figs. 2 and 3 of the cam-lever and friction-ring spindle, for opening and closing said friction-ring, as hereinafter described.

My invention relates to the drive and feed mechanism of the main or stock-holding spindle of a screw-machine; and it consists of two combined sprocket-wheels and friction-clutches mounted on said spindle, each provided with a sprocket-chain for driving the same in place of the usual smooth pulleys and leather belts, and having a shipping device interposed between the same for automatically changing the feed at regular intervals, as will be hereinafter more fully set forth.

To enable others skilled in the art to which my invention appertains to better understand

the nature and purpose thereof, I will now proceed to describe it more in detail.

In the drawings, A represents what is commonly termed the "live-spindle," or spindle which holds the stock A' in a central longitudinal opening therein, while said stock is operated upon to form the screws in a screw-machine. Said spindle is provided with the usual chuck A², and is fitted to turn in suitable bearings B' on the loom-frame B. Upon it are mounted between and next to said bearings the sprocket-wheels C C, which are each recessed upon one side to receive the split friction-rings D D. (See Figs. 2 and 3.) Said sprocket-wheels are fitted to turn on the spindle between the bearings B' B' and collars E E, secured to the spindle, each collar being provided with a suitable disk E' next to the wheels to prevent dust and other foreign substances from entering the recess or pocket therein. They are also each provided with a lateral projection or boss E² to receive and hold a small spindle F, arranged parallel to the main spindle and having a flattened head F' at its inner end adapted to fit in the slot *e* between the ends of the friction-ring D. Said spindles F F are fitted to turn in their bearings, and each has secured upon its outer end a cam-lever G, that projects laterally and down therefrom, so as to be acted upon by the shipper-cone H, which is fitted to slide on the sleeve and operated by the shipper-lever I, pivoted at I' to the frame B.

By the above construction it is evident that when the outer end of one of the cam-levers is forced out by moving the shipper-cone under the same, as indicated by dotted lines in Fig. 1, the flattened head F' of spindle F is turned a partial revolution, and thereby expands the friction-ring D against the inner surface C' of the sprocket-wheel, and thus by frictional contact ships the power from said wheel to turn the spindle A in one direction, while the reverse movement of the cone to the opposite side under the other cam-lever G, unships the power from one sprocket-wheel to the other and reverses the motion of the spindle, the sprocket-chains J J, which run the wheels continuously, being driven in op-

posite directions, as shown by the arrows, by suitable driving-power, (not shown in the drawings,) the same not constituting a part of my invention. The shipper-lever I is swung back and forth automatically with intermittent movements, so as to connect the spindle with first one and then the other of the sprocket-wheels to turn said spindle in opposite directions, as above described, by means of a cam-wheel K, mounted and secured upon a horizontal longitudinal shaft L, fitted to turn in suitable bearings L' in the loom-frame. Said cam-wheel K may be made in various well-known ways to accomplish the above result. In this instance I have shown two V-shaped cams K' K', secured to the rim thereof in reverse positions, as is shown in Fig. 1, and projecting radially beyond the periphery of the wheel, so that when the outer extremity I² of the lever I comes in contact therewith as the wheel turns said outer end is forced to one side, as indicated by dotted lines in said Fig. 1, the lever being moved to one side, as aforesaid, by one cam and then allowed to return to its normal position for a time until the next cam comes into action, when it is moved in the opposite direction, and so on continuously to move the shipper-cone back and forth with intermittent reciprocating movements to ship and unship the power of first one and then the other sprocket-wheel to and from the spindle A, as previously described. By thus employing reverse friction sprocket-wheels in connection with suitable power-shipping mechanism upon the main spindle of a screw-machine to automatically change the feed of said spindle, I am enabled to dispense with the usual smooth pulleys and friction-belts ordinarily employed on said machines, which often work unsatisfactorily, owing to the belts slipping, especially when they become stretched by long use, and thereby obtaining a regular, positive, and sure action of the spindle in the operation of making the screws.

My invention relating, as aforesaid, only to the mode of driving and reversing the motion of the live-spindle, it is unnecessary to describe said operation or the construction and working of other parts of a screw-machine.

It will be apparent that various ways may be employed for clamping the friction-ring D (by expansion or contraction) to the sprocket-wheel, and I therefore reserve the right to modify said construction within the principle of my invention.

I am of course aware that I cannot cover the use of a sprocket-wheel, a clutch, or ship-

ping mechanism independently, and therefore limit my invention to the combination of elements set forth in the following claims.

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

1. In a screw-machine, the main or live spindle A thereof, in combination with the sprocket-wheel C, fitted to turn thereon independent of the friction-ring, its drive-chain J, the collar E, fastened on spindle A at one side of the sprocket-wheel, the split friction-ring D, fitted in a side recess in said sprocket-wheel between the wheel and collar E, spindle F, fitted to turn in a bearing on said collar and having a head F', adapted to come in the opening between the ends of the friction-ring, and means for turning said spindle and head, substantially as and for the purpose set forth.

2. In a screw-machine, the combination of the main or live spindle A and the shipper-cone H, fitted to slide thereon, with the sprocket-wheel C, fitted to turn on said spindle, its drive-chain J, the split friction-ring D, fitted in said wheel, the collar E, fastened to the spindle, small spindle F, fitted to turn in said support and having the flattened head F' at its inner end fitting in the slot between the ends of the friction-ring, and the cam-lever G, secured to the outer end of spindle F and adapted to engage at its outer end with the shipper-cone when the latter is moved against it, substantially as and for the purpose set forth.

3. In a screw-machine, the combination of the main or live spindle A, frame B, and shaft L with the sprocket-wheels C C, fitted to turn on said spindle, their drive-chains J J, the split friction-rings D D, fitted in said wheels, the collar E E, fastened to the spindle, small spindles F F, fitted to turn in said supports and each having a flattened head F' at its inner end fitting in the opening between the ends of its respective friction-ring, the cam-levers G, secured to the outer ends of the spindles F F and adapted to engage at their outer ends with the shipper-cone H, said shipper-cone fitted to slide on spindle A between the aforesaid friction sprocket-wheels, shipper-lever I, pivoted to frame B and adapted to engage with said cone at one end and with a cam-wheel K, secured to shaft L, and said cam-wheel, substantially as and for the purpose set forth.

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Witnesses:

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