No. 657,157. Patented Sept. 4, 1900.

H. BUNKER & G. E. HORN.

MACHINE FOR MAKING STRAW OR PEAT FUEL.

(Application filed Mar. 2, 1900.)

(No Model.) 3 Sheets—Sheet 1.

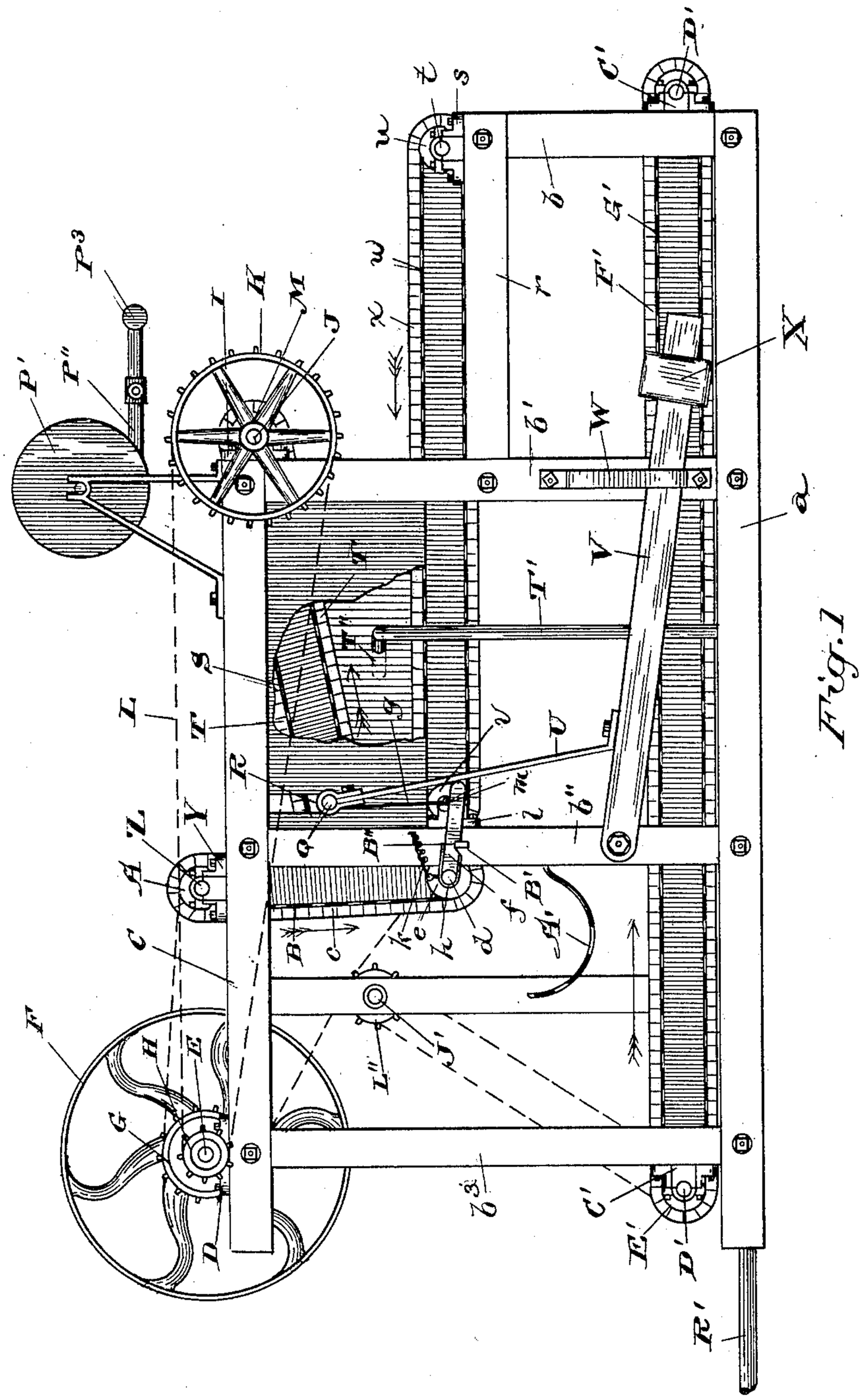

Fig. 1.

