(No Model.)

2 Sheets—Sheet 1.

J. S. GRIFFIN.

MACHINE FOR ROLLING HARROW TEETH.

No. 266,465. Patented Oct. 24, 1882.

Fig. 1.

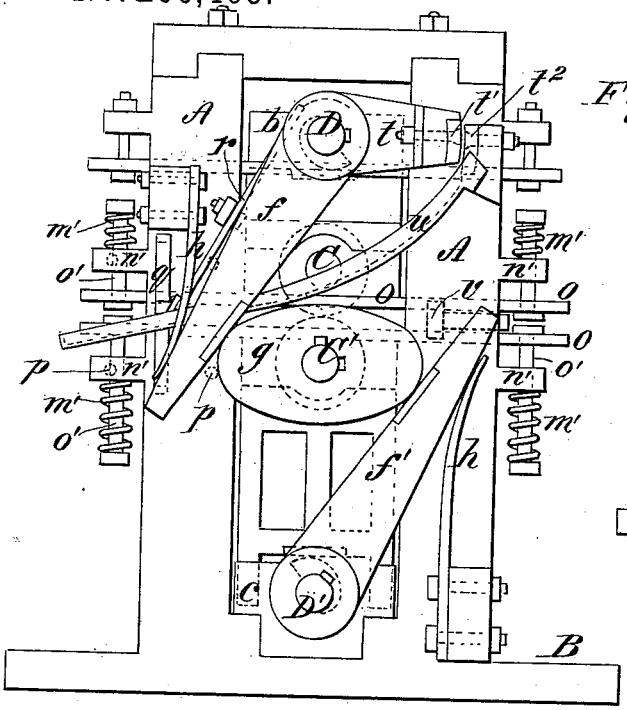


Fig. 5.

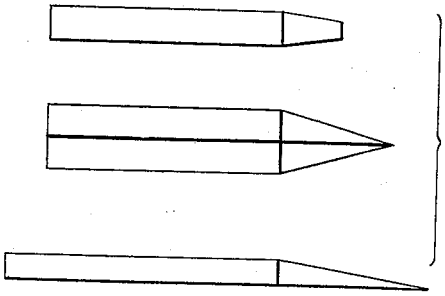
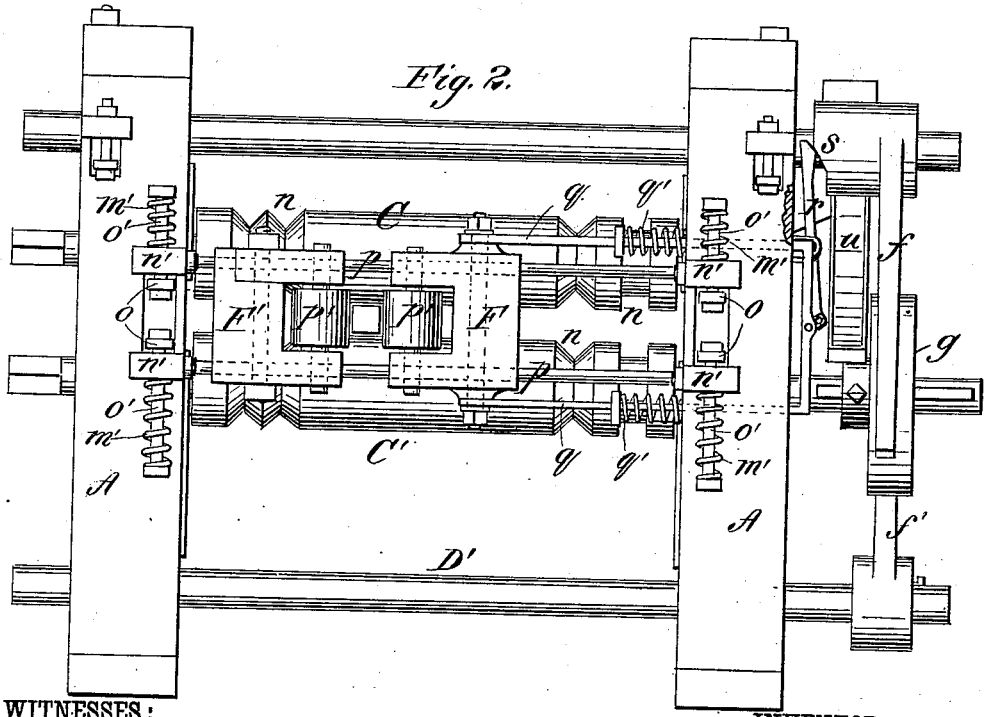


Fig. 2.



