(No Model.)

3 Sheets—Sheet 1.

H. C. SERGEANT.

CHANNELING MACHINE.

No. 522,236. Patented July 3, 1894.

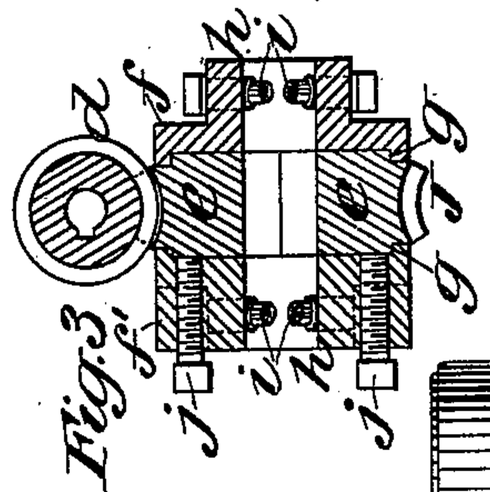

Fig. 3.

Fig. 2.

Fig. 4.

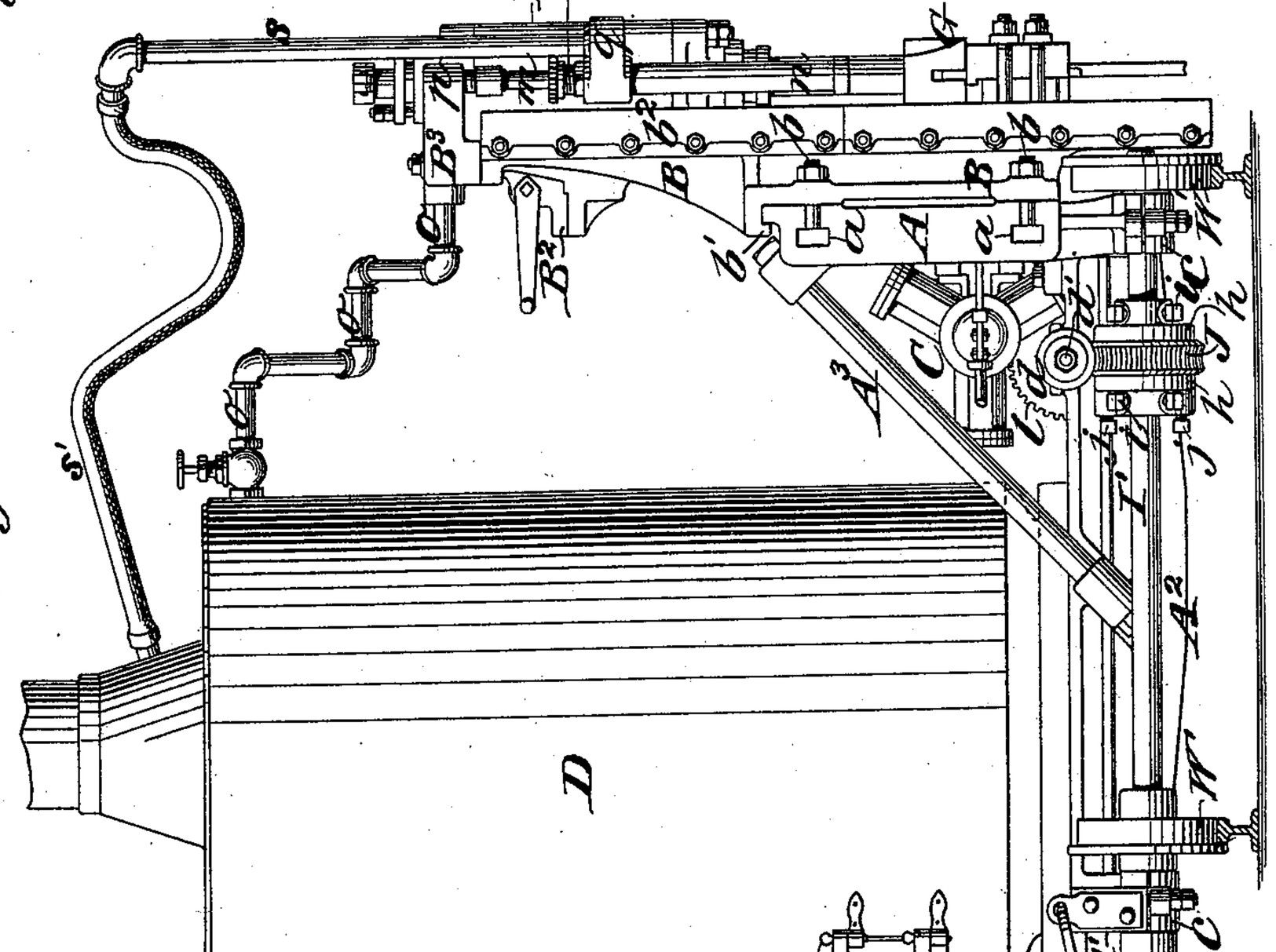

Fig. 1.

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Fig. 7.

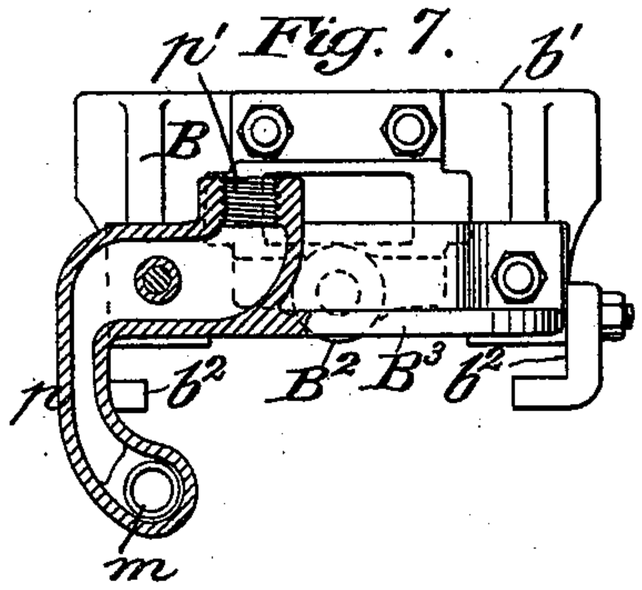

Fig. 5.

