(No Model.) 2 Sheets—Sheet 1.

W. H. ATKINSON & D. M. SOMERS.

DRIVE ROD CLUTCH FOR SHEARS.

No. 489,210. Patented Jan. 3, 1893.

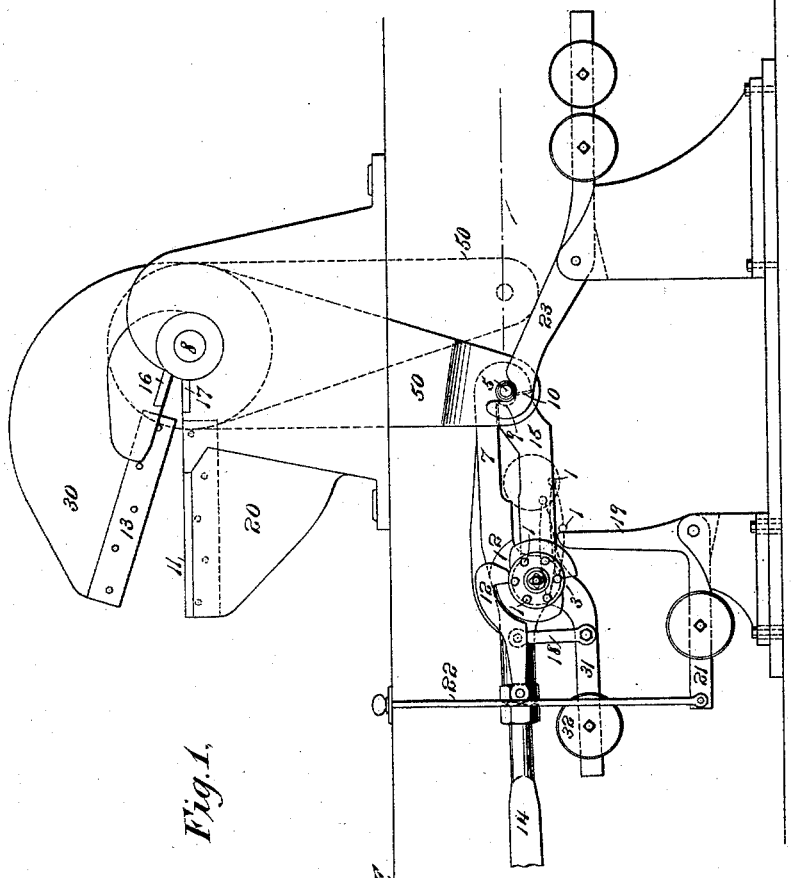


Fig. 1.

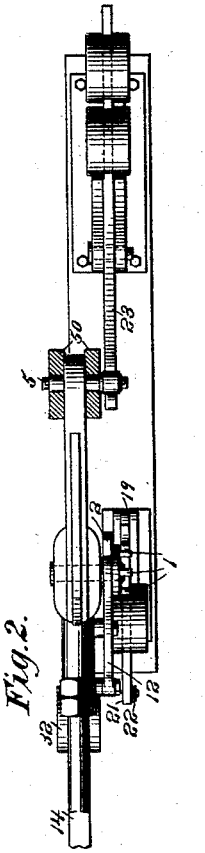
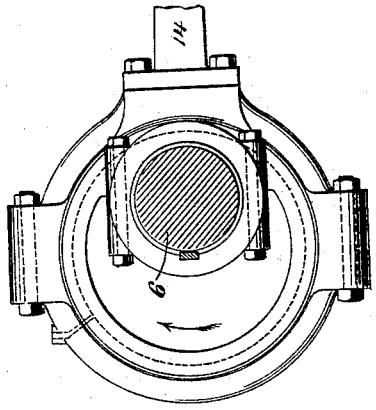


Fig. 2.