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(No Model.) 2 Sheets—Sheet 2.

J. S. GRIFFIN.

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Fig. 4.

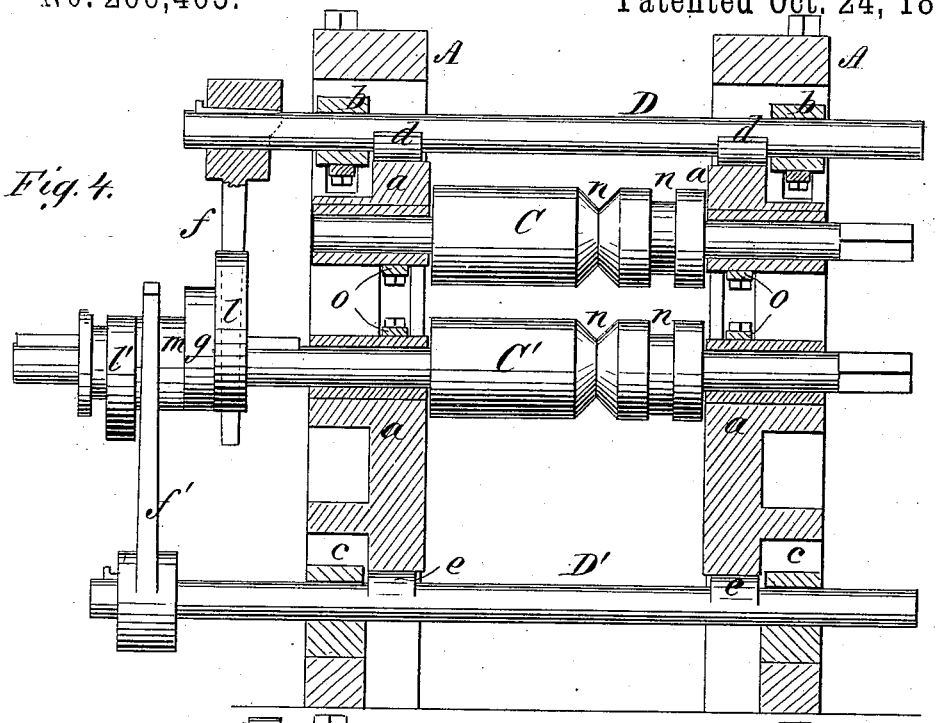

Fig. 3.

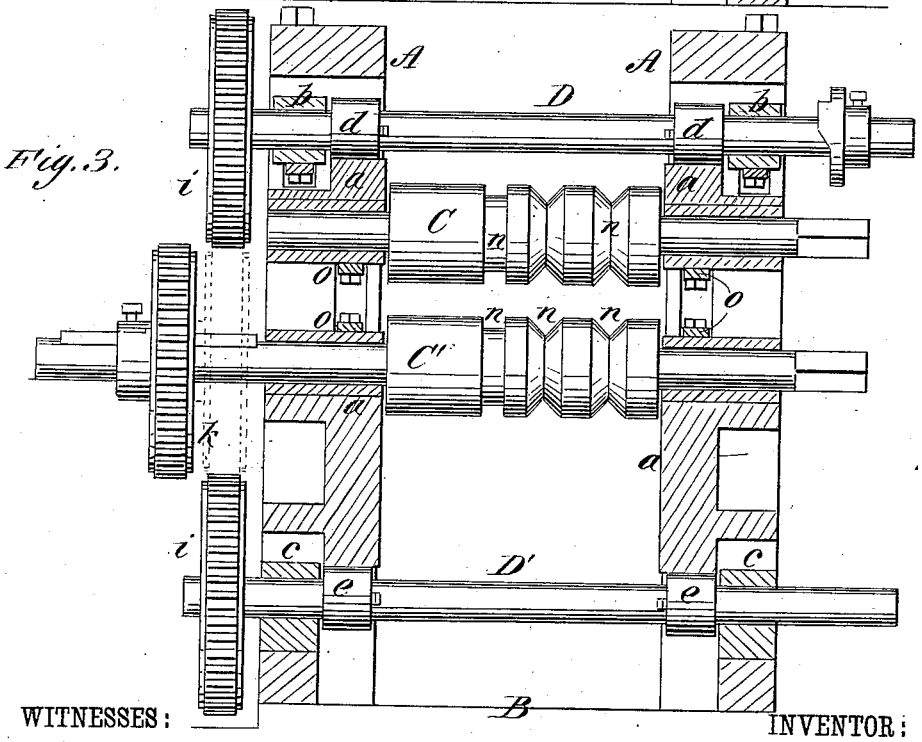

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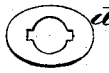
Fig. 6.