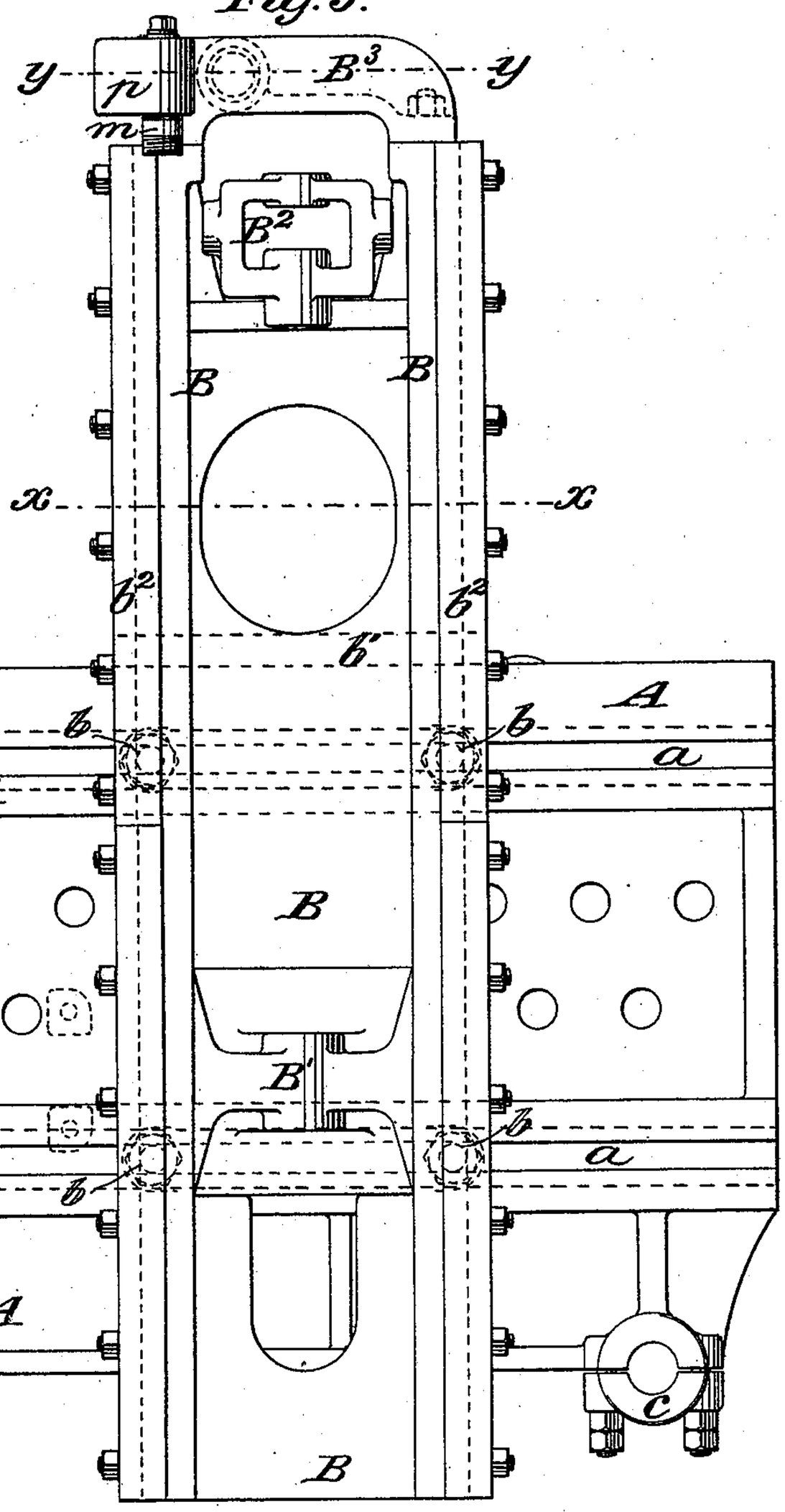

Fig. 6.

