2 Sheets—Sheet 1.

W. H. H. SISUM.

MACHINERY FOR FORMING LINKS AND ANALOGOUS ARTICLES.

No. 182,135. Patented Sept. 12, 1876.

Fig: 1.

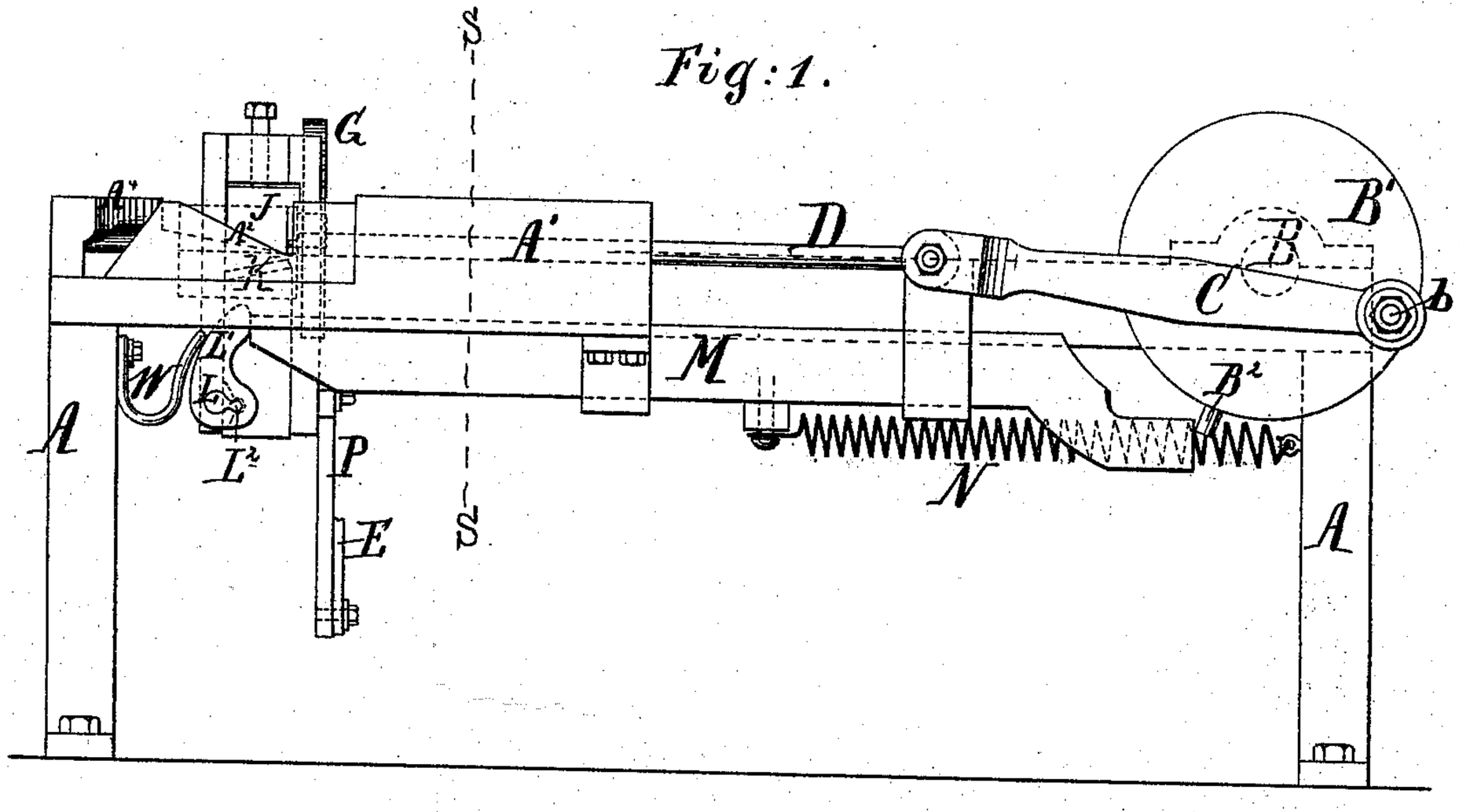
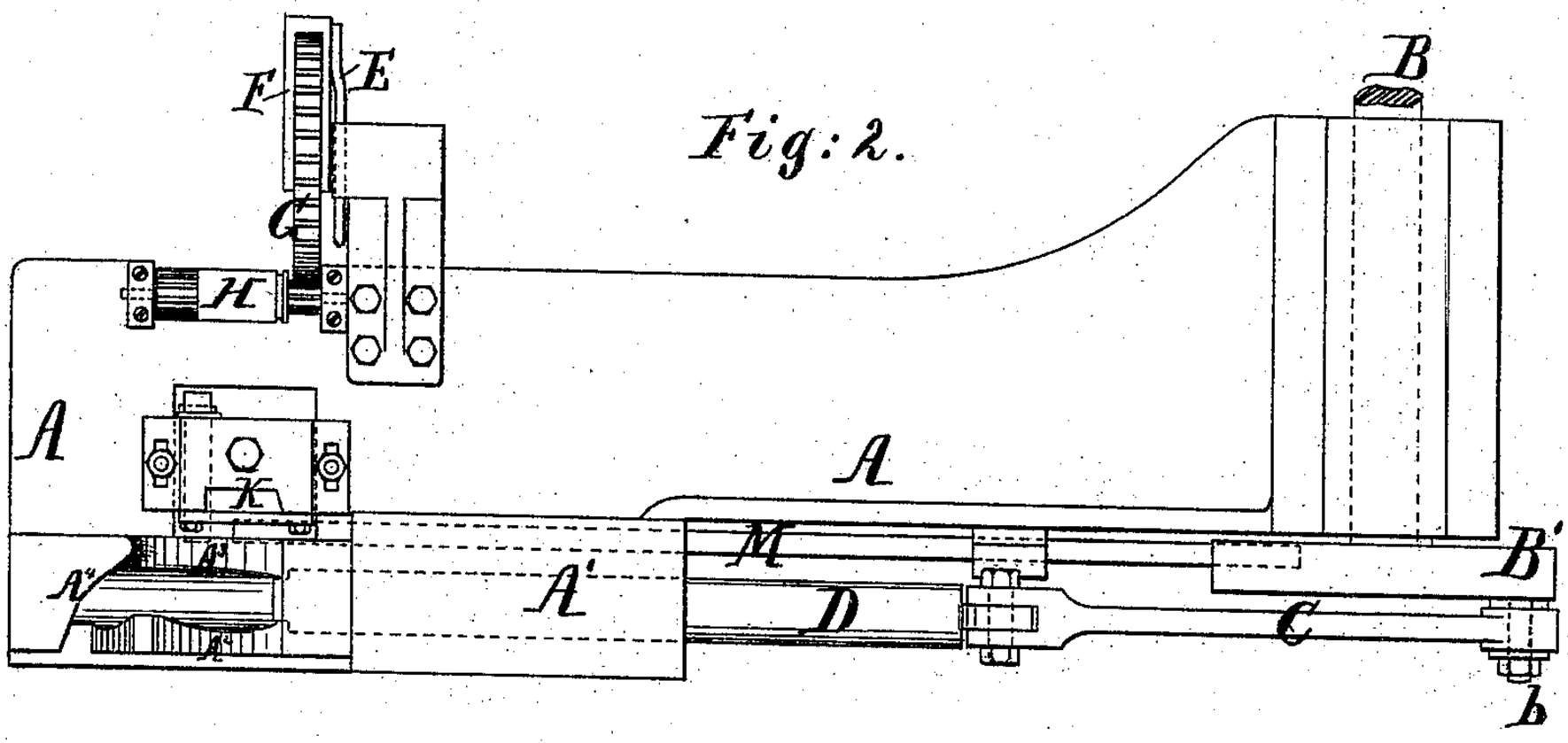


