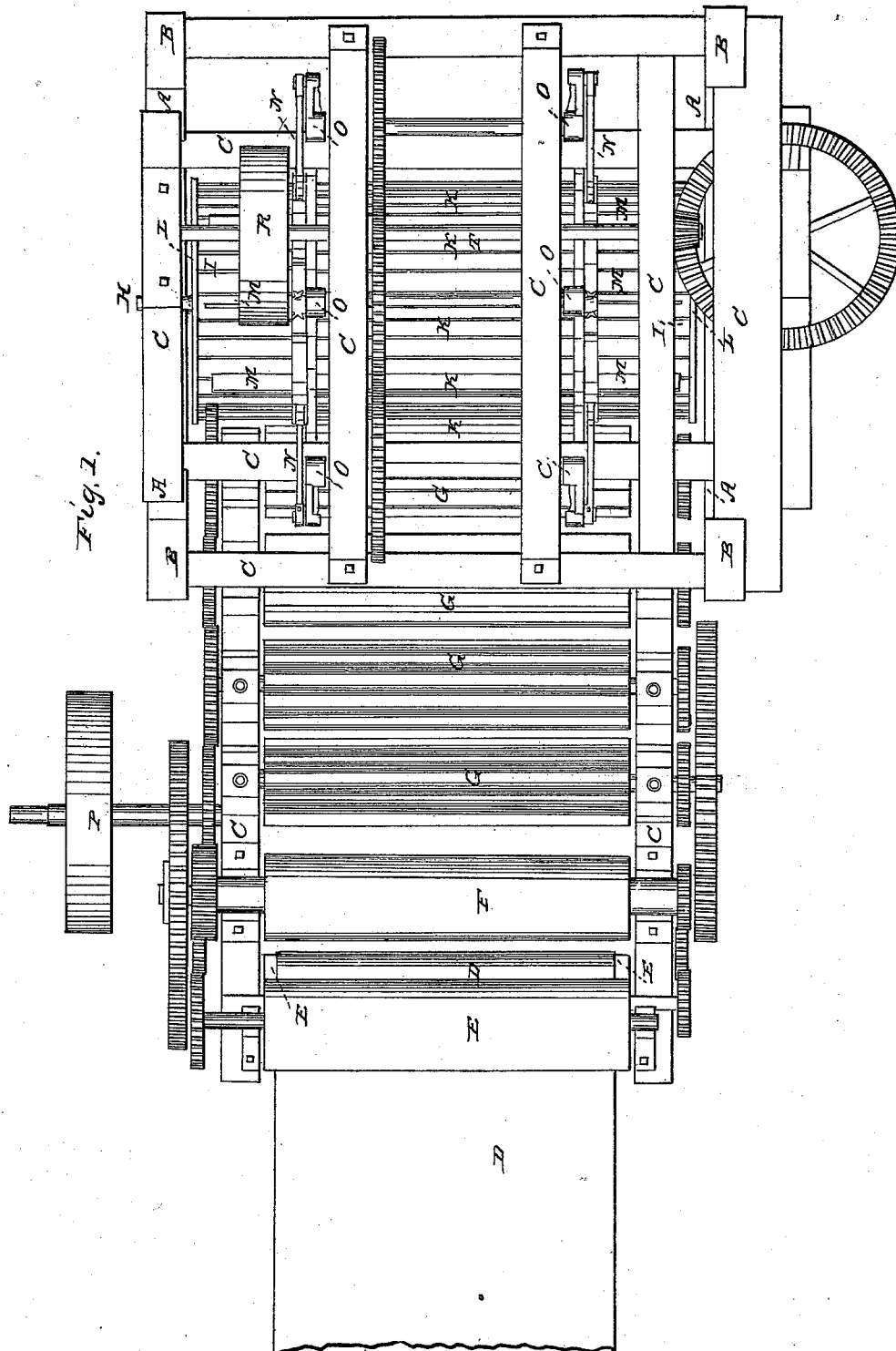


BILLINGS & HARRISON.

Hemp Brake.

No. 4,071.

Patented June 7, 1845.