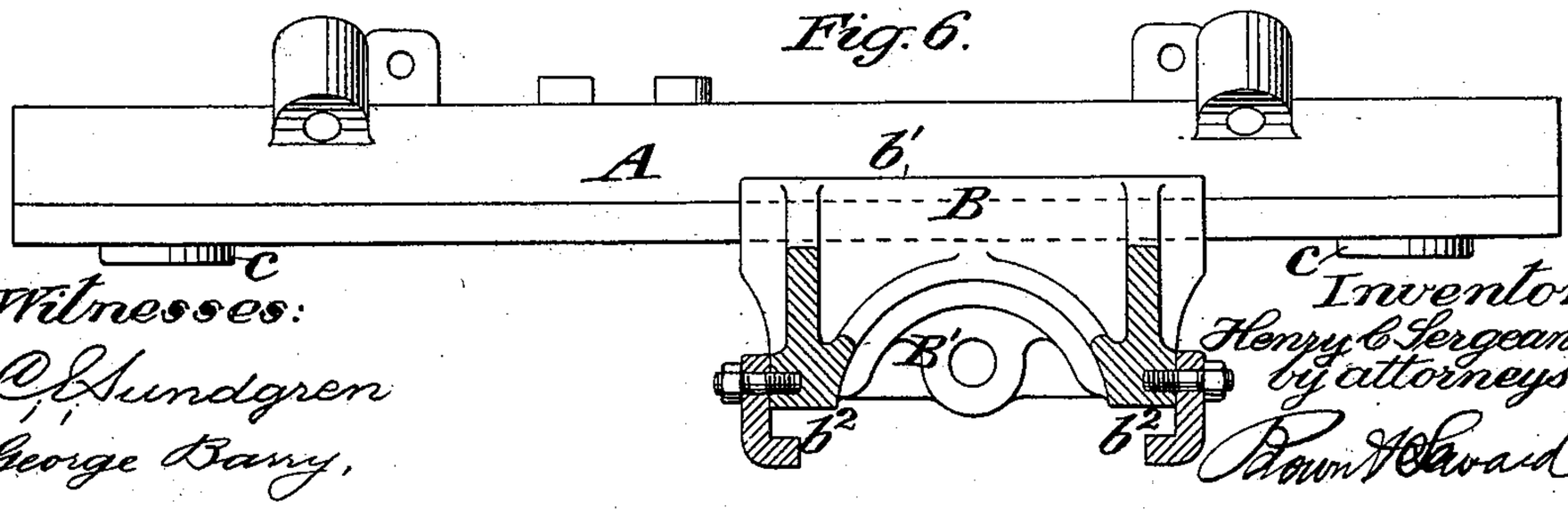

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Fig. 9.

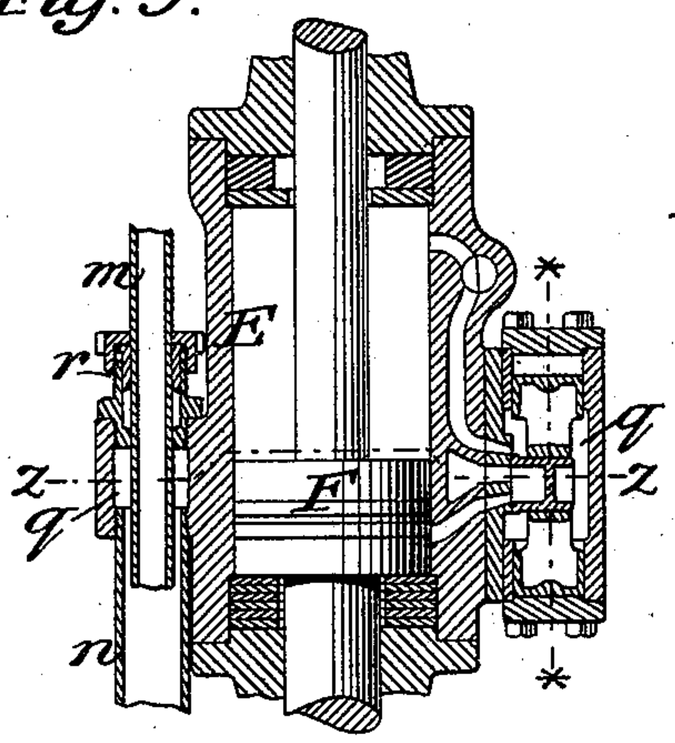


Fig. 11.

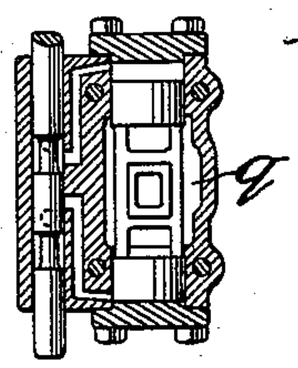


Fig. 10.