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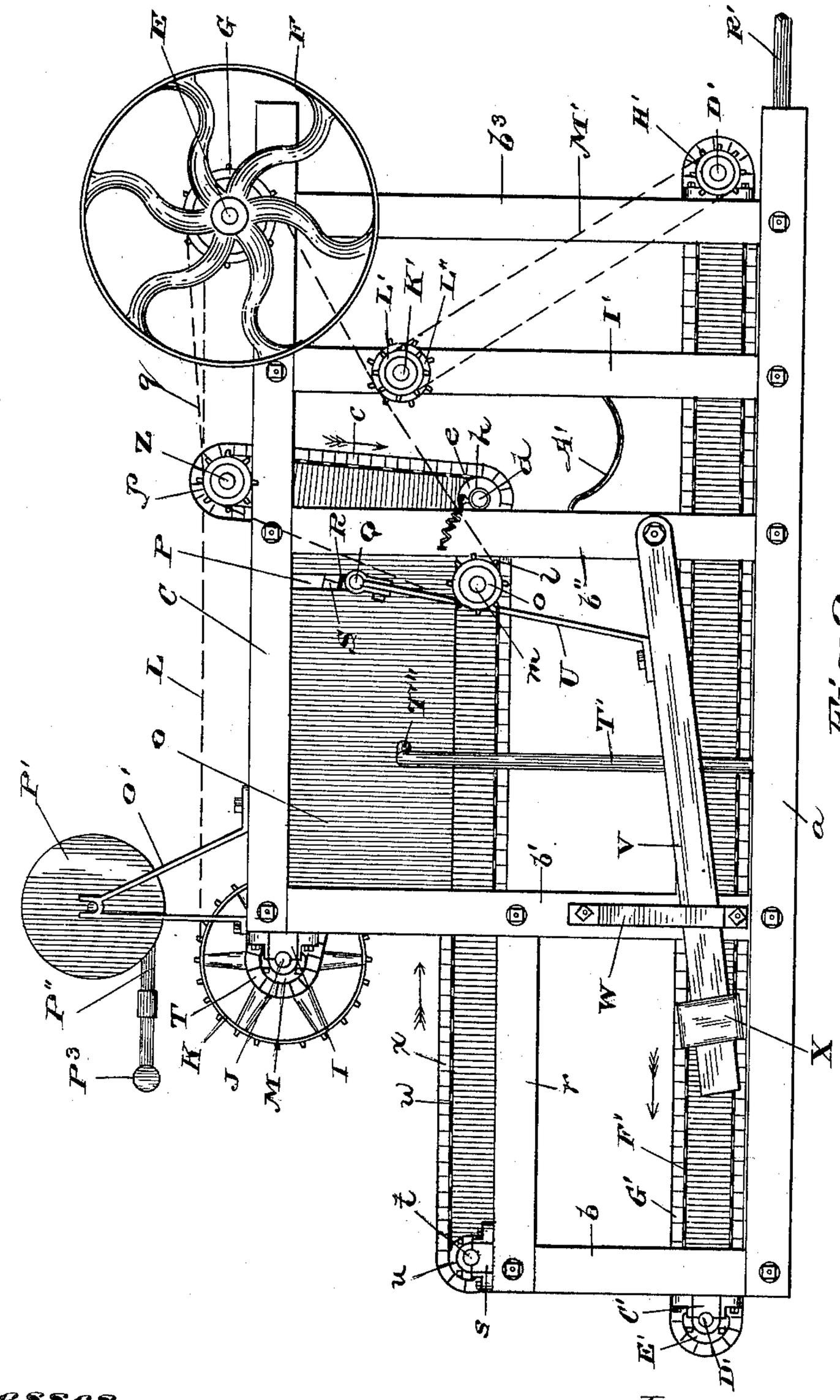
3 Sheets—Sheet 2.



