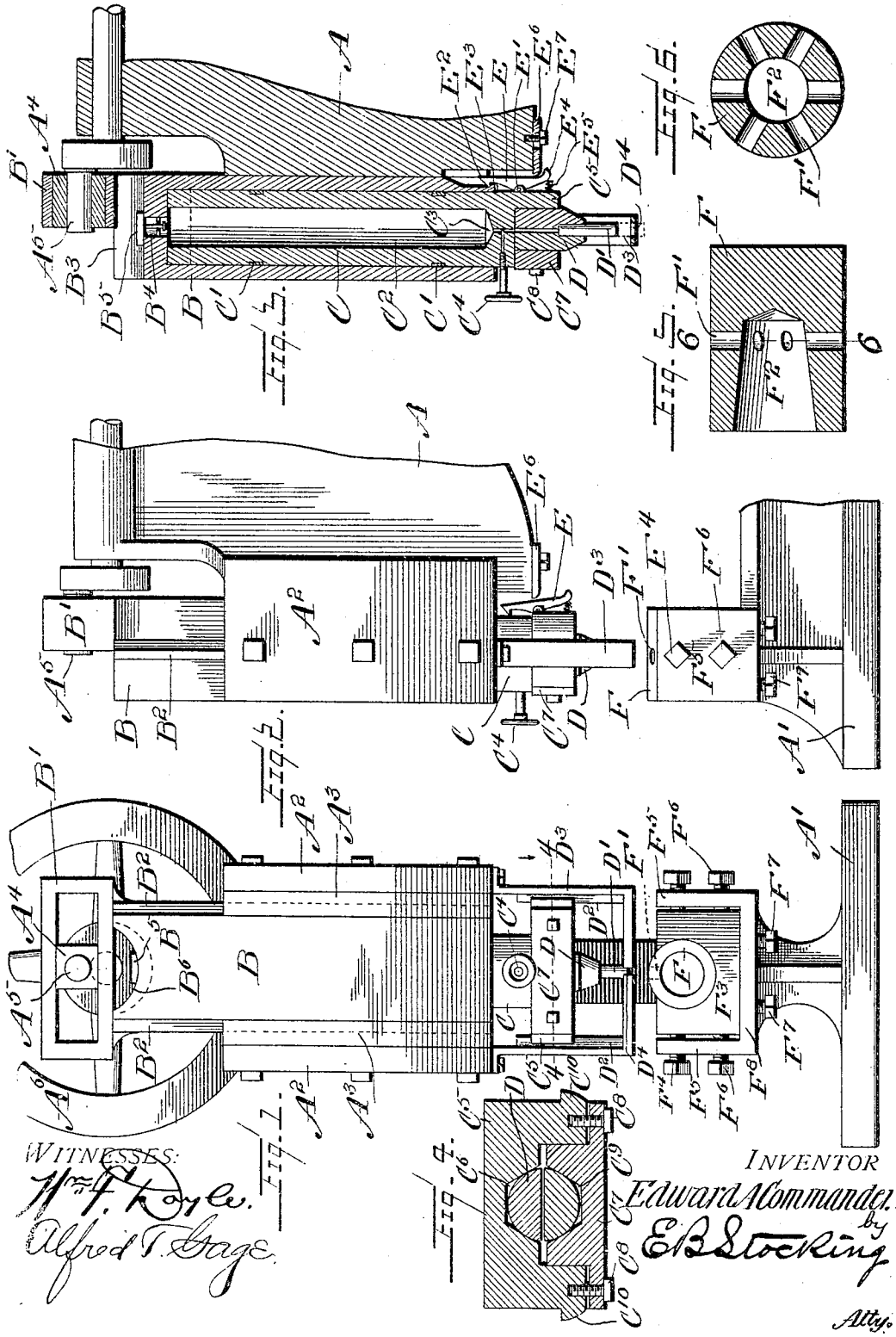
No. 800,550. PATENTED SEPT. 26, 1905.

E. A. COMMANDER.

PUNCHING MACHINE.