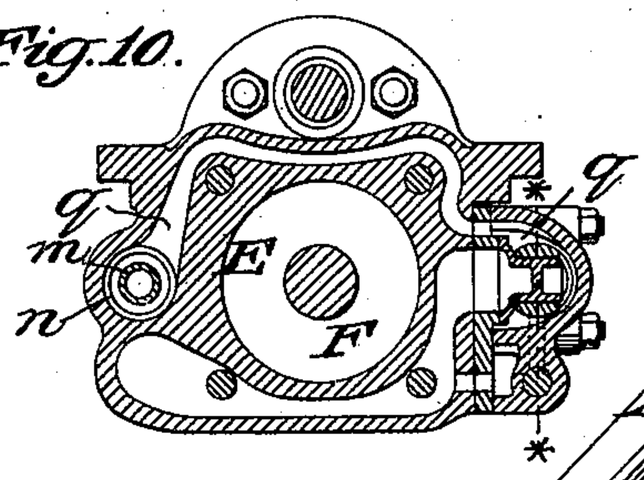
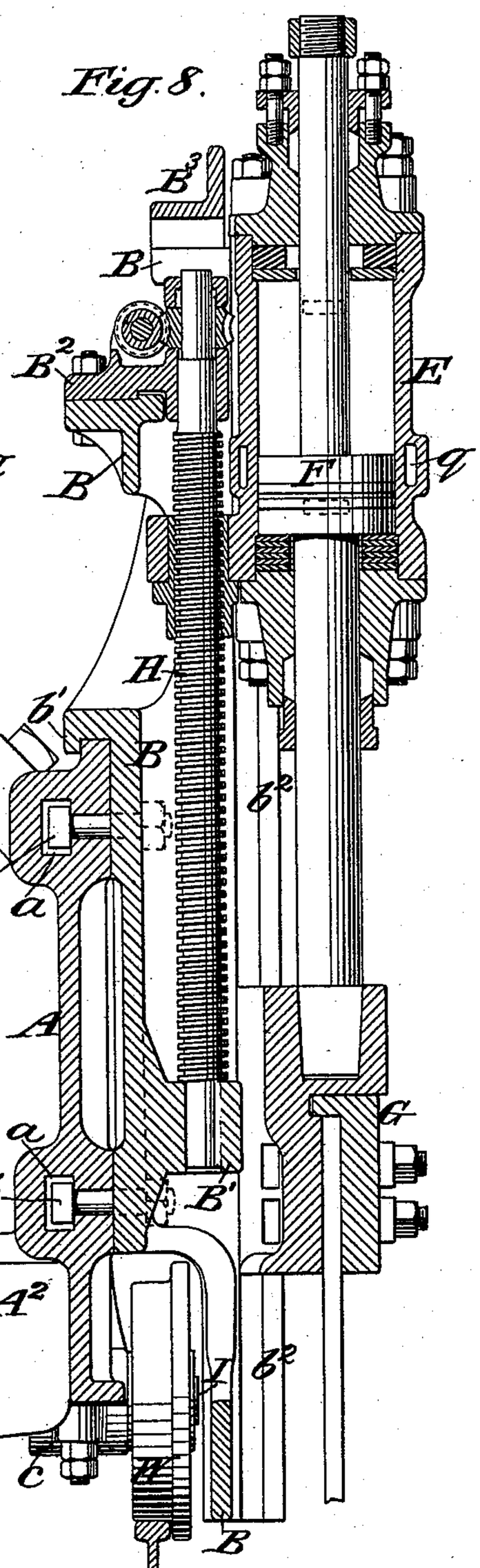


Fig. 8.



Witnesses:
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George Barry.

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UNITED STATES PATENT OFFICE.

HENRY C. SERGEANT, OF WESTFIELD, NEW JERSEY, ASSIGNOR TO THE INGERSOLL-SERGEANT DRILL COMPANY, OF NEW YORK, N. Y.

CHANNELING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 522,236, dated July 3, 1894.

Application filed July 8, 1893. Serial No. 479,934. (No model.)

To all whom it may concern:

Be it known that I, HENRY C. SERGEANT, of Westfield, in the county of Union and State of New Jersey, have invented a new and useful Improvement in Channeling-Machines, of which the following is a specification.

The nature of the improvement will be described with reference to the accompanying drawings and its novelty set forth in the claims.

Figure 1 represents a side elevation of a channeling machine embodying my improvement; Fig. 2 a front elevation of the same. Figs. 3 and 4 are detail views of the devices for moving the carriage which will be hereinafter explained. Fig. 5 is a front view of the shell in which the drill cylinder and holder work, the wheels and the cylinder and feed mechanism being omitted. Fig. 6 represents a horizontal section of the drill shell in the line *x x* Fig. 5; Fig. 7 a horizontal section in the line *y y* of Fig. 5. Fig. 8 represents a vertical section of the machine parallel with Fig. 1, with part of the carriage broken out and the engine and boiler omitted; Fig. 9 a vertical sectional view of the drill operating cylinder, piston and valves parallel with Fig. 2; Fig. 10 a horizontal section in the line *z z* of Fig. 9; Fig. 11 a vertical section in the line * * of Fig. 10.