Fig: 2.



Witnesses:

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C. C. Stetson.

Inventor:

W. H. H. Sisum

by his attorney

C. C. Stetson

2 Sheets—Sheet 2.

W. H. H. SISUM.

MACHINERY FOR FORMING LINKS AND ANALOGOUS ARTICLES.

No. 182,135. Patented Sept. 12, 1876.

Fig: 3.

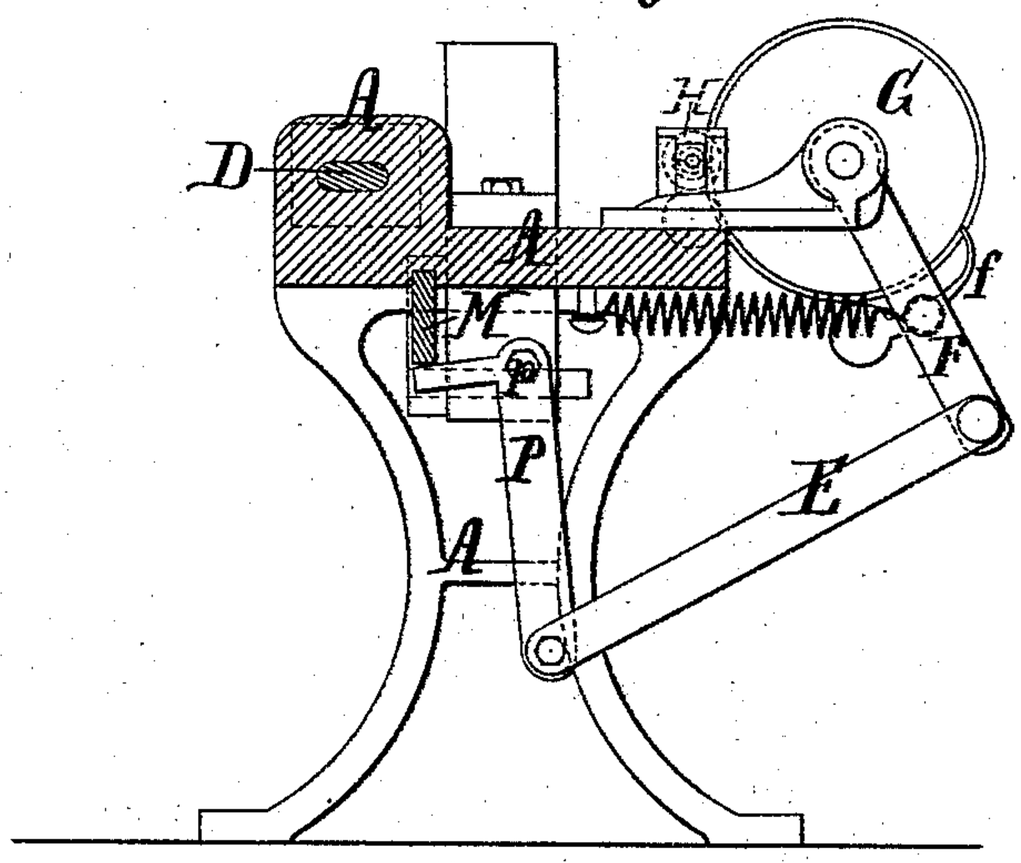


Fig: 4.