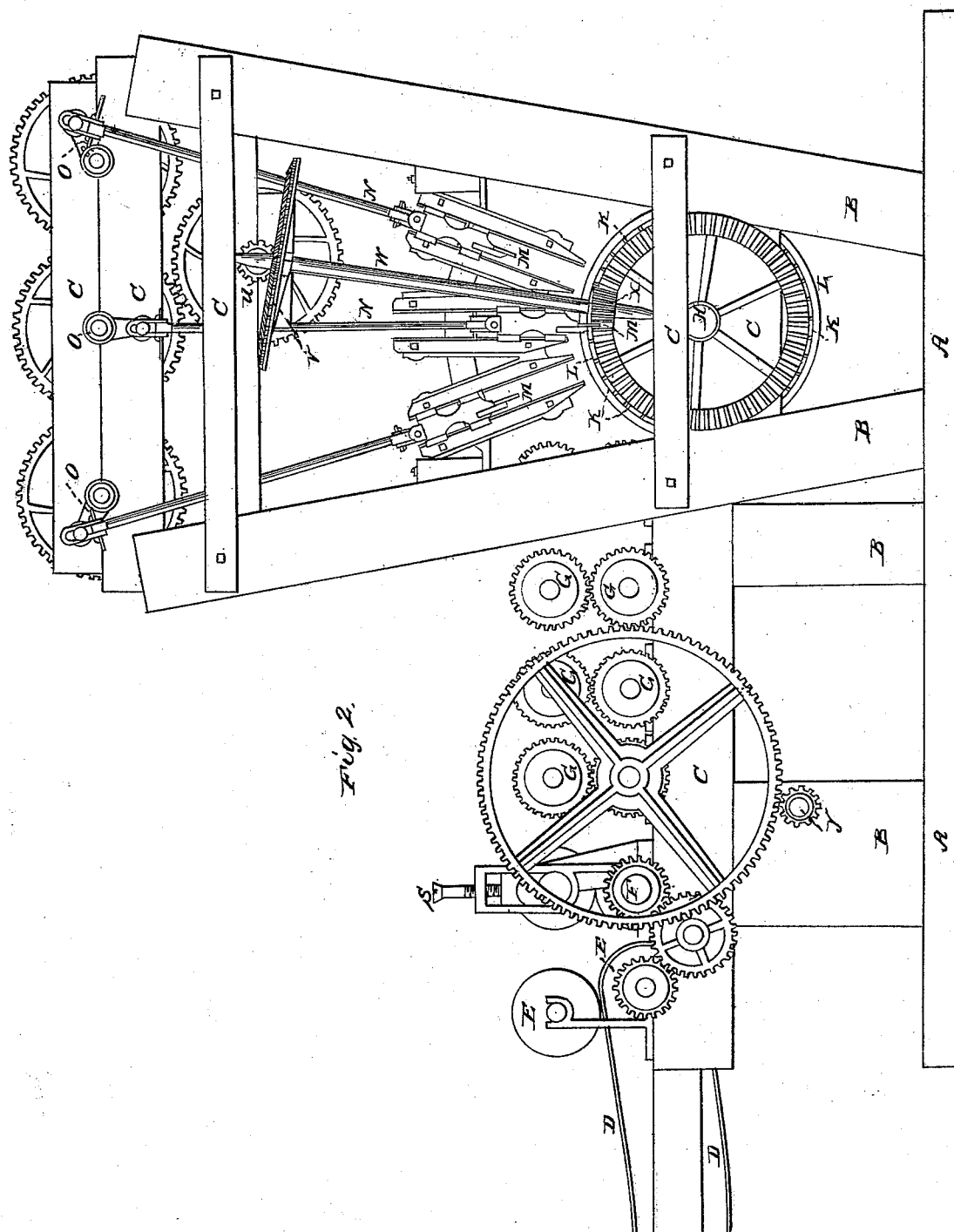
BILLINGS & HARRISON.

4 Sheets—Sheet 2.

Hemp Brake.

No. 4,071.

Patented June 7, 1845.