Similar letters of reference designate corresponding parts in all the figures.

A A′ A^2 A^3 designate the carriage of the machine mounted on wheels W W′ and supporting the drill shell B, the engine C for propelling the carriage and the boiler D which supplies steam to said engine as well as to the drill cylinder E for operating the drill piston F. The carriage is represented as consisting of an upright front frame A, a rear girder A′, two side girders A^2 and diagonal braces A^3 connecting the front frame A with the side girders A^2. The front frame A has in its face two horizontal grooves *a* which are widened at the back in T-shaped transverse section, as shown in Fig. 8, and open at the ends for the reception of the heads of bolts *b*, by which the back of the shell B is secured to the carriage at various points in the width of the latter as may be desired.

The shell B is made with a flange *b′* on its back as shown in Fig. 8, to overlap the straight horizontal upper edge of the frame A in such manner as to support its own weight and that of the drill cylinder piston and drills directly on the carriage. The said shell has attached to its front the guides b^2 which serve both for the drill cylinder E and the drill holder G; its sides are braced at the top above the guides b^2 by a bridge B^3, and it has in its lower part the bearing B′ for the lower end of the feed screw H. The upper bearing of this feed screw is in a bracket B^2 (Figs. 5 and 8) bolted to the upper part of the shell below the bridge B^3. The shell being supported on the straight horizontal upper edge of the frame A of the carriage and being secured by the bolts *b* the heads of which are in the T-shaped slots *a* of the carriage, is permitted to be easily adjusted to any position along the carriage from one end to the other by simply slackening the nuts of the bolts *b* without removing the bolts and sliding the shell along the carriage and the drills may thus be made to work to the extreme end of the carriage.

The driving wheels W W′ to which motion is imparted to move the machine in the direction of the line of the channels are fast upon the axles I I′ (see Fig. 1) which turn in bearings *c* in the carriage, and motion is transmitted to said axles from the engine C (Fig. 1) through two endless screws *d*, one of which is shown in Figs. 1, 3 and 4, which are geared with the engine in any suitable manner and with worm gears J on the axles. The gearing between the engine shaft and the endless screws is shown in Fig. 8 consisting of a spur gear *k* on the engine shaft and a gear *l* on the shaft *d′* of the endless screws. The gear *l* is loose on the shaft *d′* but engages with the said shaft with a friction clutch which permits the slipping of said gear *l* around the shaft in case of the travel of the machine being stopped by the drills being stuck in the rock. The change of direction of the movement of the carriage by the endless screws and worm gears is intended to be effected by reversing the engine.

As the worm gears are liable to wear out several times during the life of the machine

and they are arranged between the driving wheels W′ and between the bearings *c* of their respective axles I I′ so that they could not be removed over the ends of their axles without dismounting the machine therefrom and taking off one driving wheel of either axle, I make the said gears as shown in Figs. 3 and 4, Fig. 3 representing a section of one of the said gears and its endless screw parallel with the axis of the gear and Fig. 4 representing a side view of the same; that is to say, I divide each of said gears diametrically or transversely into two semicircular halves *e e* which are placed over the axle from opposite sides thereof and secure said halves together by two caps or collars *f f′* which fit the axle and also fit over the hub-like projections *g* on opposite sides of the gear as shown in Fig. 3. These caps are made with hubs *h* and are secured firmly to the shaft by means of set screws *i* which screw through their hubs *h* and enter holes or notches in the shaft, and the worm gear is clamped firmly between the caps and compelled to turn them and also turn the shaft by means of set screws *j* which screw through lugs on the hub *h* of the cap *f′* and press the worm gear firmly against the cap *f*. When either worm gear is worn out and it becomes necessary to substitute a new one, the screws *i* of one or both of the caps *f f′* are unscrewed and either or both caps are thus left free to slide on the shaft lengthwise thereof and so to allow the two halves *e e* of the gear to be removed laterally from the shaft and the two halves of a new gear to be put on laterally into their place to be secured by moving the caps up to them and screwing up the set screws of the latter.

