(No Model.)

N. HICKS & G. A. METCALF.

CARD GRINDING MACHINE.

No. 325,744. Patented Sept. 8, 1885.

Fig. 1.

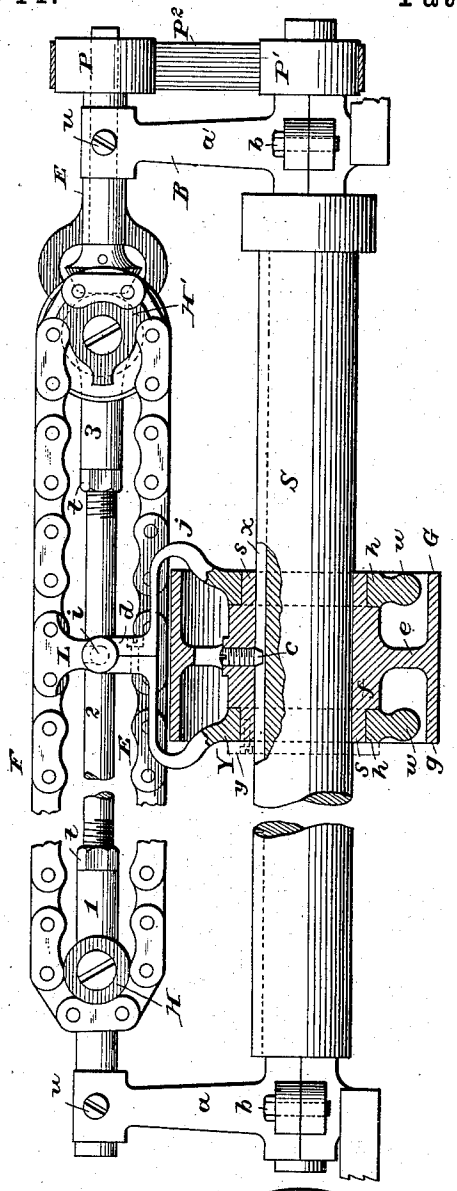


Fig. 3.

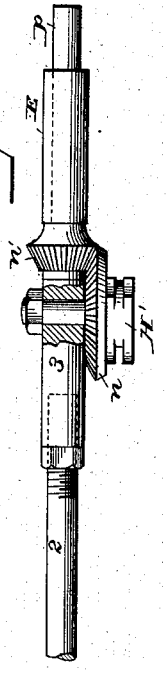
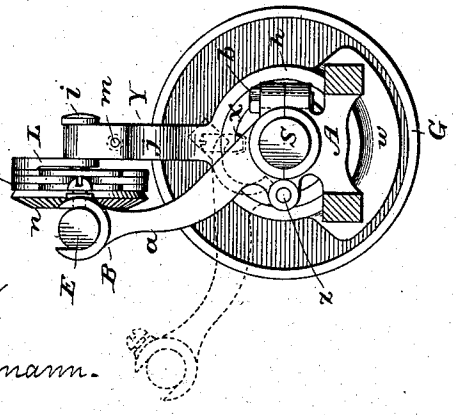


Fig. 2.



Attest:
Court. A. Cooper.
K. E. G. Fanmann.

Nehemiah Hicks, 2nd
George A. Metcalf,
Inventors:
By Foster & Freeman
Attorneys.

N. PETERS, Photo-Lithographer, Washington, D. C.

UNITED STATES PATENT OFFICE.

NEHEMIAH HICKS, OF ATTLEBOROUGH, MASSACHUSETTS, AND GEORGE A. METCALF, OF WOONSOCKET, RHODE ISLAND.

CARD-GRINDING MACHINE.

SPECIFICATION forming part of Letters Patent No. 325,744, dated September 8, 1885.

Application filed July 2, 1884. (No model.)

To all whom it may concern:

Be it known that we, NEHEMIAH HICKS, of Attleborough, Bristol county, Massachusetts, and GEORGE A. METCALF, of Woonsocket, Providence county, Rhode Island, have invented certain new and useful Improvements in Card-Grinding Machines, of which the following is a specification.

Our invention relates to that class of grinding-machines especially adapted for grinding cards, in which the grinding-wheel rotates with and travels back and forth upon the driving-shaft; and our invention consists in combining with the said wheel a driving-chain moving continuously in one direction, and a yoke and link connection, whereby the traversing movement of the wheel is effected by the action of the said chain.

In the drawings, Figure 1 is a front elevation in part section of our improved grinding-machine. Fig. 2 is an end elevation. Fig. 3 is a plan of the chain-supporting rod and driving mechanism.

A A′ represent portions of the stationary part of the machine, to which are jointed arms *a a′*, which, with a cross-bar, E, constitute a swinging frame, and the bearings of a shaft, S, carrying the grinding-wheel G, are between the two frames, so that the frame B may be swung on pivots *z* back to the position shown in dotted lines, Fig. 2, in which case the shaft S may be lifted from its bearings. When the frame B is in the position shown in full lines, Fig. 2, it is retained by means of bolts *b*. The shaft S has a longitudinal groove, *x*, into which enters the conical end of a pin, *c*, projecting from the grinding-wheel; and this end of the pin may, if necessary, be provided with a conical friction-roller, so that the grinding-wheel may be carried back and forth longitudinally upon the shaft S while turning therewith, the combined rotary and traversing motions of the grinding-wheel causing it to operate upon the entire width of the card or other object to be ground. The traversing motion of the wheel is imparted from a continuously-moving chain, F, carried by sprocket wheels or pinions H H′, supported by the bar E, and connected by a link, L, to a stud, *d*, upon a yoke, Y, in which the hub of the grinding-wheel revolves, the connection being formed by a pin, *i*, on the link, which fits a notch in the end of the stud.