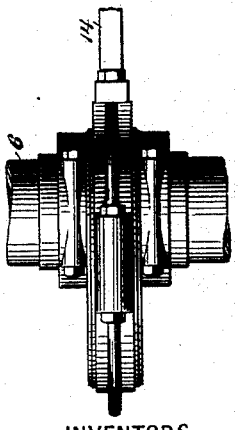


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Fig. 4.

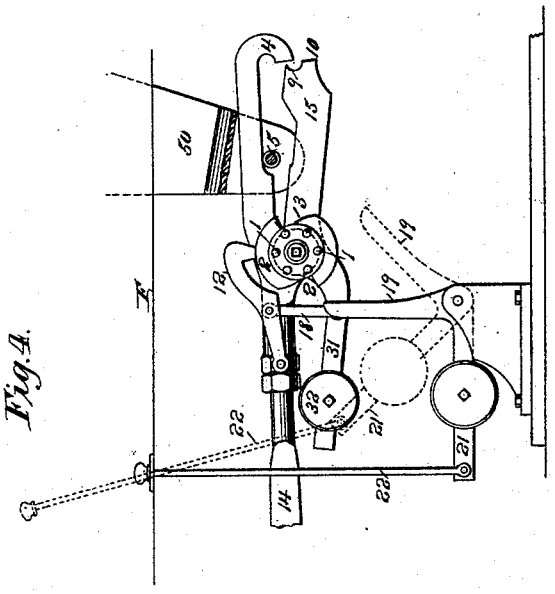
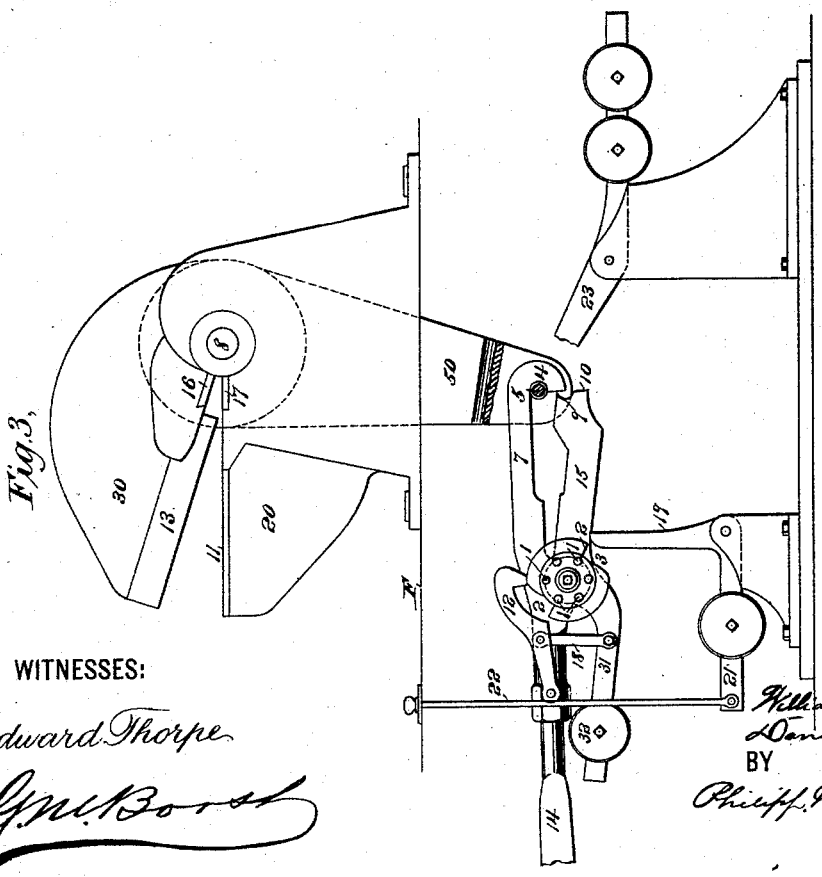


Fig. 3.



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UNITED STATES PATENT OFFICE.

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DRIVE-ROD CLUTCH FOR SHEARS.

SPECIFICATION forming part of Letters Patent No. 489,210, dated January 3, 1893.