APPLICATION FILED MAR. 9, 1904.



WITNESSES:

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UNITED STATES PATENT OFFICE.

EDWARD A. COMMANDER, OF PEORIA, ILLINOIS.

PUNCHING-MACHINE.

No. 800,550. Specification of Letters Patent. Patented Sept. 26, 1905.

Application filed March 9, 1904. Serial No. 197,336.

To all whom it may concern:

Be it known that I, EDWARD A. COMMANDER, a citizen of the United States, residing at Peoria, in the county of Peoria, State of Illinois, have invented certain new and useful Improvements in Punching-Machines, of which the following is a specification, reference being had therein to the accompanying drawings.

This invention relates to a punching-machine, and particularly to improvements in the construction of the plunger thereof.

The invention has for an object to provide a plurality of telescoping plungers adapted to travel together in one direction and independently in the opposite direction, whereby the punch-carrying member is adapted to rest upon the work prior to the application of power to perform the punching operation.

A further object of the invention is to provide a construction of these plungers whereby an air chamber or cushion is provided to effect the gradual descent of one of the plunger members when released from the other, together with an improved construction by which the plungers are automatically connected together at the downward limit of their travel.

A further object of the invention is to provide an improved construction of die to coöperate with said punch and provided with a plurality of apertures therein adapted to be successively presented for use with the punch, as found desirable.

Other and further objects and advantages of the invention will be hereinafter set forth, and the novel features thereof defined by the appended claims.

In the drawings, Figure 1 represents an end view of the punch of the machine. Fig. 2 is a side view; Fig. 3, a central vertical section of the plungers and punch; Fig. 4, a horizontal section on the line 4 4 of Fig. 1; Fig. 5, a longitudinal section of the die, and Fig. 6 a cross-section thereof on the line 6 6 of Fig. 5.

Like letters of reference indicate like parts in the several figures of the drawings.

The letter A designates the frame, which may be of any desired construction and configuration suitable for the work to be accomplished thereon. It is provided with a base A′ and with a head A^2, having slideways A^3 at the opposite sides to guide the travel of the plunger B, which is adapted to reciprocate therein. The upper portion of this plunger is provided with a cross-head B′, adapted to receive the sliding crank-block A^4, carried by the crank-arm A^5 on the driving-shaft of the machine, which shaft is driven from any suitable source—for instance, the driving-pulley A^6, as shown in Fig. 1. The controlling of this driving-shaft is effected in the usual well-known manner to trip the same and apply the power at the desired interval.

The pressure-plunger B is formed with a chamber and is provided with ribs B^2 upon the opposite sides to travel in the guideways, while the upper portion thereof is closed at B^3 and there provided with a port B^4, adapted to be controlled by a valve of any desired character—for instance, a check-valve B^5, as shown in Fig. 3. This valve is located in a recessed portion B^6, so as to open upwardly as the air is expelled from the interior of the chamber within the plunger B.

Disposed within the plunger B is a telescoping punch C, preferably of cylindrical form and provided with any desired form of packing, as shown at C′, to form an air-tight connection, while within the cylinder C an oil-chamber C^2 may be provided, if so desired. When this chamber is used, a duct C^3 is provided in the lower portion thereof and extends to the punch. The discharge of oil therethrough is suitably controlled by a needle-valve C^4. The lower portion of the plunger C is provided with a fixed rear wall C^5, having a socket C^6 therein adapted to receive the two-part or divided chuck-block D, adapted to carry the punch D′, of any desired construction, between the clamp members thereof. This clamping is effected by means of a plate C^7, suitably secured to the face of the block C^5 by any desired means—for instance, bolts C^8, as shown in Fig. 4—while the block C^7 is provided with a suitable recess C^9 to receive and engage one of the members of the chuck.

The block C^5 at the lower end of the cylinder C is provided with ribs C^{10} at the opposite sides, adapted to engage guide-blocks D^2, carried by the stripper-frame D^3, suitably secured in any desired manner to the head A^2, said stripper being provided at its lower horizontal portion with a suitable aperture D^4 to permit the passage of the die D′ therethrough.