When it is desired to run the machine to and fro upon the tracks without setting it in operation, it will be necessary to liberate the worm gears from their axles I I′. To effect this liberation it will only be necessary to slacken the screws *j*. The worm gears when thus liberated will still be held in place by the collars *f f′* overlapping their hub-like projections *g*. It will thus be understood that the construction of the divided worm gears and the means of securing them in place provide not only for the removal and changing of the said gears but also provide for loosening them and yet holding their two semicircular halves together.

The steam for operating the piston F of the drill cylinder E comes from the boiler through a flexible-jointed pipe *o* and goes to the valve chest *q* of the said cylinder through telescopic pipes *m n* in communication with said chest, the communication between said flexible-jointed and telescopic pipes being through the bridge B^3 of the drill shell B, a portion of the said bridge at one end being made hollow and the said hollow portion being extended forward in the form of a bracket as shown at *p* in Figs. 1, 2, 5, and 7, to make the last mentioned connection. The flexible-jointed pipe is connected with the hollow part *p* of the bridge B^3 at *p′* (Fig. 7). One member *m* of the telescopic pipe is connected directly with the said hollow part of the bridge and the other member *n* which is closed at the bottom is connected fixedly with the steam chamber *q* of the valve-chest as shown in Fig. 9. A stuffing-box *r* (Figs. 1, 2 and 9) is provided in the top of the steam chamber *q* and through this stuffing-box the member *m* passes into the member *n* which is sufficiently larger than *m*, as shown in Fig. 9, to permit the free passage of steam between them, the member *m* of the telescopic pipe *m n* moving up and down through the stuffing-box *r* and within the member *n* as the cylinder is moved downward or upward on the shell. By the jointed steam pipe *o* the lateral adjustment of the shell and cylinder on the carriage is provided for and the telescopic pipe connection between the hollow bridge B^3 of the shell B, the movement of the cylinder within the shell for feeding the drills is provided for. The exhaust pipe *s s′* is connected with the smoke stack of the boiler, and both of the above movements of the cylinder and shell are provided for in the said pipe *s s′* by making a portion *s′* of it flexible.

The valves and valve gear employed on or in connection with the cylinder E may be such as is commonly used in such machines and therefore they need no particular description and I have only illustrated them as far as I have thought necessary to illustrate the connection between the valve chest and the boiler through the cavity in the hollow portion of the drill shell.

The feed mechanism for producing the feed movement of the drill cylinder is or may be the same as in other machines and I have not thought necessary to describe it.

What I claim as my invention is—

1. In a channeling machine, the combination with the carriage and its driving axle and driving wheels, of a transversely divided worm gear on said driving axle arranged between said driving wheels, two caps or collars fitted to said axle and capable of moving lengthwise thereon for receiving projections on said worm gear, and means substantially as herein described for securing said caps or collars on the axle and screws in one of said two caps or collars for clamping the worm gear between the said caps or collars, all substantially as herein set forth.

2. The combination in a channeling machine, of a carriage and a drill shell movable lengthwise thereon, a drill cylinder with valve chest and valve movable lengthwise within said shell, a steam boiler on said carriage and steam pipes communicating between said boiler and valve-chest, a portion of said shell being made hollow to form part of said steam pipe communication, all substantially as herein set forth.

3. The combination in a channeling ma-

chine, of a carriage, a drill shell which is movable lengthwise on said carriage and a part of which contains a steam cavity, a drill cylinder with valve-chest and valve movable lengthwise within said shell, a steam boiler on said carriage, a flexible steam pipe between the boiler and said cavity in the drill shell, and a telescopic steam pipe forming a communication between said steam cavity and the valve-chest, all substantially as herein set forth.

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