INVENTOR:

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UNITED STATES PATENT OFFICE.

JOHN S. GRIFFIN, OF CLEVELAND, OHIO.

MACHINE FOR ROLLING HARROW-TEETH.

SPECIFICATION forming part of Letters Patent No. 266,465, dated October 24, 1882.

Application filed April 21, 1882. (No model.)

To all whom it may concern:

Be it known that I, JOHN S. GRIFFIN, of Cleveland, in the county of Cuyahoga and State of Ohio, have invented certain new and useful Improvements in Machines for Rolling Harrow-Teeth, of which the following is a full, clear, and exact description.

My invention relates to machines for making harrow-teeth and other tools and implements by a drawing operation between rolls.

It consists in revolving or rocking cams placed above and beneath the rollers and fitted for vertical movement to insure a true taper on both sides of the blank.

It consists, further, in self-acting guards for holding the blank in a proper position until caught by the rolls, all as hereinafter described and claimed.

Reference is to be had to the accompanying drawings, forming part of this specification, in which similar letters of reference indicate corresponding parts in all the figures.

Figure 1 is an end elevation of the machine. Fig. 2 is a side elevation of the same. Fig. 3 is a vertical longitudinal section of the machine modified in certain particulars, and Fig. 4 is a vertical longitudinal section of the machine with only the upper rollers fitted for vertical movement. Fig. 5 are three different forms of the finished teeth, and Fig. 6 is a side elevation of the cam.

A A are the standards of the machine, fitted on a base, B.

C is the upper roll, and C′ the lower roll, both sustained at their ends in boxes *a*, that are fitted to slide vertically in the standards A.

D is a shaft, sustained above the upper roll, C, in boxes *b*, that are fixed on said standards A, and D′ is a shaft sustained below the lower roll, C′, in boxes *c*. On the shaft D are cams *d d*, above the boxes *a* of the roller C, and on shaft D′ are cams *e e*, below the boxes *a* of the roller C′, by which cams the boxes are moved and the rollers brought together to compress the blank.

Referring, now, to Figs. 1 and 2, *f f′* are arms fixed on shafts D D′, respectively, at one end of the machine.

g is a double cam fixed on the shaft of the lower roller, C′, and between the arms *f f′*.

h h are springs fixed on standards A, and bearing on the arms *f f′* to keep them in contact with the cam *g*. The shafts of rollers C C′ project at the other end of the machine, to receive gearing by which the two shafts will be connected and simultaneously rotated. The cam *g*, revolving with the lower roll, moves the arms *f f′* outward, thereby rocking the shafts D D′ and bringing the rolls C C′ together twice in each rotation of the rollers. This double action is available when the taper to be made is short, and it facilitates rapid work.

In place of the cam and levers to move the rolls, gearing may be used to rotate the shafts D D′. This arrangement is shown in Fig. 3, wherein *i i* are gear-wheels on the shafts D D′, and *k* is an intermediate gear-wheel on the shaft of the lower roller, C′, for meshing with the gear-wheels *i*. The teeth of wheels *k i i* are made deep enough to allow the upward movement of the roll, and the wheel *k* is fitted for being moved out of gear, as shown, so that the roll can be turned for equalizing the wear. The cams *d e* in this case are made continuous, and double, if desired, as shown in Fig. 6.

In Fig. 4 a construction is shown which allows the vertical play to be entirely in the upper roll, while the lower one simply revolves. On the shaft of roller C′ is the double cam *g*, as before, and two single cams, *l l′*, for operating on the arms *f f′* of the rock-shafts, and between these cams is a concentric roller, *m*. The arm *f′* of shaft D′ is adjustable to either cam *g* or *l′*, or to the roller *m*. When placed against roller *m* the lower shaft, D′, remains stationary, while the upper roller, C, moves down once or twice in each rotation, according as to whether its operative arm *f* is upon the cam *l* or *g*. By placing arm *f′* on cam *l′* and arm *f* on cam *l* both rollers will be moved once in each rotation, or twice if the arms be upon cam *g*.