The independent plungers B and C are adapted to be connected together by any desired form of latch, the preferred form thereof being herein illustrated as comprising a pivoted dog E, mounted in a lug E′, carried upon the rear of portion C^5 of the plunger C and provided at its upper end with a tooth E^2,

adapted to engage the hook E^3, carried by the lower portion of the outer plunger B. The opposite end of the dog E is provided with the curved face at E', normally forced outward from the plunger C by means of a spring E^5 and adapted in the upward movement of the plungers to engage a trip-block E^6, which is adjustably supported upon the head-frame A of the machine by means of a bolt E^7, as shown in Fig. 3.

The improved construction of die is particularly shown in Figs. 5 and 6 and comprises a cylindrical body F, provided with a series of apertures F', disposed radially to the longitudinal axis thereof and of suitable size to receive the punch carried by the machine. The chamber C^2 within the die is preferably of conical shape, so as to discharge the cut or punched pieces outwardly toward the front of the machine, where they may be collected in any suitable receptacle. This die is mounted in a die-block F^3 and is adapted to be clamped in position therein by means of screws F^4, adjustably mounted in the walls F^5 of the seat carried by the base of the machine to receive the die-block. The block F^3 is also adapted to be adjusted and held within this seat by means of screws F^6 at the opposite sides thereof and screws F^7 in the bottom F^8 of the seat, as shown in Fig. 1.

In the operation of the invention it will be seen that the pressure-plunger and the punch-plunger rise together, as they are connected by the latch. When it is desired that the punch be set upon the work prior to the application of the power, the trip-plate is provided to automatically release the latch as the plungers jointly ride to the upward limit of their movement. As soon as this latch is released the punch-plunger begins its descent, which is retarded by the entrance of the air around the valve disposed at the upper portion of the power-plunger, and the rapidity of this movement may be governed by providing means upon the valve or its seat to permit the entrance of different amounts of air to the space between the plungers. When the punch-plunger is set, it rests upon the templet or upon the mark on the work where the hole is to be punched, and the power-shaft is then placed in operative relation to the power, so as to carry the power-plunger downward, expelling the air above the top of the punch-plunger until they are in contact, when the punching operation occurs and the material punched passes through the die and is discharged from the front thereof. This die is provided with a series of apertures, so that they may be conveniently adjusted for use when one or more thereof become worn to such an extent as to prevent a clean sharp cutting action. Furthermore, the construction of plungers herein shown provides means by which a lubricant may be supplied to the punch through the separable parts of the chuck. It will also be observed that if it be desired to use the plungers without disconnecting the same the trip-plate may be removed from the path of the latch, and the plungers will then operate in the ordinary manner.

It will be obvious that changes may be made in the details of construction and configuration without departing from the spirit of the invention as defined by the appended claims.

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

1. In a punching-machine, a plurality of telescoping plungers, means for connecting the same during their operative stroke, means for disconnecting the plungers during their return travel, and means upon one plunger to retard the travel of its associate in its movement away therefrom.

2. In a punching-machine, a plurality of telescoping plungers, means for automatically connecting the same together, means for automatically disconnecting the plungers during their travel to permit an independent descent of the released plunger, and means carried by one plunger to retard the descent of the released plunger.

3. In a punching-machine, a power-plunger, a punch-plunger slidably carried thereby to travel downwardly independently of the power-plunger, and a latch for connecting said plungers together.

4. In a punching-machine, a power-plunger, a punch-plunger slidably carried thereby to travel downwardly independently of the power-plunger, a latch for connecting said plungers together, and a trip-plate disposed in the path of said latch to engage the same and disconnect the plungers in the upward travel thereof.

5. In a punching-machine, a power-plunger provided with an air-chamber therein having only a valve-controlled passage at its upper end, a punch-plunger disposed within said chamber and acting as a piston therein, and means carried by the valve of said passage to permit the entrance of air into said chamber as the plungers are separated.