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(No Model.) 3 Sheets—Sheet 3.

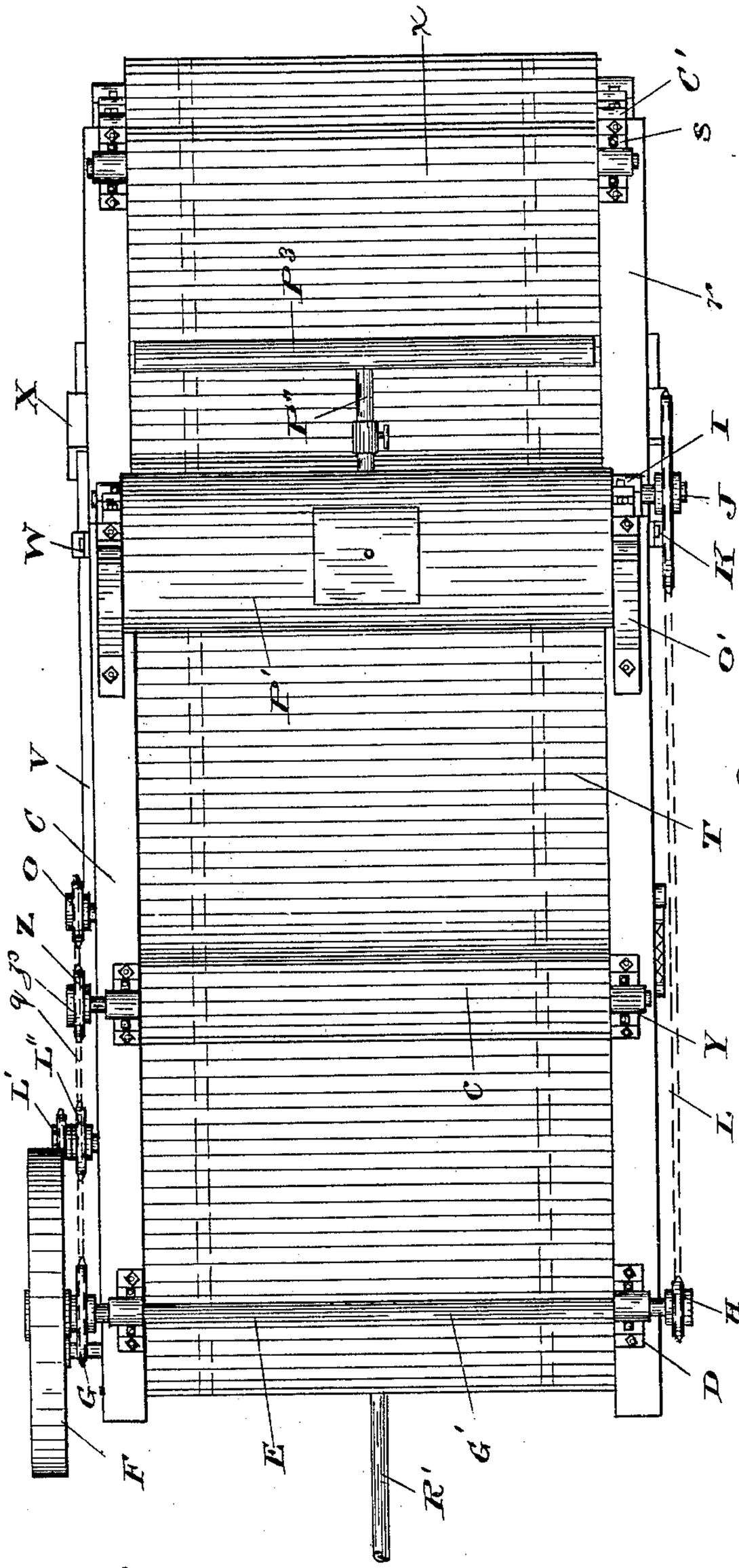

Fig. 3

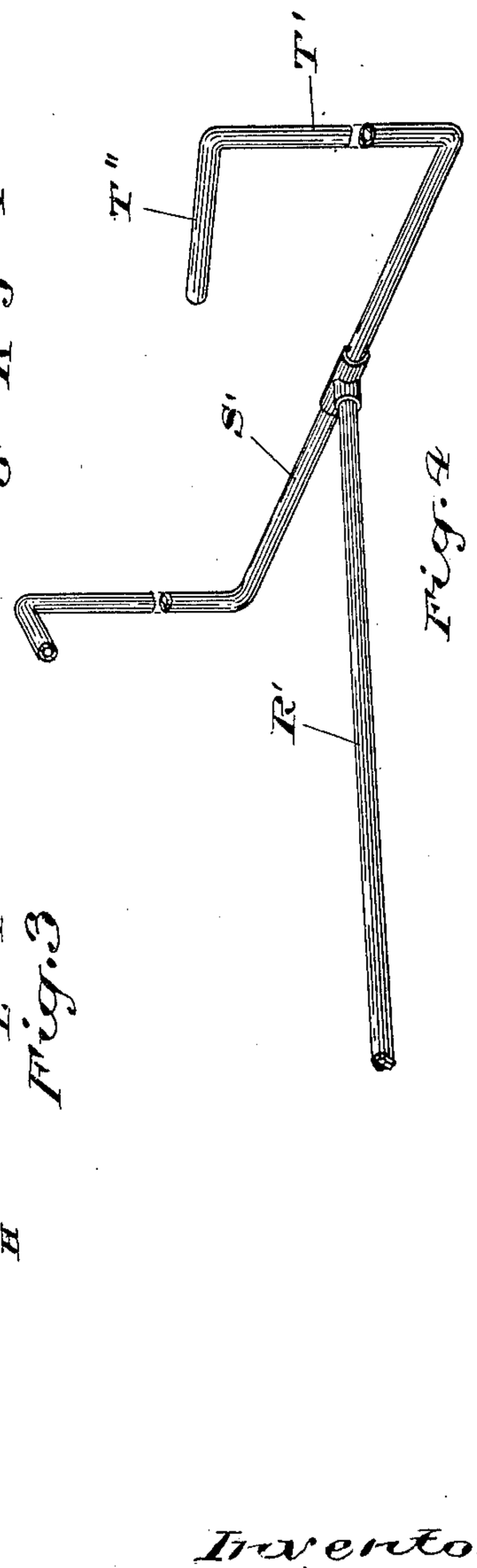

Fig. 4

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UNITED STATES PATENT OFFICE.

HARMAN BUNKER, OF BARRIE, CANADA, AND GEORGE E. HORN, OF CAVALIER, NORTH DAKOTA.

MACHINE FOR MAKING STRAW OR PEAT FUEL.

SPECIFICATION forming part of Letters Patent No. 657,157, dated September 4, 1900.

Application filed March 2, 1900. Serial No. 7,138. (No model.)

To all whom it may concern:

Be it known that we, HARMAN BUNKER, residing at Wellington street, Barrie, in the county of Simcoe and Province of Ontario, Canada, and GEORGE EDWARD HORN, residing at the City Hotel, in the town of Cavalier, in the county of Pembina and State of North Dakota, have invented certain new and useful Improvements in Machines for Making Straw or Peat Fuel; and we hereby declare that the following is a full, clear, and exact description of the same.

This invention relates to certain new and useful improvements in machines for making straw and peat fuel, and relates more particularly to the peculiar construction and arrangement of the parts and their mode of operation; and the object of the invention is to so arrange the machine that it will compress the material constituting the fuel into a comparatively-small bulk in a simple, convenient, and expeditious manner; and the invention consists, essentially, of the device hereinafter more fully set forth, and more particularly pointed out in the claims.