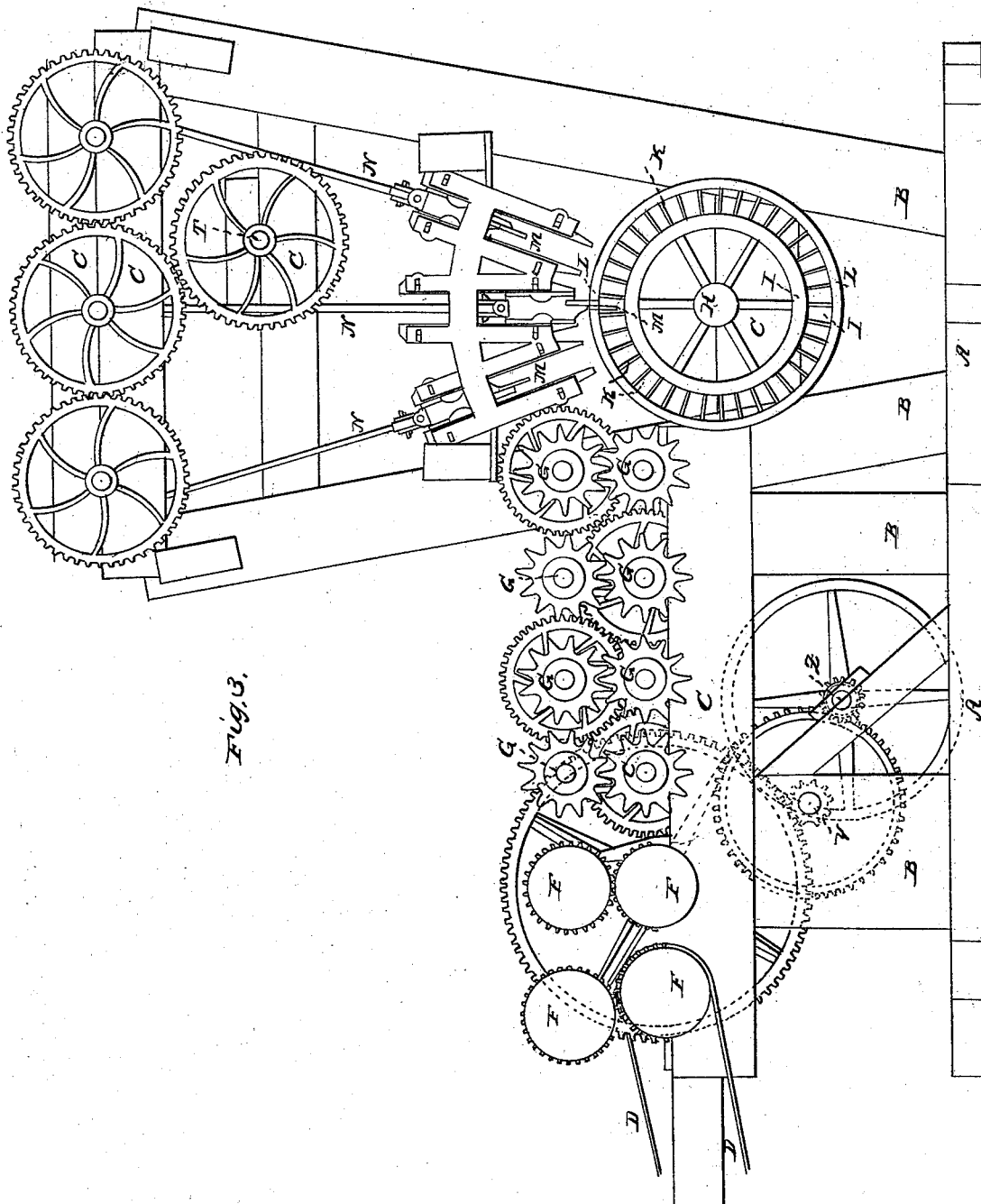
BILLINGS & HARRISON.

4 Sheets—Sheet 3.

Hemp Brake.

No. 4,071.

Patented June 7, 1845.



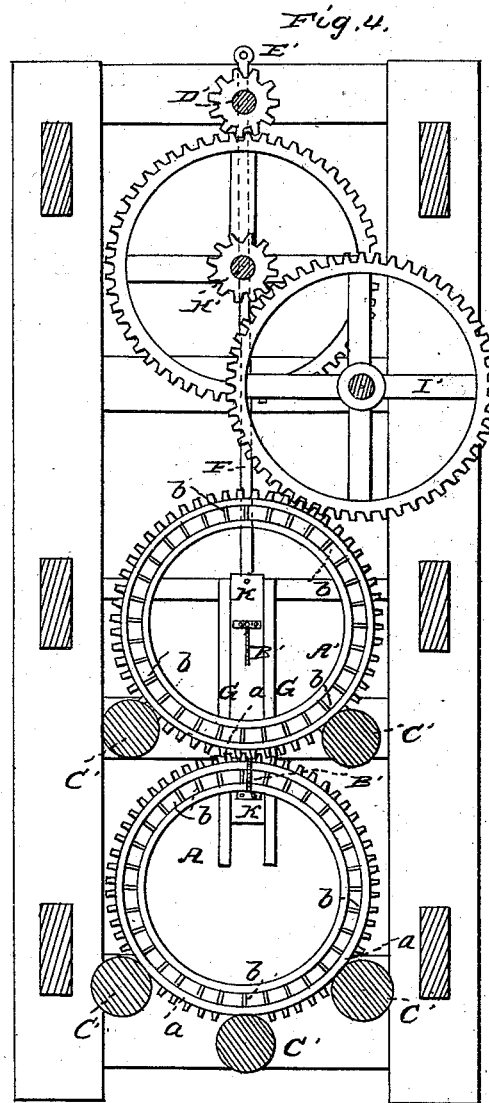
BILLINGS & HARRISON.