6. In a punching-machine, a power-plunger provided with a chamber therein, a punch-plunger disposed within said chamber, a valved passage at the upper end of said chamber, and a latch carried by one of said plungers and adapted to engage the other.

7. In a punching-machine, a power-plunger provided with a chamber therein, a punch-plunger disposed within said chamber, a valved passage at the upper end of said chamber, a latch carried by one of said plungers and adapted to engage the other, and means for automatically releasing said latch.

8. In a punching-machine, a power-plunger provided with a chamber therein, a punch-plunger disposed within said chamber, a

valved passage at the upper end of said chamber, a latch carried by one of said plungers and adapted to engage the other, means for automatically releasing said latch, an oil-chamber within the power-plunger, a punch-chuck communicating with said chamber, and means carried by the punch-plunger for retaining said chuck in position.

9. In a punching-machine, a power-plunger provided with a chamber therein, a punch-plunger disposed within said chamber, a valved passage at the upper end of said chamber, a latch carried by one of said plungers and adapted to engage the other, means for automatically releasing said latch, an oil-chamber within the power-plunger, a punch-chuck communicating with said chamber, means carried by the punch-plunger for retaining said chuck in position, a stripper-frame supported from a fixed part and provided with guides, and means carried by the punch-plunger for engaging said guides.

10. In a punching-machine, a power-plunger provided with a chamber therein, a punch-plunger disposed within said chamber, a valved passage at the upper end of said chamber, a latch carried by one of said plungers and adapted to engage the other, means for automatically releasing said latch, an oil-chamber within the power-plunger, a punch-chuck communicating with said chamber, means carried by the punch-plunger for retaining said chuck in position, a stripper-frame supported from a fixed part and provided with guides, means carried by the punch-plunger for engaging said guides, a slotted head at the upper end of the power-plunger, and a crank-shaft provided with a sliding block disposed in said head.

11. In a punching-machine, a head provided with guideways, a power-plunger slidably mounted in said head and provided with a valve-controlled passage at its upper end, a punch-plunger disposed within the power-plunger, a pivoted latch mounted upon one of said members to engage the other, and a spring for normally holding said latch in engagement.

12. In a punching-machine, a head provided with guideways, a power-plunger slidably mounted in said head and provided with a valve-controlled passage at its upper end, a punch-plunger disposed within the power-plunger, a pivoted latch mounted upon one of the members to engage the other, a spring for normally holding said latch in engagement, and an adjustable tripper-plate mounted upon said head and adapted to engage the outer face of said latch during the upward movement thereof.

13. In a punching-machine, a head provided with guideways, a power-plunger slidably mounted in said head and provided with a valve-controlled passage at its upper end, a punch-plunger disposed within the power-plunger, a pivoted latch mounted upon one of said members to engage the other, a spring for normally holding said latch in engagement, an adjustable tripper-plate mounted upon said head and adapted to engage the outer face of said latch during the upward movement thereof, a clamping-plate carried by the lower portion of the punch-plunger, and a punch-chuck secured by said plate.

14. In a punching-machine, a head provided with guideways, a power-plunger slidably mounted in said head and provided with a valve-controlled passage at its upper end, a punch-plunger disposed within the power-plunger, a pivoted latch mounted upon one of said members to engage the other, a spring for normally holding said latch in engagement, an adjustable tripper-plate mounted upon said head and adapted to engage the outer face of said latch during the upward movement thereof, a clamping-plate carried by the lower portion of the punch-plunger, a punch-chuck secured by said plate, a hollow chamber within the punch-plunger having a passage extending to said chuck, and a controlling-valve for said passage.

15. In a punching-machine, a valved pressure-plunger, a telescoping punch-plunger, and means constructed and arranged to automatically connect said plungers together at the downward limit of their movement and to disconnect the same at the upward limit of their movement.

In testimony whereof I affix my signature in presence of two witnesses.

EDWARD A. COMMANDER.

Witnesses:

CHAS. C. COLE,

GEORGE MORGAN.