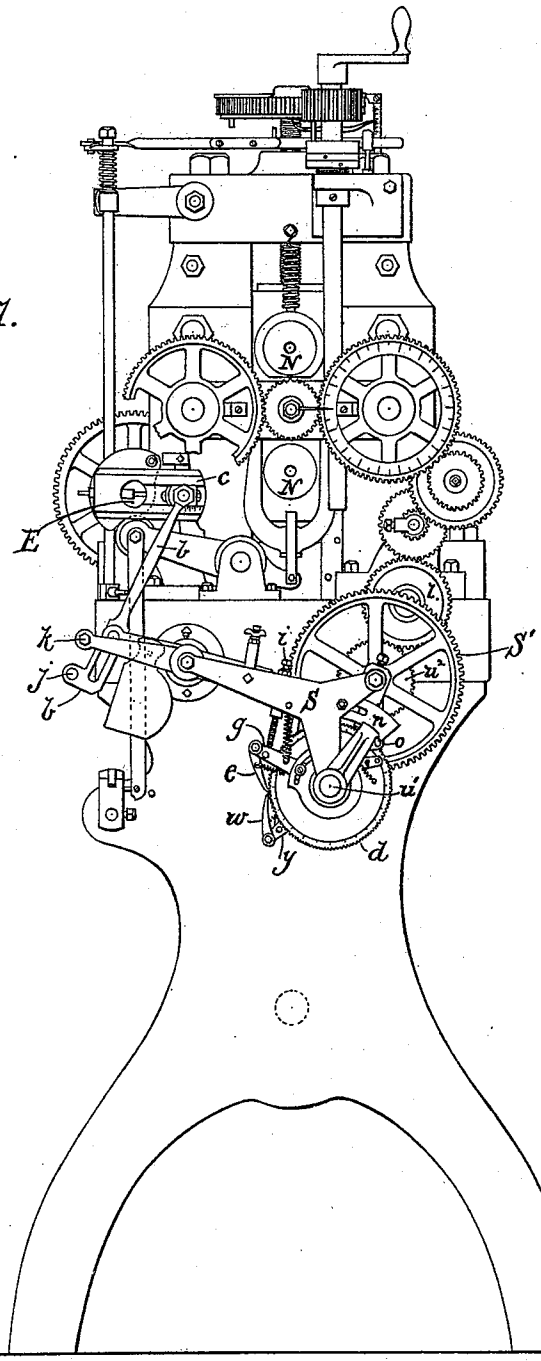
(No Model.) 2 Sheets—Sheet 1.

A. B. SHIPPEE.

ROLLING MACHINE.

No. 496,490. Patented May 2, 1893.

Fig. 1.



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(No Model.) 2 Sheets—Sheet 2.

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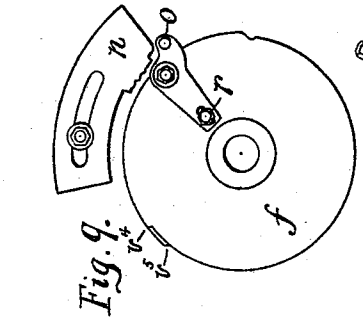

Fig. 9.

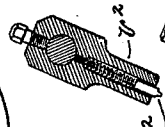

Fig. 4.

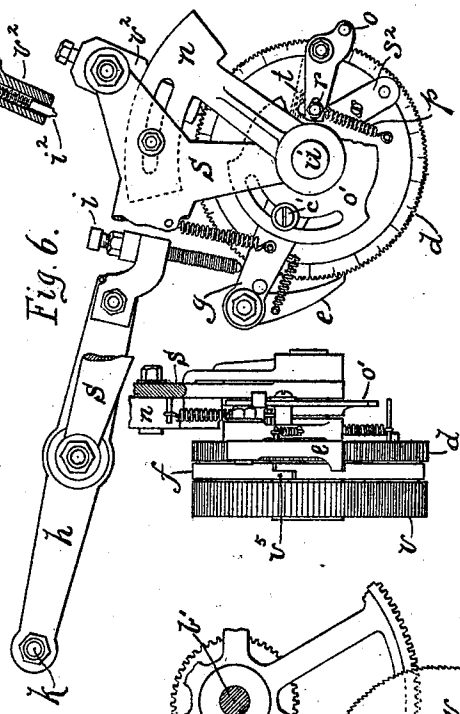

Fig. 6.