4 Sheets—Sheet 4.

Hemp Brake.

No. 4,071.

Patented June 7, 1845.



UNITED STATES PATENT OFFICE.

GEORGE W. BILLINGS AND JOHN HARRISON, OF GLASGOW, MISSOURI.

IMPROVEMENT IN BREAKING AND CLEANING HEMP.

Specification forming part of Letters Patent No. 4,071, dated June 7, 1845.

To all whom it may concern:

Be it known that we, GEORGE W. BILLINGS and JOHN HARRISON, of Glasgow, Howard county, and State of Missouri, have invented a new and useful Machine for the Purpose of Breaking and Cleaning Hemp and Flax; and we do hereby declare that the following is a full, clear, and exact description of the construction and operation of the same, reference being had to the annexed drawings, making a part of this specification.

Figure 1 is a top view. Fig. 2 is a side elevation, and Fig. 3 is a longitudinal section.

The frame of our improved machine for breaking and cleaning hemp or flax we build of timber five by ten inches square and fasten it with five-eighth or three-fourth inch iron bolts. It occupies a space of six feet in width and twenty feet in length, and requires for a machine of this size about four-horse power to drive it.

A A are sills, B B are posts, and C C are cross-pieces forming the frame of our machine.

D is an endless apron, twelve feet in length, passing around the lower feed-roller, E. The unbroken hemp or flax is placed upon this apron, which carries it between the two feed-rollers E E. The ends of the hemp or flax pass immediately from the feed-rollers between the smooth pressure-rollers F F. The amount of pressure between the smooth rollers is regulated by the screws S S or by levers and weights. From the smooth pressure-rollers F F the hemp or flax passes between the series of fluted rollers G G G. (In our large machines we generally use three sets of fluted rollers.) From the fluted rollers the hemp or flax passes to and over the cleaning-cylinder I. The surface of the cleaning-cylinder is composed of knives K K, running parallel with its shaft H, and their sides are in a line with the radii of the same. While the hemp or flax is passing over the revolving knives K K of the cleaning-cylinder, the sheaves, dirt, and ligneous parts are beaten out and separated from them by the reciprocating knives M M, each of which strikes in regular succession one after the other into all of the spaces between the revolving knives upon the cleaning-cylinder, each revolution of the driving-pulley R causing a revolution of the cranks (O O O, to which the reciprocating knives M M M are connected by the pitman N N N,) and moving the clean-

ing-cylinder the distance of the space between the revolving knives upon the same. Motion is communicated to the cleaning-cylinder by means of the vertical shaft W. The large bevel cog-wheel V on the top of this shaft is geared to the pinion U on the driving-shaft T, and the small bevel-pinion X at the bottom of the vertical shaft W meshes into a cog-wheel on the end of the cleaning-cylinder I.

The connection between the driving-pulley P and the rollers is as follows: On the driving-shaft Z is a pinion which meshes into a cog-wheel on the shaft Y, and a pinion on the shaft Y meshes into a large cog-wheel on the shaft of the lower pressure-roller, F, and the two pressure-rollers are geared to each other, and the lower one to an intermediate cog-wheel which communicates motion to the feed-rollers. The lower pressure-roller, F, is geared to the lowest fluted roller nearest to it, and the lower roller of the first set of fluted rollers is geared to the upper fluted roller of the second set. The upper roller of the second set is geared to the lower roller of the third, and the lower roller of the third is geared to the upper roller of the fourth set of fluted rollers, which puts them all in motion and connects them with the driving pulley P.