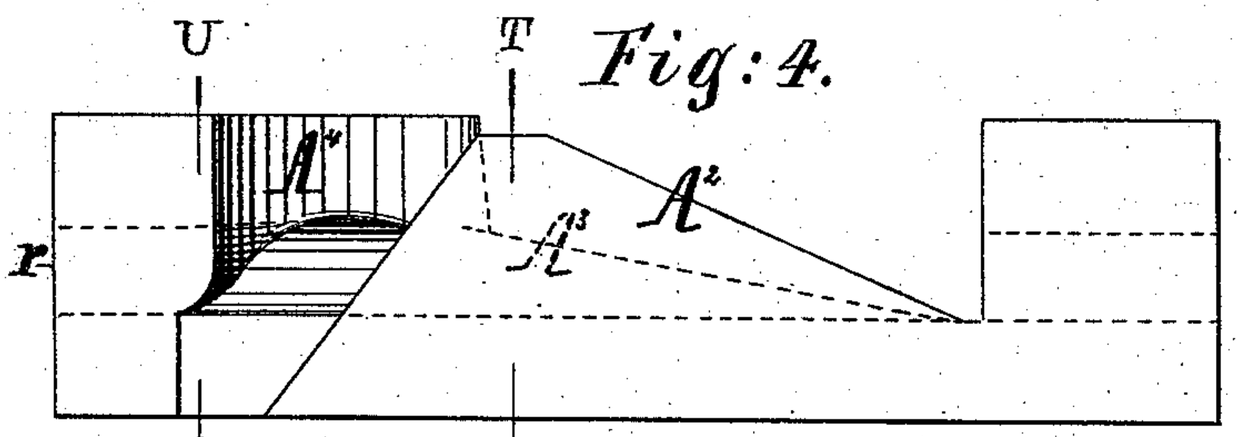


Fig: 6.

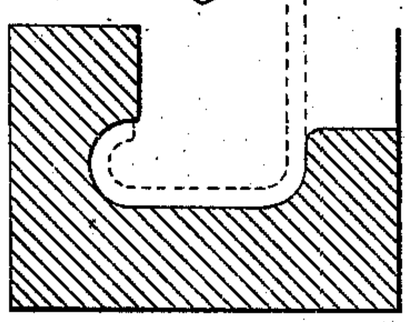


Fig: 5.

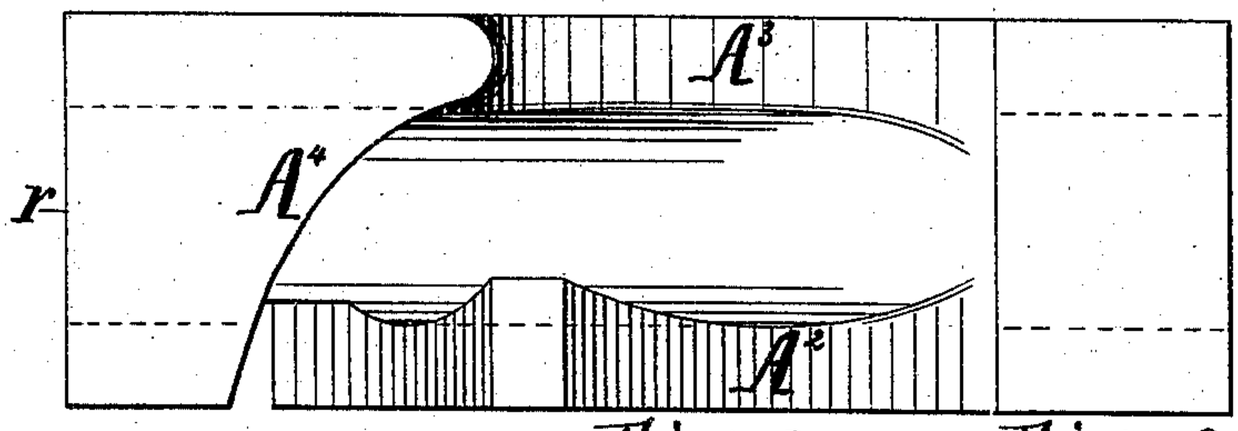


Fig: 7.

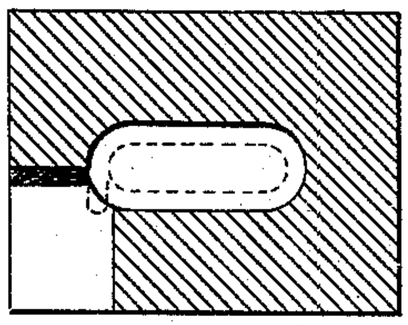


Fig: 9.

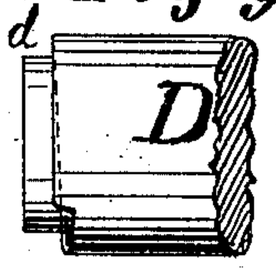
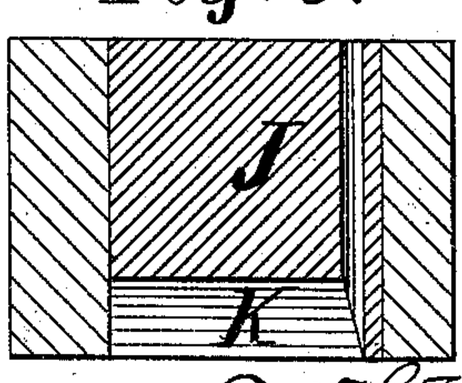


Fig: 8.



