W. A. INGALLS.
Chuck.

No. 206,113. **Patented July 16, 1878.**

Fig. 7

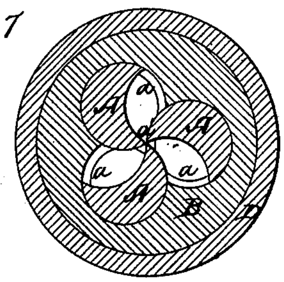


Fig. 1.

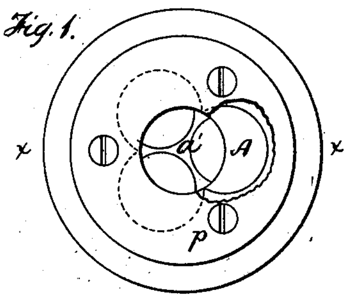


Fig. 8

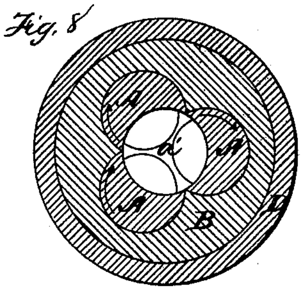


Fig. 2

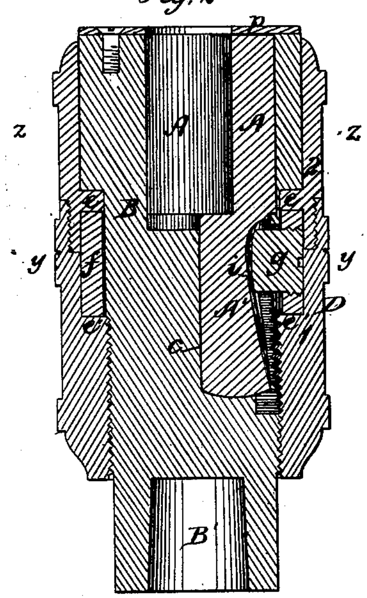


Fig. 4.

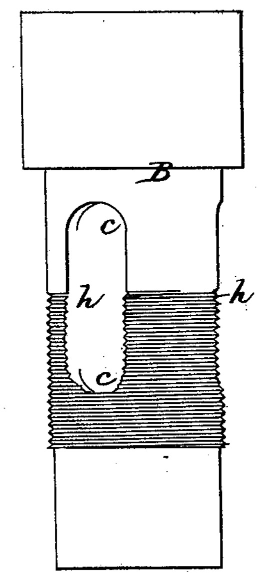


Fig. 5

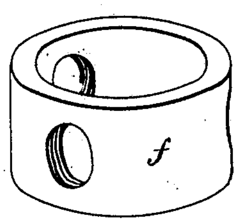


Fig. 6.

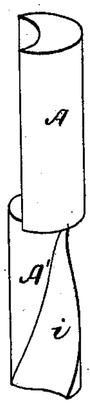
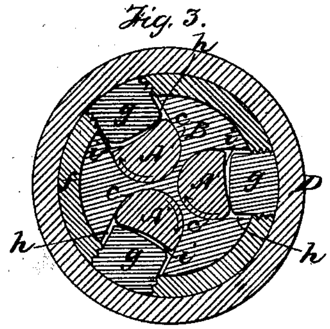


Fig. 3.



Witnesses.
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UNITED STATES PATENT OFFICE.

WILLIAM ALLEN INGALLS, OF BOSTON, MASSACHUSETTS.

IMPROVEMENT IN CHUCKS.

Specification forming part of Letters Patent No. **206,113**, dated July 16, 1878; application filed May 24, 1878.

To all whom it may concern:

Be it known that I, WILLIAM ALLEN INGALLS, of Boston, in the county of Suffolk and State of Massachusetts, have invented certain Improvements in Chucks, of which the following is a specification:

This invention relates to that class of chucks in which rotating crescent-shaped jaws are employed, which are contained in a shell or holder, and are rotated simultaneously, each on its own axis or center, and the griping-edges of the jaws are thereby caused to approach or recede from a common center or tool-receiving space, according to the direction in which said jaws are rotated, as shown in the patent to Thomas R. Almond, August 19, 1873, and in a pending application for Letters Patent for an improvement in chucks, filed by me April 12, 1878.

The present invention has for its object to effect certain improvements in the construction of chucks of this class, whereby the operation of the chuck is rendered more certain and satisfactory than heretofore, and its efficiency and durability are increased.

To these ends my invention consists in the improvements which I will now proceed to describe.

Of the accompanying drawings, forming a part of this specification, Figure 1 represents an end view of a chuck of the class to which my invention relates. Fig. 2 represents a longitudinal section on line *x x*, Fig. 1. Fig. 3 represents a transverse section on line *y y*, Fig. 2. Fig. 4 represents a side elevation of the body of the chuck without the other parts. Figs. 5 and 6 represent perspective views of parts in detail. Figs. 7 and 8 represent sections on line *z z*, Fig. 2, showing the jaws in different positions.

In the drawings, A A A represent the jaws, which are preferably three in number, and each is composed of a cylinder of metal, concaved on one side, and therefore crescent-shaped in cross-section, the angles of the crescent constituting griping or biting edges.

The jaws are provided with cylindrical extensions A′, of smaller diameter, which are on the same axial line as the jaws and are provided with spiral surfaces *i*, which will be described hereinafter.