In the drawings, Figure 1 is a side elevation of the machine. Fig. 2 is a similar view from the opposite side. Fig. 3 is a plan view. Fig. 4 is a perspective view of the steam-ejector.

Like letters of reference refer to like parts throughout the specification and drawings.

The frame consists of two opposite sides, each of which is composed of a base *a* and four standards or uprights *b b' b'' b³*, the lower ends of which are rigidly bolted or otherwise fastened to the base *a*. The uprights *b' b'' b³* are of the same height, and bolted to the upper end of the uprights *b' b'' b³* is a girder C. Mounted on the girders C above the uprights *b³* are journal-bearings D, and journaled in the bearings D is a shaft E. One end of the shaft E projects beyond the adjacent girder C, and mounted on the projecting end of the shaft is a pulley F, by means of which motion is imparted to the machine. Rigidly mounted on the shaft E, contiguous to the pulley F, is a sprocket-wheel G, and mounted on the opposite end of the shaft E is a sprocket-wheel H. Bolted to the front of the uprights B' and to the front of the girder C are bearing-boxes I, and journaled in the bearing-boxes I is a shaft J, one end of which projects beyond the outer side of the uprights *b'*, on the same side of the machine as sprocket-wheel H. Mounted on the projecting end of the shaft J is a large sprocket-wheel K, and passing around the sprocket-wheels H and K is a sprocket-chain L. Mounted on the shaft J, intermediate the uprights *b*, are sprocket-wheels M. Connected to the uprights *b' b''*, immediately below the girders C, are side plates O, each of which is provided with a vertical slot P, contiguous to the upright *b''*, and vertically movable in the slots P is a shaft Q, on which are mounted sprocket-wheels R, in alinement with the sprocket-wheels M. Passing around the sprocket-wheels M and R are sprocket-chains S, and fastened to the outer face of the sprocket-chains S are lateral slats T, which form a compressor-belt for the purpose hereinafter mentioned. Connected to the ends of the shaft Q on the outer face of the side plates O are arms U, the lower ends of which are bolted or otherwise rigidly connected to levers V, pivoted to the uprights *b''* slightly above the base *a*. The levers V are forwardly directed, and the free ends of the levers are prevented from lateral displacement by guide-straps W, bolted to the uprights *b'*. Mounted on the free end of each lever V is a weight X. Mounted on the top of the girder C, above the upright *b''*, are bearing-boxes Y, and journaled in the bearing-boxes Y is a shaft Z. Mounted on the shaft Z, intermediate the girders C, are sprocket-wheels A. Passing around the sprocket-wheels A are sprocket-chains B, and connected to the outer face of the chains B are slats *c*, which form an endless belt hanging from the sprocket-wheels A. Within the lower end of the belt *c* is a shaft *d*, on which are mounted sprocket-wheels *e*, in alinement with the sprocket-wheels A. Connected to the one end of the shaft *d* is a lever *f*, and pivoted to the opposite end of the lever *f* is an arm *g*, connected to the adjacent end of the shaft Q. Connected to the upright *b''* in a convenient position to the lever *f* is a dog B', which engages with a tooth B'', formed in the lever *f*, for the purpose of preventing the lateral displacement of the lever and adjacent end of the belt until the material has raised the shaft