As shown, the grinding-wheel is provided with a central web, *e*, which extends from the hub *f* of the wheel to the rim *g*, as shown in Fig. 1, and the yoke Y is in two sections, each of which consists of a ring, *h*, fitting loosely upon an annular flange, *s*, of the hub, and a bent arm, *j*, which extends around the rim of the wheel, and is secured to the arm of the opposite section of the yoke by a bolt, *m*. In order that this yoke may maintain its upright position when disconnected from the driving-chain, a weight, *w*, is connected to or forms part of the lower side of each ring *h*, and tends to maintain the yoke in the position shown in Figs. 1 and 2.

Secured to or forming part of the wheel H′ is a bevel-gear, *n*, which gears with a bevel-pinion, *n′*, connected to a shaft, *p*, which extends through the hollow end of the rod E, and carries a pulley, P, driven by means of a belt, P^2, from a pulley, P′, upon the shaft S. The link L is connected to the chain, and the pivot *i*, connecting said link with the yoke Y, is directly opposite the center of the rod E, so that as the link approaches either of the wheels H H′ and is carried around the latter with the chain the pin *i* will, during such movement, coincide with the axis of said wheel, so that the yoke, and with it the grinding-wheel, will be carried upon the shaft S, first to one end and then to the other, back and forth, while the rotation of the wheel is continued. By this means a positive traversing action is imparted to the grinding-wheel with but little friction and through the medium of comparatively simple appliances.

It will be seen that the carrying-pin *i* and its supports and driving appliances are all carried by the hinged frame B, so that the parts may at any time be swung back out of connection with the grinding-wheel after removing the bolts *b*, the pin *i* slipping out of the notch in the stud *d*.

By making the yoke Y in two sections bolted together and fitted to opposite sides of the wheel, it can be readily applied or removed, and when in place affords a medium of communication from the chain to the grinding-wheel with comparatively little friction. By balancing the yoke Y so that it will remain

in an upright position when disconnected from the driving appliances, it is prevented from swinging down and injuring the card when thus disconnected.

To compensate for wear or stretch of the driving-chain F, we provide means for adjusting the wheels H H′ to a greater or less distance apart. Thus the rod E may consist of three parts, 1 2 3, the parts 1 and 3 carrying the bearings of the wheels H H′, and having threaded sockets to receive the threaded ends of the part 2, the threads running in opposite directions, so that by turning the part 2 the parts 1 and 3 may be separated or brought together. Jam-nuts *t* serve to secure the parts in the position to which they are adjusted, and set-screws *u* hold the sections 1 and 3 firmly in their bearings.

A belt or cable may be used instead of the chain F, and other means than those described may be employed for tightening the same and for imparting a continuous movement thereto in one direction; and the yoke Y may consist of a single ring and arm at one side of the grinding-wheel, in which case it will be confined to the hub by means of an annular collar, *y*. (Shown in dotted lines, Fig. 1.)

Without limiting ourselves to the precise arrangement and construction of parts shown, we claim—

1. The combination, with a rotating shaft, and grinding-wheel connected to slide upon said shaft, of a continuous driving belt or chain arranged outside of and parallel to said shaft, and a yoke encircling the hub of the grinding-wheel, and provided with an arm connected by a pivoted link to the driving belt, substantially as set forth.

2. The combination, with the rotating and sliding grinding-wheel and yoke connected thereto so as not to turn therewith, of a continuous driving-chain carrying a link pivoted to the yoke at a point midway between the sides of the chain, substantially as set forth.

3. The combination, with the shaft carrying the rotating and sliding grinding-wheel, of a yoke encircling the hub of said wheel, a swinging frame carrying supporting-wheels, and a continuous chain passing around said supporting-wheels and connected by a link to the yoke, substantially as described.

4. The combination, with the rotating and sliding grinding-wheel and driving-chain, of a yoke having an arm connected by a link to said chain and a ring encircling an annular flange, *s*, substantially as set forth.

5. The combination of the sliding and rotating grinding-wheel, provided with annular flanges *s* upon the opposite ends, and a yoke consisting of two independently-detachable ring-sections having arms extending around and connected detachably together opposite the rim of the wheel, substantially as described.

6. The combination, with the sliding and rotating grinding-wheel, of a yoke inclosing a flange thereof and weighted at the lower side, for the purpose set forth.

7. The combination of the main frame and a swinging frame, B, pivoted thereto, carrying a driving-chain, and a shaft carrying the grinding-wheel having its bearings between the two frames and connections between the driving-chain and grinding-wheel, substantially as described.

In testimony whereof we have signed our names to this specification in the presence of two subscribing witnesses.

NEHEMIAH HICKS.
GEORGE A. METCALF.

Witnesses:
J. M. DAGGETT, Jr.,
NANCY M. DAGGETT.