B represents the part which I denominate the "body of the chuck." This is composed, preferably, of a single cylindrical piece of metal, and is provided in its outer end with spaces or sockets *a*, which receive the jaws A, and merge into a common tool-receiving space, *a′*, at the center of the body B.

The spaces *a* are formed and arranged to form a backing or support for the entire area of the cylindrical or convex side of the jaws A when the latter are in the position shown in Figs. 1, 2, and 8.

From the spaces *a* extend inwardly into the chuck sockets *c*, which are adapted to receive the extensions A′ of the jaws. These sockets *c* are of such size that the extensions A′ fit snugly in them, and the extensions are supported in all directions, laterally and against inward endwise pressure, by said sockets. The sockets *c* are arranged at equal distances apart from each other and from the longitudinal center of the body B.

To the outer end of the body B is secured a plate, *p*, which entirely covers the ends of the jaws A, where the latter are arranged as shown in Figs. 1, 2, and 8, and prevent the jaws from being accidentally moved outwardly.

The plate *p* is provided with a central aperture, which allows the insertion into the space *a′* of the shank of a tool or other object to be held by the jaws. The periphery of the body B is threaded near its inner end.

D represents a shell or jacket, which incloses the body B and is free to rotate thereon. The jacket D is threaded internally near one end, to engage with the threaded periphery of the body B, so that when rotated on said body it will also move endwise thereon. The jacket D is composed of two sections, 1 and 2, which are screwed together, or otherwise detachably coupled, at or near the center, as shown in Fig. 2. The parts 1 2 of the jacket are provided internally with shoulders *e e′*, and into the space between these shoulders is fitted a ring or band, *f*, which surrounds the body B, and is smooth on its outer and inner periphery, and is adapted to be moved lengthwise by and with the jacket D, but is not rigidly attached to the jacket, so that it does not revolve therewith.

To the ring f are attached a suitable number of bolts or projections, g, one for each jaw-extension A′. These bolts are cylindrical, and preferably threaded on the outer ends, and fitted into threaded orifices in the ring. These bolts g project inwardly through longitudinal slots h, formed in the body B, into the sockets c.

The inner ends of the projections g are flat, or nearly so, excepting around the edges, where they are preferably chamfered or beveled slightly, and said inner ends bear against the spiral inclined surfaces or seats i, formed on the extension A′ of the jaws. These surfaces i, together with the projections g, constitute the means whereby the jaws A are rotated when the jacket D is revolved on the body B. The surfaces i are preferably nearly flat transversely, as shown in Fig. 3, and correspond in width to the diameter of the bolts. The spiral surfaces i are so arranged that the bolts g bear against them only at or near one edge of each, as shown in Fig. 3.

The rotation of the jacket D on the body B causes said jacket to travel along the body and move with it the ring f without rotating the latter. The ring f is prevented from rotating by the projections g and the slots h of the body, the projections moving along the slots, which are parallel with each other and extend lengthwise of the body. The projections g are thus caused to move along the inclined spiral surfaces i, and exert a leverage or pressure against each of the surfaces i at one edge, as shown in Fig. 3, the line of pressure exerted being therefore tangential with the peripheries of the extensions, and causing the rotation of said extensions and the jaws A in their sockets, the direction of the rotation corresponding to the direction in which the projections g are moving.

In Fig. 3 the projections and surfaces i are represented as they operate when the jaws and extensions are rotating in the direction indicated by the arrows in Figs. 3 and 8, this rotation retracting or withdrawing the jaws from the space a'. When the jaws are rotating in the opposite direction the projections bear against the opposite edges of the spiral surfaces. The slots h in the body B are of sufficient length to permit the necessary movement of the jacket and projections g on the body to effect the rotations of the jaws from the position shown in Fig. 8 to that shown in Fig. 7.

From the foregoing it will be seen that a chuck is produced in which the jaws are entirely contained in, and supported in all directions by, the single part or body B; and this body being provided at its rear end with the socket B′, to receive the lathe center or shaft which rotates the chuck, there can be no wabbling or unsteadiness of the jaws, the latter being practically rigid or integral with said center or shaft; hence no working loose of the jaw-holding parts by wear is possible.

By the described means for rotating the jaws I am enabled to avoid rotating the body B, so that the jaws are simply rotated on their own axes, without revolving around a common center while they are being adjusted to the shank of a drill in space a'.

The inclined spiral surfaces i and guide-bolts g constitute an effective mechanical arrangement for rotating the jaws, a strong and steady tangential leverage or pressure being exerted on the extensions and jaws without material friction or binding, and without any lateral thrust, such as is produced when spiral grooves are made in the jaws to receive the ends of guide-pins, as in the Almond patent and in my pending application, above referred to. It is obvious that the spiral surfaces i may be formed on the backs of the jaws A instead of the extensions A′, the location of the slots h and projections g being correspondingly altered. Therefore I do not desire to limit myself to the location of the surfaces i on the extensions A′.

I claim—

1. The socketed, slotted, and threaded body B, containing the jaws A, and the spiral surfaces i, pertaining to said jaws, combined with the internally threaded jacket D, provided with the ring f and projections g, as set forth.

2. The combination of the jacket D, ring f, projections g, slotted and socketed body B, and jaws A, having extensions A′ and spiral surfaces i, all as set forth.

3. The jaws A and the inclined spiral surfaces i pertaining thereto, combined with the longitudinally-movable guide projections g, as set forth.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

WM. ALLEN INGALLS.

Witnesses:
WINSLOW BAXTER,
JAMES MCCULLEN.