Q and belt T into the elevated position hereinafter described. Connected to the upright b'' and to a collar h on the shaft d is a spring k to normally hold the shaft d and lower end of the belt c in their normal position. The revolution of the shaft Z causes the revolution of the belt c, which in turn causes the revolution of the sprocket-wheel e, the lever f normally holding the shaft d in its proper relative position to the other parts. Journaled in bearings l, connected to the uprights b'', is a shaft m, and mounted on the shaft m is a sprocket-wheel o, on the same side of the frame as the sprocket-wheel G. Mounted on the shaft Z is a sprocket-wheel p, and passing around the sprocket-wheels G, o, and p is a sprocket-chain q, by means of which motion is imparted from the pulley F to the shafts Z and m. Bolted to the tops of the uprights b and to the middle of the uprights b' are horizontal girders r, and mounted on the girders r, above the uprights b, are bearing-boxes s, in which is journaled a shaft t. Mounted on the shaft t are sprocket-wheels u, intermediate the girders r, and mounted on the shaft m, in alinement with the sprocket-wheels u, are sprocket-wheels v. Passing around the sprocket-wheels u and v are sprocket-chains w, to the outer face of which are connected lateral slats x, forming an endless platform or conveyer-belt, the inner end of which is adjacent to the face of the endless butting-belt c. The operation of this portion of the invention is as follows: Motion is imparted to the pulley F, which causes the revolution of the shaft E and sprocket-wheel G. The sprocket-chain q, passing around the sprocket-wheels G, p, and o, imparts a revolution to the shafts Z and m and through the shafts Z and m to the endless butting-belt c and conveyer-belt x, causing the conveyer-belt x to carry the material contained on its upper surface toward the butting-belt c. The revolution of the shaft E causes the revolution of the sprocket-wheel H, which in turn causes the revolution of the sprocket-wheel K and shaft J by means of the chain L. The revolution of the shaft J causes the revolution of the compressor-belt T. The three belts x, c, and T revolve in the direction indicated by arrows. The material constituting the fuel is placed upon the conveyer-belt x at the front of the machine and is carried by the conveyer-belt x toward the butting-belt c. The belts x, c, and T, revolving in the direction indicated by arrows, roll the material into a cylindrical form and during the rolling process compress it into a comparatively-small compass. When the material has been rolled and compressed into its full size, it raises the compressor-belt T and shaft Q. The raising movement of the shaft Q lifts the lever f and disengages it from the dog B', after which the lower end of the belt c can swing outward to permit of the delivery of the compressed material. The compressed material passes between the end of the compressor-belt x and the adjacent face of the butting-belt c to receivers A', which are connected to the rear face of the standards b'' below the lower end of the butting-belt c. The weighted lever V exerts sufficient pressure on the shaft Q to prevent it being lifted until the compressed material is of such size and solidity as to force it upward. As soon as the compressed material is discharged to the receivers A' the levers V immediately return the shaft Q to its normal position, and the spring k at the same time returns the lower end of the butting-belt c to its normal position.

Connected to the standards b b^3 are bearings C', and journaled in each pair of bearings C' is a shaft D'. On the shaft D' are sprocket-wheels E', around which pass sprocket-chains F', to the outer faces of which are connected slats G', forming a return-belt. The belt G' revolves toward the front of the machine in order that it will return to the front of the machine all particles of material which fall upon it from the conveyer-belt x, in order that they can be conveyed to the operator at the front of the machine. Mounted on the shaft D' at the back of the machine is a sprocket-wheel H'. Connected to the base a and girder C, intermediate the uprights b'' b^3, is a standard I', in which is journaled a shaft K', and mounted on the shaft K' is a sprocket-wheel L'. Passing around the sprocket-wheels H' and L' is a sprocket-chain M'. Mounted on the shaft K' on the inner side of the sprocket-wheel L' is a sprocket-wheel L'', which engages the sprocket-chain q. The revolution of the sprocket-chain q imparts motion to the sprocket-wheel L'' and through the sprocket-wheel L'' to the shaft K' and sprocket-wheel L'. The revolution of the sprocket-wheel L' imparts motion to the sprocket-wheel H' and causes the revolution of the return-belt G' toward the front of the machine. Mounted on the top of the frame of the machine at the front of the girders C are brackets O', and supported by the brackets O' is a water-tank P', which is provided with an outlet-pipe P'', having a laterally-disposed horizontal branch P^3, provided with a number of perforations to form a spray for the distribution of the water to the material passing over the top of the conveyer-belt x. Extending along the bottom of the machine is a steam-pipe R', provided with a laterally-disposed arm S', to each end of which is connected an upright pipe T'. The upper end of each of the upright pipes T' is fitted with a downwardly and inwardly directed elbow T'' to throw a jet of steam toward the compressible material, in order that it will soften and render the material more plastic and facilitate its compression and formation.