Witnesses:

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C. C. Stetson.

Inventor:

W. H. H. Sisum.

by his attorney

W. D. Stetson

UNITED STATES PATENT OFFICE.

WILLIAM H. H. SISUM, OF NEWARK, NEW JERSEY.

IMPROVEMENT IN MACHINERY FOR FORMING LINKS AND ANALOGOUS ARTICLES.

Specification forming part of Letters Patent No. **182,135**, dated September 12, 1876; application filed February 9, 1876.

To all whom it may concern:

Be it known that I, WILLIAM H. H. SISUM, of Newark, Essex county, State of New Jersey, have invented certain new and useful Improvements Relating to Machinery for Forming Links and Analogous Articles, of which the following is a specification:

I have devised a simple and compact form of machinery in which the metal, being introduced in the form of a long rod properly heated to allow it to be easily cut and bent, is fed forward intermittently, sheared off obliquely, and bent gradually around a forming-mandrel by being moved against surfaces which are inclined to its path, and effect the bending as the mandrel moves. When, as is the case in bending the links of heavy chains to be welded, the iron should overlap, one end upon the other, I carry a piece of iron past inclined surfaces so arranged that one end is bent over first upon the mandrel, and then the other end is subjected to a similar treatment. The mandrel moves endwise, carrying the iron, and the last end, on being bent over, has a clear space to move in, which would not be the case if both ends were bent over at one time.

The following is a description of what I consider the best means of carrying out the invention.

The accompanying drawings form a part of this specification.

Figure 1 is a side elevation. Fig. 2 is a corresponding plan view. Fig. 3 is a cross-section on the line S S.

The succeeding figures represent certain portions on a larger scale.

Fig. 4 is a side elevation of the bending-surfaces and the adjacent parts. Fig. 5 is a corresponding plan view. Fig. 6 is a cross-section on the line T T. Fig. 7 is a corresponding section on the line U U. Fig. 8 is a horizontal section, showing the die through which the iron is fed, and the shear which cuts it off obliquely. Fig. 9 is a plan view, showing the working end of the mandrel.

Similar letters of reference indicate like parts in all the figures.

A is the fixed frame-work, certain portions of which will be designated by additional marks A^1 A^2, &c. B is a revolving shaft, carrying a wheel, B′, in which is a crank-pin, *b*, which gives motion by a link, C, to a reciprocating slide, D, the front end of which is adapted to serve as a mandrel by allowing the metal to be bent or formed around it, as will presently appear. The mandrel D is guided in a stout portion, A^1, of the fixed frame-work.

I will describe the machine as adapted to manufacture links of an ordinary iron chain. The iron is introduced in the form of a continuous bar or rod of proper round section, and heated. It is fed forward through a pair of feeding-rollers, H H, geared together, and driven by a large gear-wheel, G, which is actuated intermittently by a lever, F, having a pawl, *f*, which receives a vibratory motion through a link, E. The iron fed forward intermittently by the rolls H H enters a die, J, and is sheared off by a knife, K, which, at the proper moment, rises from below, driven by the cam L^2 of the rocking-shaft L, which, through the arm L^1, receives motion in one direction from the slide M, and in the other from a spring, W.

The slide M, supported in suitable guides on the framing, is actuated by a pin, B^2, in the periphery of the wheel B^1. It is drawn back after each stroke by the spring N. At each forward motion its inclined front end acts on the short arm of a bell-crank lever, P, turning on a center, *p*, and the long arm of the lever P gives motion to the link E and its connections to operate the feed. The further motion of the slide M rocks the lever L^1 L^2.