Application filed May 2, 1892. Serial No. 431,536. (No model.)

To all whom it may concern:

Be it known that we, WILLIAM H. ATKINSON and DANIEL M. SOMERS, citizens of the United States, both residing at Brooklyn, county of Kings, and State of New York, have invented certain new and useful Improvements in Drive-Rod Clutches for Shears, fully described and represented in the following specification and the accompanying drawings, forming a part of the same.

This invention though particularly designed for use in connection with doubling shears in the operation known as hot rolling in the preparation of metal plates in the manufacture of tin or terne plates, is nevertheless adapted for use in many other machines.

The invention relates to means for controlling the transmission of the movements of a reciprocating driver to the machine it is to operate, and consists in the mechanical constructions fully hereinafter described and particularly pointed out in the claims, the object being to utilize the movements of a rapidly operating driver by coupling the same to the machine to be operated at regular or desired periods.

The manner in which this invention is or may be carried into effect will now be explained aided by reference to the accompanying drawings, in which:—

Figure 1 represents in side elevation doubling shears provided with said improvement. Fig. 2 is a plan view of the operating devices. Fig. 3 is an enlarged side elevation of the same, with the driving shaft omitted and showing the controlling devices as unclutched, and Fig. 4 is a similar view with the parts in another position.

In the manufacture of these metal plates, such as are suitable to be made into what is termed "tin or terne plate," the reduction of an ingot to a pack of sheets each of the proper thickness is accomplished as follows:—An ingot of suitable size is heated and rolled down until it is extended to the proper length, which is about double the length of the sheet that is desired, when finished, or two ingots of half weight and thickness are rolled separately, one following the other, and then laid together, with their edges parallel such an ingot is then folded through its center, bringing the ends as near even as possible with the side edges parallel; any projecting end being then clipped off by the shears. This gives a pack composed of four plies loose at one end and a tight folded seam or doubled edge at the other end, the length of which pack is about that of the desired finished sheet. It is then re-heated and rolled by first inserting the folded end or doubled edge between the rolls and rolled, making it of about twice its length. It is then doubled by bringing its ends and edges as evenly as possible, and pressed with the foot to roughly fold it, being thereafter placed under the doubler and squeezed between the pressing plates to form a flat crease or fold at its end. It is then squared round and the four loose ends and the four folded or doubled ends, which are about even with each other are sheared off, leaving eight loose ends at one end of the pack and the other end of the pack tightly folded. It is then placed in the re-heating furnace and again heated and rolled to about the desirable length to make the proper thickness and length of sheets that are desired. It is then allowed to cool and is taken to the squaring shears, and cut into marketable sizes.

As the preliminary doubling of the rolled ingot or pack and the feeding of the same first to present the crudely doubled portion to the pressing plates of the shears and then to present the projecting edges or ends of the doubled plate or pack to the cutting action of the shears, are necessarily performed by hand manipulation and it is necessary, in order to economize time and reduce cost of production, that the doubling and shearing or trimming operations shall be quickly performed when the plate or pack is in position to be operated upon, it follows that the doubling shears must move quickly when in operation. This in turn requires that the driver of the shears shall run at high speed and means be provided for automatically coupling it with the shear and uncoupling it therefrom at suitable times, and, it is furthermore desirable to provide means for retaining the uncoupled condition in consequence of delays incident to heating the ingot and plates to the required degree for perfect rolling.

That a ready understanding of the invention may be had the machine illustrated will first be generally described and then its details and operation will be explained.