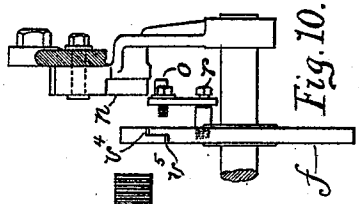

Fig. 10.

Fig. 7.

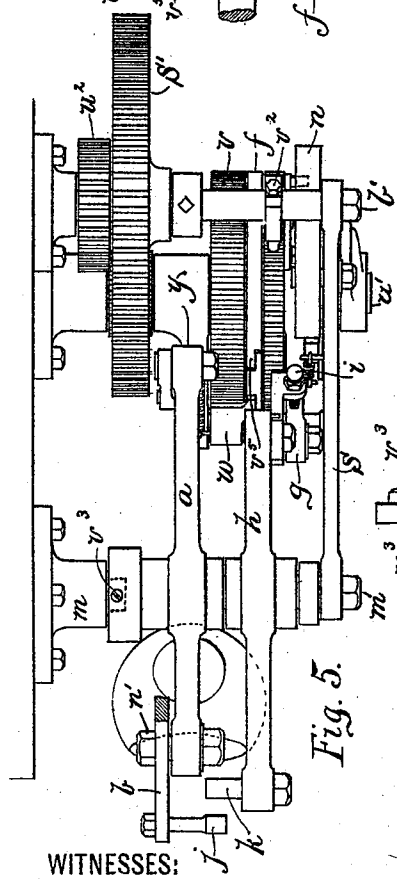

Fig. 5.

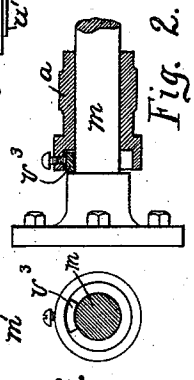

Fig. 2.

Fig. 3.

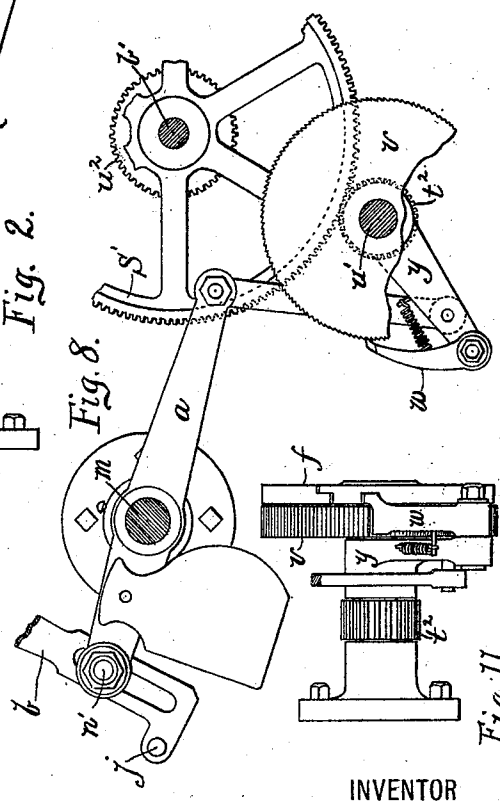

Fig. 8.

Fig. 11.

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UNITED STATES PATENT OFFICE.

AARON B. SHIPPEE, OF PROVIDENCE, RHODE ISLAND, ASSIGNOR TO ALBERT W. CHAPMAN, OF SAME PLACE.

ROLLING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 496,490, dated May 2, 1893.

Application filed April 2, 1892. Serial No. 427,494. (No model.)

To all whom it may concern:

Be it known that I, AARON B. SHIPPEE, of Providence, in the county of Providence and State of Rhode Island, have invented certain new and useful Improvements in Rolling-Machines; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form a part of this specification.