The rollers C C′ are formed with grooves *n*, of square or V form, according to the shape of the teeth to be rolled. The square grooves produce the taper on two opposite sides, while the V forms bring the taper on the four sides of the tooth. A portion of the surface is left plain for finishing the teeth by a second rolling. In case the upper roller alone moves inward, the groove *n* in the lower roll should be eccentric, as shown in Fig. 4, so that the taper

shall be equal on both sides. That is practicable, however, only in rolling by the square grooves. The bearings *a* of the rollers C C′ are attached upon cross-bars *o o*, that extend through slots in the standards A, so as to guide the boxes in their movement. The bars *o* are sustained at their ends by slide-rods *o′ o′*, fitted through side brackets, *n′*, on standards A. Around the rods *o* and taking in the brackets are spiral springs *m′*, which, being compressed by the inward movement of the rolls, react and return the rolls outward as the pressure of the cams is released.

For holding the bar or blank until grasped by the rollers I provide devices shown in Figs. 1 and 2, and next described.

F′ is a stationary block, and F is a slide-block sustained on four rods, *p*, at the front of the machine and between the standards A.

p′ p′ are rollers fitted in the adjacent ends of the slides F and block F′. *q q* are rods connected to slide F, and extending through the standard A at one end of the machine, where these rods connect to the end of a lever, *r*. The outer end of lever *r* extends to a cam, *s*, that is on the end of the upper shaft, D, which cam is formed to press the lever inward, and by thus drawing on rods *q* move the slide-block F outward, thereby releasing the blank held between the rollers *p′ p′*, this movement being simultaneous with the movement outward of rolls C C′. On rods *q* are springs *q′*, acting to return the slide F when the lever *r* is released by the cam.

On one end of the upper shaft, D, is fixed an arm, *t*, provided at its end with a shear, *t′*, and on one standard A is a fixed cutter, t^2, in front of which the shear *t′* is carried by the movement of the rock-shaft for cutting off the blanks or bar into lengths, as required. A chute, *u*, beneath receives the cut-off blanks and carries them to the front of the machine.

Stops *v* (shown by dotted lines in Fig. 1) are fixed behind the rolls C to limit the distance that the blanks are inserted, and consequently the length of the taper. The grooves *n* are to be in number and depth as required for gradually reducing the blank.

In operation the bar is fed by hand to the cutters *t′* t^2 and the blanks cut off slide upon chute *u* to the front of the machine. The operator, taking a blank in hand, inserts one end between the rolls as they open until the ends take against the stop *v*. The rolls then closing, the pressure tapers the end of the blank and forces it outward toward the operator. The rolls opening again, the operator reinserts the blank for a second pressure, and continues the operation as long as necessary, changing from one groove to the other to complete the reduction. To finish the taper the blank is inserted between the rollers of the blocks F F′, which open as the rolls separate, and the blank is held by the rollers in the correct position, while the rolls act to finish the tooth by giving the taper a smooth finish and fine edge.

The forms of teeth produced by the operation are shown in Fig. 5.

Having thus fully described my invention, I claim as new and desire to secure by Letters Patent—

1. The combination of rolls C C′ in sliding boxes *a* and the rock-shafts D D′, provided with cams *d e*, that bear on the boxes of the rolls, substantially as shown and described.

2. In rolling-machines, the shafts D D′, placed above and below the rollers, and provided with cams or eccentrics for pressing the rolls together, substantially as shown and described.

3. The combination of rolls C C′, shafts D D′, cams *d e*, arms *f f′*, fitted on the shafts, and cam *g*, fixed on the shaft of the lower roll, substantially as described, for operation as set forth.

4. The combination of cams *l l′* and *g* on the shaft of the lower roll, C′, and the rock-shafts D D′, provided with adjustable arms *f f′*, substantially as described.

5. The combination of block F′, slide-block F, rods *q*, springs *q′*, lever *r*, and cam *s* with the compression-rolls C C′, substantially as described, for operation as set forth.

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Witnesses:
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WILLIAM LUCAS.