By means of this apparatus straw, peat, or composition material can be quickly, effectively, and cheaply compressed into a comparatively-small bulk and rendered suitable for fuel at a comparatively-small cost.

Having thus fully described our invention,

what we claim as new, and desire to secure by Letters Patent, is—

1. A machine for making straw and peat or other fuel embracing in its construction a frame, a substantially-horizontal conveyer-belt, a butting-belt opposed to the inner end of the conveyer-belt the lower end of which is outwardly movable, a compressor-belt above the conveyer-belt, and means for imparting a rotary motion to the belts, substantially as specified.

2. A machine for making straw and peat or other fuel embracing in its construction a frame, a substantially-horizontal conveyer-belt, a butting-belt opposed to the inner end of the conveyer-belt the lower end of which is outwardly movable, a compressor-belt above the conveyer-belt, means for imparting a rotary motion to the belts, a water-tank supported above the conveyer-belt provided with a spraying apparatus to discharge its contents on the material carried by the conveyer-belt, and a steam-pipe having upwardly-extending branches at each end to direct a jet of steam on the material being formed by the belts, substantially as specified.

3. A machine for making straw and peat or other fuel embracing in its construction a frame, a substantially-horizontal conveyer-belt, a butting-belt opposed to the inner end of the conveyer-belt the lower end of which is outwardly movable, a compressor-belt above the conveyer-belt, means for imparting a rotary motion to the belts, and receivers connected to the frame below the inner end of the conveyer-belt to receive the fuel after its formation, substantially as specified.

4. A machine for making straw and peat or other fuel embracing in its construction a frame, a substantially-horizontal conveyer-belt, a butting-belt opposed to the inner end of the conveyer-belt, a shaft within the butting-belt, springs connected to the shaft and to the frame, a compressor-belt, shafts for the compressor-belt one of which is vertically movable in its bearings and the other of which is stationary, means for imparting motion to the belts, an arm depending from the end of the movable shaft, a lever pivoted to the lower end of the arm and connected to the shaft within the butting-belt, a second arm depending from the movable shaft connected to a lever one end of which is pivoted to the frame the other end of which is weighted, receivers connected to the frame below the inner end of the conveyer-belt, a water-tank mounted on the frame above the conveyer-belt, a spray for the water-tank to dampen the material passing over the conveyer-belt, and a steam-pipe to throw a jet of steam on the materials during its formation by the belts, substantially as specified.

5. A machine for making straw and peat or other fuel embracing in its construction a frame, a substantially-horizontal conveyer-belt passing around shafts journaled in the frame, a butting-belt passing around a shaft journaled in the frame the lower end of the butting-belt being opposed to the inner end of the conveyer-belt, a shaft within the butting-belt, a collar mounted on the shaft in the butting-belt, a spring connected to the collar and to the frame, a compressor-belt passing around shafts one of which is vertically movable in the frame the other of which is stationary, means for imparting motion to the belts, an arm depending from the end of the movable shaft, a lever pivoted to the lower end of the arm and connected to the shaft within the butting-belt, a second arm depending from the movable shaft connected to a lever one end of which is pivoted to the frame the other end of which is weighted, receivers connected to the frame below the inner end of the conveyer-belt, a water-tank mounted on the frame above the conveyer-belt, a spray for the water-tank to dampen the material passing over the conveyer-belt, a steam-pipe to throw a jet of steam on the materials during its formation by the belts, and a return-belt below the conveyer-belt to return any of the material falling from the conveyer-belt to the front of the machine, substantially as specified.

Barrie, Canada, January 27, 1900.

H. BUNKER.
GEORGE E. HORN.

In presence of—
W. H. BUNKER,
PERCY PLAXTON.