On the opposite side of the machine from the driving-pulley there is a large cog-wheel on the shaft of the lower roller of the first set of fluted rollers, meshing into a pinion on the shaft Y, and each set of fluted rollers on this side of the machine are geared together. The revolving knives on our cleaning-cylinder are confined to the heads I of the same by a band of iron, L. They are likewise stayed and supported on their inner edges by circular pieces of iron placed at equal distances from each other and from their ends. The speed we give to our machine is one hundred and eighty revolutions per minute to the upper pulley, R, on shaft T, and one hundred and thirty revolutions per minute to the lower pulley, P, on shaft Z.

The hemp is fed to the machine in bundles of sufficient size to make from a pound to a pound and a half of lint when fit for baling. The machine running at the speed herein given will pass six bundles of the above size of seven feet in length through per minute.

Fig. 4 is a modification of our rotary and

reciprocating knives or beaters for cleaning hemp or flax after it has been broken by the pressure and fluted rollers herein described. In this modification we make use of two cleaning-cylinders with revolving knives, the hemp or flax passing between them.

A' A' are the cleaning-cylinders. The revolving knives b' b' in this arrangement are confined to hollow iron rings at both ends. The cleaning-cylinders A' A' rest upon flanges, a a, projecting from the iron rings at each end, and revolve upon the friction-rollers C' C'. In this arrangement there are two beating-knives, B' B', one in the upper cleaning-cylinder and another in the lower. Both beating-knives are attached to the same upright pieces, K', at both ends of the cylinders, and are moved up and down between the guides G' G' by the pitmen F' F', connecting the knife-frame to the cranks E E on both ends of the driving-shaft D'. When the crank is approaching its upper center, it projects the lower knife up between every second and third revolving knife of the lower cleaning-cylinder, and as the crank descends to its lower center it projects the upper knife down through the spaces between every third and fourth revolving knife in the upper cylinder, and so on. In this manner do the double-acting reciprocating knives B' B' act upon the hemp or flax while it is passing through between the double cleaning-cylinders A A in this modification of our machine for breaking and cleaning hemp and flax.

Figs. 5 and 6 represent another modification of our machine for cleaning hemp or flax after it has passed through between the pressure and fluted rollers herein described, in which we make use of the same arrangement of reciprocating knives or beaters already described in our machine, in combination with an endless chain of knives moving horizontally.

Fig. 5 is a section, and Fig. 6 is a perspective view, of one of the knives forming the endless chain.

A'' A'' are cogged rollers, over which the endless chain of knives passes.

a a are the knives composing the endless chain. b' b' are the flanges at each end of them. c' c' are the keys which fasten the knives to each other. d d are the cogs or points upon the rollers A'' A'', of such a size as to accurately fit the space between the flanges of the knives and the keys c' c'.

The driving-shaft to which the reciprocating knives are connected to cranks at both ends should be so geared and connected to the rollers A'' A'' as to project the reciprocating knives between each of the knives on the endless chain over which the hemp passes from the pressure and fluted rollers.

Figs. 7, 8, and 9 represent the manner in which we construct our hollow fluted rollers. We construct them entirely of iron.

Fig. 7 is a longitudinal elevation, and Fig. 9 is an end view representing the shaft of one of our hollow fluted rollers with one of the sharp projections placed upon it.

1 is the shaft, and 2 2 are collars on each end of it, cast solid with the shaft.

3 are the sharp projections, their shape being such as to form the teeth and fluted grooves between each of them when they are placed entirely around the shaft. The seats at each end of the sharp projections form on their inner surfaces segments of a circle which exactly fit to the collars 2 2, on which they rest, and they are of such a size as to perfectly inclose the collars, leaving no space between them when all are arranged in order. After they are thus placed around the shaft and collars, a strong wrought-iron ring, Fig. 8, is driven on over the projecting shoulders or flanges at both ends, which confines them firmly to the shaft, the key 4 having half of its seat in one of the projections, and the other half in the collars is then driven in tightly, one into both ends of the same projection, which prevents the projecting teeth from turning upon the shaft.

We are aware that the hemp or flax has been broken or cleaned on a cylinder of knives, the whole set of beaters or breakers striking at once between the knives as they rotate, and therefore it will be understood that we do not claim this general character or principle; but

What we do claim, and desire to secure by Letters Patent, is—

The arrangement of the beaters or scutchers to strike one after the other in succession, in combination with the continuous movement of the bed knives or slats, as described and represented herein.

GEO. W. BILLINGS.
JOHN HARRISON.

Witnesses:

R. P. HANENKAMP,
JOHN F. NICOLDS.