This invention relates to mechanism for obtaining a varying decrease of feed in closing rolls or dies, in machines for operating them, when articles are operated upon that require several successive passages between the rolls, to produce the necessary reduction, and is intended more especially for the operation of rolling cold metallic work many times between the rolls, without any intermediate annealing to soften them. It is well known that in rolling cold metal repeatedly without annealing, it becomes denser and harder at each operation, and consequently, will bear less and less reduction at each succeeding rolling. It is to produce this decrease of feed automatically and regularly, that this mechanism is devised, that it shall be precisely the same in any number of articles, and produce uniform results. It is illustrated in the accompanying drawings.

Figure 1 is an end elevation of a machine with the mechanism attached. Figs. 2 to 11, show the parts more or less in detail, or in combination with each other.

The following is a description of the parts of the mechanism and their arrangement and combination, when ready for use.

The shaft u', which is held in a bearing in the leg frame and plate S, has a ratchet wheel v, secured to it. (See Fig. 5.) This ratchet wheel v, is moved by a pawl w, pivoted to the arm y, that is held loosely on the shaft u'. The arm y, is connected by a rod to the arm a, held on a stud m, fast in the leg frame, and has its other end connected by the rod b, to an adjustable arm c, secured to the shaft E, connected to the driving gear of the machine, so as to revolve in unison with the rolls N, N, Fig. 1. A cut-off disk f, and an auxiliary ratchet wheel d, are held loosely on the shaft u', with a pawl e, pivoted to an arm g, also loose on the same shaft, Figs. 5 and 6. The disk f, is shown in elevation in Fig. 9. The upper part is of a slightly larger diameter than the outer ends of the ratchet teeth on the two ratchet wheels v and d, so that the smaller circle of part of the disk, will allow the pawls w and e, to catch and operate their respective ratchet wheels, until the larger diameter of the disk comes under a portion of each pawl that overhangs it, when the pawls will be lifted out of range with the ratchet teeth and cease to move the wheels. The ratchet wheel d, is moved in the opposite direction to the wheel v, by a screw i, in the arm h, which is held on the same stud as lever a, and is moved by a stud j, in the end of the arm b, which, when the arm rises, strikes against the stud k, in a short, adjustable piece secured to the end of lever h, Fig. 5, so that the arm b, operates wheel v, by the lever a, and the stud n', in the slot when the arm c, goes down, and the wheel d, by the arm h, and stud j, when it goes up; the slot in the end of the arm b, being for the purpose of limiting the time of moving the wheel v, to less than one-third of a revolution of the rolls N, N, the other two-thirds being required for rolling the blank. A three-armed bar S, has two of its arms secured to the studs m and b', and supports the outer end of shaft u', in the lower end of its third arm. This plate has an adjustable stop-plate n, bolted to it, for the lever o, to strike against when the ratchet wheel d, has reached its limit, Fig. 6. The lever o, is pivoted to the wheel d, near its outer edge, and a stud r, fast by its inner end in disk f, extends out through an oval opening in the wheel d, and enters a hole in the lever o, (see Fig. 9) so that when the lever o, is moved on its pivot, the stud r, will move the disk f, back or forward with regard to the wheel d. The lever o, is held back of a spring p, to the wheel d, and a stop-plate s^2, pivoted to the wheel d, is made adjustable by a slot and screw at its inner end, by which it can be set to cut off any or all motion of the stud r, in the opening in wheel d, the amount of motion allowed, being determined accurately by a set of graduated lines t, made on the face of the wheel d. As the arm c, in revolving,

goes down, it causes the lever a, by arm b, to move the ratchet wheel v, by the pawl w, and drives the feed gear S′, above, by gear t' on shaft u'. The arm c, by its upward movement, moves the lever h, by stud j, which causes the ratchet wheel d, to move by the pawl e, and with it the disk f. The feed of the wheel v, by the pawl w, continues until the disk f, is moved around by the pawl e, and brings the rise v^5. Figs. 9 and 5, on the disk, under the part of the pawl w that projects half way over the disk. This rise v^5, approaches the pawl w, at the finishing end of its working motion.