These details relating to the feeding and shearing are only adjuncts of the main operation, which latter is effected by the sliding mandrel D and certain fixed inclines. The front end of the mandrel D is carefully worked to exactly the form of the interior of the links. If the link is to be bent in a form sufficiently open to allow it to be readily slipped upon the link just preceding it, the mandrel D is formed with the rabbet *d* correspondingly inclined. The length of metal to be treated is received in the recess or rabbet *d* below the central portion of the front end of the mandrel. As the mandrel moves forward it seizes and confines the iron between itself and the fixed framing below.

Articles of widely-varying form may be bent according to my invention by providing a suitable mandrel and suitable holding and bending surfaces. For a chain-link, the central portion of the end of the mandrel is extended farther than the surfaces above, below, or on either side. In other words, a recess or rabbet, *d*, extends around the front end of the mandrel in which the metal lies. First, the mandrel receives the metal lying straight across its path. It presses it against the fixed surface below, and, carrying it forward, strikes the short end of the metal or blank against an inclined surface, A^2, and compels it to bend around the mandrel. Then, as the mandrel continues to move forward by the continued revolution of the shaft B, its other end is pressed against the inclined surface A^3, and is bent. As the mandrel continues to move forward the stock is bent around, lying close within the rabbet in the mandrel, and the inclined surface A^3 being virtually continued across over the top of the mandrel, as indicated by A^4, the complete link is bent tightly around the mandrel, and the latter moves forward with it, delivering it through the orifice *r*, represented at the front of the machine. As the mandrel D is drawn back after each operation the metal around the orifice *r* removes the link from the mandrel, and either drops it immediately or holds it loosely until the next forward movement of the mandrel bringing the next link pushes this previous one out and drops it.

A clearer, acting on the principle of a claw or a wedge, may be applied, by any suitable connection, to the revolving or reciprocating parts, if preferred.

All the parts subjected to severe wear should be of hard steel; the movable shear K, as also the sharp fixed surface against which it works, should be of steel, accurately ground, and kept cool by a constant stream of water, or otherwise. This surface, as also the inclines A^2 A^3 A^4, may be made adjustable and removable by suitable screws or analogous devices.

It is especially important that the length of iron fed in at each motion be adjustable, as may be effected by varying the relative lengths of the levers.

For butt-welded links, and for links of chains, frames of buckles, and various other parts which are not to be lap-welded, the shears K should be so constructed and arranged as to cut off the iron nearly or quite at right angles to its axis.

I have in my experiments bent iron wire of various sizes in a cold state, and, although I have in this specification described the bars as being heated before their introduction, do not wish to confine the use of the machine to iron thus conditioned; nor, obviously, do I mean to confine the application of it to iron alone. I believe it practicable to bend a great variety of metals, and, probably, various parts in the manufacture of glass and other material.

The mandrel may, instead of running close to a fixed surface below and holding the material in its rabbet by the pressure between itself and such fixed surface, be provided with a jaw, analogous to tongs, and may hold the material between the main body and a movable jaw thus provided.

I esteem it practicable to bend very thin material, such as all ordinary sizes of sheet metal, by my machine, either with or without such jaw.

I claim as my invention—

1. A rabbeted mandrel, having an endwise motion, in combination with inclines A^2 A^3, mounted near its path, adapted to serve therewith, substantially as and for the purposes herein specified.

2. The shears K, in combination with the rabbeted mandrel D and inclines A^2 A^3, as specified.

3. The intermittent feeding devices H H, in combination with the knife K, rabbeted mandrel D, and inclines A^2 A^3, as specified.

4. The combination of the rabbeted reciprocating mandrel D, inclines A^2 A^3, shears K, and intermittent feeding devices H H, as and for the purposes herein specified.

5. In the manufacture of links and analogous articles, the mode of operation in which a piece of iron or other metal, being cut off to the right length and firmly held, is moved in a direction transverse to its length, and bent in a plane across its path, by contact with one or more inclined surfaces presented thereto, the metal being guided by the rabbet *d*, all substantially in the manner and for the purposes herein specified.

In testimony whereof I have hereunto set my hand this 24th day of January, 1876, in the presence of two subscribing witnesses.

WM. H. H. SISUM.

Witnesses:

A. HENRY GENTNER,

C. C. STETSON.