Although the requisite high speed may be taken from any suitable driven shaft, it is convenient and desirable in a rolling mill that the main shaft driven by the engine shall be used, and hence such a shaft, as 6, is made use of in this instance, and shown in Fig. 1 as running beneath a floor F upon which is supported an ordinary doubling shears composed of a stationary jaw 20 and a movable jaw 30. This jaw 20 is provided with a cutting plate 11 and the jaw 30 with a cutting blade 13 that cooperate in performing the shearing operation; and the jaw 20 also supports at its rear end a pressing plate 17 and the jaw 30 carries a similar pressing plate 16, which plates are as long as the ingot or pack of plates is wide, and cooperate in pressing flat the doubled or folded edge of the ingot or pack. The jaw 30 is pivoted on a shaft 8 from which a rock arm 50 projects downward below said floor, which arm will, when properly oscillated, cause the jaw 30 to open and close and hence move the pressing plates 16, 17, to and from each other and carry the cutting blade 13 past the cutting plate 11 in shearing contact therewith. The rock arm 50 is oscillated by means of a connecting rod 14 that is reciprocated by an eccentric on the shaft 6. This rod 14 is shaped at its forward end into a hook 4 that may engage the stud 5 in the bifurcated end of the rock arm 50 and said rod is provided for a suitable distance rearward from the engaging hook 4 with a straight bearing surface 7 so that the rod may at times slide upon the stud 5. And in order to lock the engaging hook 4 so that it will rigidly embrace the stud 5 a clutching jaw 15 is pivoted to the rod 14 and provided with a curved recess 9 and straight bearing 10 at its extremity that adapt it to embrace one-half of said stud 5 and snugly bear against the end of the engaging hook 4 when the jaw 15 is closed, as in Fig. 1, to clutch the reciprocating driving rod 14 to the rock arm 50 and thus enable said rod to rock the arm and operate the shears.

In order to have the advantage of speedy movements imparted by the shaft 6, through the reciprocating driving rod 14, at such intervals of time or during such reciprocations of the rod 14 as may be desired, the jaw 15 is automatically brought into position to clutch the hook 4 to the arm 50, as follows:—This pivoted jaw 15 has a tail piece 31 carrying a weight 32 which normally acts to raise the jaw 15 into clutching position, and upon the pivot of this jaw is provided a rotating controlling cam having two opposite low parts 2, 3, and provided with laterally extending equidistant pins 1, and said rod 14 carries pivoted to it an actuating lever 12 whose forward end bears upon the controlling cam and which lever 12 is connected to the weighted tail piece 31 by a strap 18, whereby the movements of the lever are communicated to the tail piece and thence to the clutching jaw 15. In vertical alignment with the pins 1 of the cam there is a pivoted tappet 19 that has a projecting weighted arm 21 by which it is normally held upright, and a lifting rod 22 with a handle projecting through the floor F by which it may be tilted out of active position, as shown in dotted lines in Fig. 4.

When the forward end of the lever 12 is entered into a low part of the cam disk, as 2 in Fig. 1, the tail piece 31 will have been rocked downward by the weight 32 and thus have raised the clutching jaw 15 so that its curved recess 9 will embrace the stud 5 and its bearing 10 rest against the end of the engaging hook 4 thus clutching the rod 14 to the rock arm 50. With the parts in this position the forward movement of the rod 14 will move the rock arm 50 to the dotted position shown in Fig. 1, and operate the shears, and during this forward movement of the rod 14 the lowermost pin 1 will be moved forward in the upper dotted curved path indicated and thus pass over the top of the tappet 19, but upon the rearward movement of said rod 14 this pin 1 will be moved in the lower dotted curved path and thus abutting against the end of said tappet 19 will cause the controlling cam to make a sixth revolution (if there be six such pins as shown) and thus cause the end of the actuating lever 12 to ride up onto the enlarged part of said cam, as in Fig. 3, thereby raising the tail piece 31 and forcing the jaw 15 open and out of contact with the stud 5 and hook 4 as the rearward movement of the rod 14 is being completed, at which time a weighted rocking hooked arm 23 engages the stud 5 which is extended at one side of the arm 50 for that purpose and prevents the jaw 30 from closing by its own weight. When the forward movement of the rod 14 is repeated the engaging hook 4 will leave the stud 5 and slide inoperatively forward upon its straight bearing 7, as in Fig. 4, during which movement the lowermost pin 1 will swing in the curved paths described with reference to Fig. 1, and this pin will, upon the next rearward movement of the rod 14 engage the tappet 19 and cause the controlling cam to make another sixth revolution during which the actuating lever 12 remains sustained upon the high part of the controlling cam, as in Fig. 4, and consequently still holds the jaw 15 open and out of contact with the stud 5 and hook 4. When however, the next forward movement of the rod 14 is made, the then lowermost pin 1 will ride over the tappet 19, but when the next return movement of the rod 14 is made this pin 1 will engage the tappet 19 and cause the controlling cam to make another sixth revolution which will bring the low part 3 of the controlling cam into such position that the end of the actuating lever 12 will drop into it and thus bringing the parts into the positions shown in Fig. 1, with the rod 14 clutched to the rock arm 50; and consequently when