I will suppose that the pawl w, is feeding the wheel v, thirty-five teeth at a stroke. This it continues to do for seven strokes; in the mean time the pawl e, is moving the wheel d, say four teeth at a stroke, to bring the rise v^5, on the disk over in front of the pawl w, and it reaches it at the end of the seventh stroke, so that on the eighth stroke, it will overlap and lift the pawl w, out of the teeth of its wheel, four teeth from the end, so it will have fed that time, thirty-one teeth; at the next stroke it will overlap four teeth more, leaving a feed of twenty-seven teeth. This decrease of four teeth at a time, continues for seven strokes, leaving only seven teeth; but at the termination of the last seventh stroke, the end of lever o, has been set to arrive at the corner of the plate n, so that on the back stroke of the pawl w, and forward stroke of the pawl e, the cut-off lever o, strikes its outer end against the plate n, and the inner end, by means of the stud r, throws the disk f, ahead, such an additional number of teeth, as it may be set to do by the stop-plate s^2, as before described. This lessens the seven teeth left that much, in addition, to the regular four teeth taken off, as described by the wheel d. Now if the lever o, is set to move the disk f, ahead one tooth, this one with the four teeth of the pawl e, will make five teeth of the seven left at the end of the seventh stroke, to be taken off by the eighth stroke, this would leave only two teeth of the seven for the ninth stroke to finish the feed with; but if the lever o, had been set to move the disk f, ahead two teeth of the wheel d, these two, with the four teeth of pawl e, would make six to be taken off of the seven by the eighth stroke, and only one tooth would be left for the ninth stroke. This motion of the ratchet wheel v, with all its modifications, is conveyed to the devices that move the rolls or dies toward each other, through the shaft u', and gear t^2, fast thereon, between the arm y, and frame.

In Fig. 6, is shown a check motion consisting of a hollow arm v^2, that carries a spring detent i^2, (see Fig. 4) the end of which drops into the teeth of the wheel d, and checks its motion sufficiently to prevent it from being carried back by the return motion of the pawl e, or too far ahead by its momentum.

In Fig. 6, are shown the devices that determine the amount of motion given pawl e. A screw i, held in the end of the arm h, can be set to bring the pawl e, to stop at the same point as the pawl w, and the plate o', on the arm g, can be set by the screw c', in the slot to determine the starting point of the wheel d, by bringing the stud in that wheel that holds the spring p, up against the plate o'.

Figs. 2 and 3, illustrate a friction device for checking the motion of arm a, on stud m. It consists of a copper block v^3, held in a recess in the arm, and subject to the pressure of a set screw in the arm, to increase or lessen the friction on the stud.

Having thus described my improvements, I claim as my invention—

1. In a die feeding mechanism for die operating machines, the combination of a main ratchet wheel and actuating pawl, receiving motion from the driving shaft, to operate the feed, an auxiliary ratchet wheel and actuating pawl, also receiving motion from the driving shaft, adapted to modify the action of the pawl on the main ratchet wheel, a disk concentric with the two ratchet wheels and actuated by the auxiliary ratchet wheel, and having its diameter enlarged for a portion of its circumference, to raise the pawls of one or both ratchet wheels, as it may be set.

2. In a die feeding mechanism for die operating machines, a main ratchet wheel and actuating pawl receiving motion from the driving shaft, to operate the feed, an auxiliary ratchet wheel and actuating pawl also receiving motion from the driving shaft, adapted to modify the action of the pawl on the main ratchet wheel, a disk placed concentric with the two ratchet wheels and actuated by the auxiliary ratchet wheel and having its diameter enlarged for a portion of its circumference, to raise the pawls of one or both ratchet wheels, as it may be set, in combination with a lever pivoted to the auxiliary ratchet wheel, and arranged to move said disk by a stud fast therein and projecting through a hole in said auxiliary ratchet wheel, when said lever strikes a stationary stop plate, substantially as described.

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