that rod again reciprocates it will oscillate the shears to perform work, and the controlling cam will be moved to raise the actuating lever 12 and again drop the jaw 15 open as this reciprocation is completed. As there are six pins and two low parts of the controlling cam it follows that said cam will be rotated with a step by step movement accomplished at each reciprocation of the rod 14 and that said cam will be effective to oscillate the rock arm 50 and operate the shears only at each third reciprocation of the rod 14. Of course this number of effective reciprocations of the rod 14 may be varied as desired by providing the controlling cam with more or less low parts and pins.

When it is desired to put the shears out of operation the tappet 19 is tilted out of active position, as in dotted lines Fig. 4, by raising the rod 22 at a time when the lever 12 is resting upon a high part of the cam whereupon the rod 14 will continue to reciprocate but remain unclutched from the rocking arm 50.

What is claimed is:—

1. The combination with a reciprocating driving rod and an arm to be oscillated thereby, an engaging hook and a weighted clutching jaw, of a cam controlled actuating lever for coupling and uncoupling the rod and arm and means for rotating said cam with a step by step movement, substantially as described.

2. The combination with a reciprocating driving rod and an arm to be periodically oscillated thereby, of an engaging hook elongated to provide it when unclutched with a sliding bearing, a weighted clutching jaw, a cam controlled lever for actuating the clutching jaw, and means for rotating said cam with a step by step movement, substantially as described.

3. The combination with the rock arm 50 connected with the moving jaw of the shears, the reciprocating driving rod 14, and its engaging hook 4, of the pivoted weighted clutching jaw 15, co-operating with said hook, an actuating lever 12 linked to said jaw and a cam operating to control the movements of said jaw, substantially as described.

4. The combination with the rock arm 50, connected with the moving jaw of the shears, a reciprocating driving rod 14, its engaging hook 4 and clutching jaw 15 co-operating with said hook, of an actuating lever 12 connected with said jaw, a cam operating to control the movements of said jaw, and pins 1, and tappet 19, for actuating said cam, substantially as described.

5. The combination with the rock arm 50 connected with the moving jaw of the shears, a driving rod 14, its engaging hook 4, and a lever 12 attached to the clutching jaw 15 and limited in its movements by a controlling cam, of said clutching jaw 15 pivoted to the driving rod and having a weighted tail piece 31 whereby said jaw is normally held closed, substantially as described.

6. The combination with the rock arm 50 connected with the moving jaw of the shears, a driving rod 14, its engaging hook 4, and co-operating clutching jaw 15, the lever 12 attached to the clutching jaw and limited in its movements by a controlling cam, of pins 1 carried by the cam and engaged by the tappet 19 and means for tilting the latter out of active position, substantially as described.

7. The combination with the rock arm 50 connected with the moving jaw of the shears, its driving rod 14 and means for periodically coupling and uncoupling said arm and rod, of the weighted hooked arm 23 for sustaining said rock arm when it is uncoupled, substantially as described.

In testimony whereof we have hereunto set our hands in the presence of two subscribing witnesses.

WILLIAM H. ATKINSON.
DANIEL M. SOMERS.

Witnesses:
OSCAR M. BERRY,
HUBERT G. MAGNUS.