

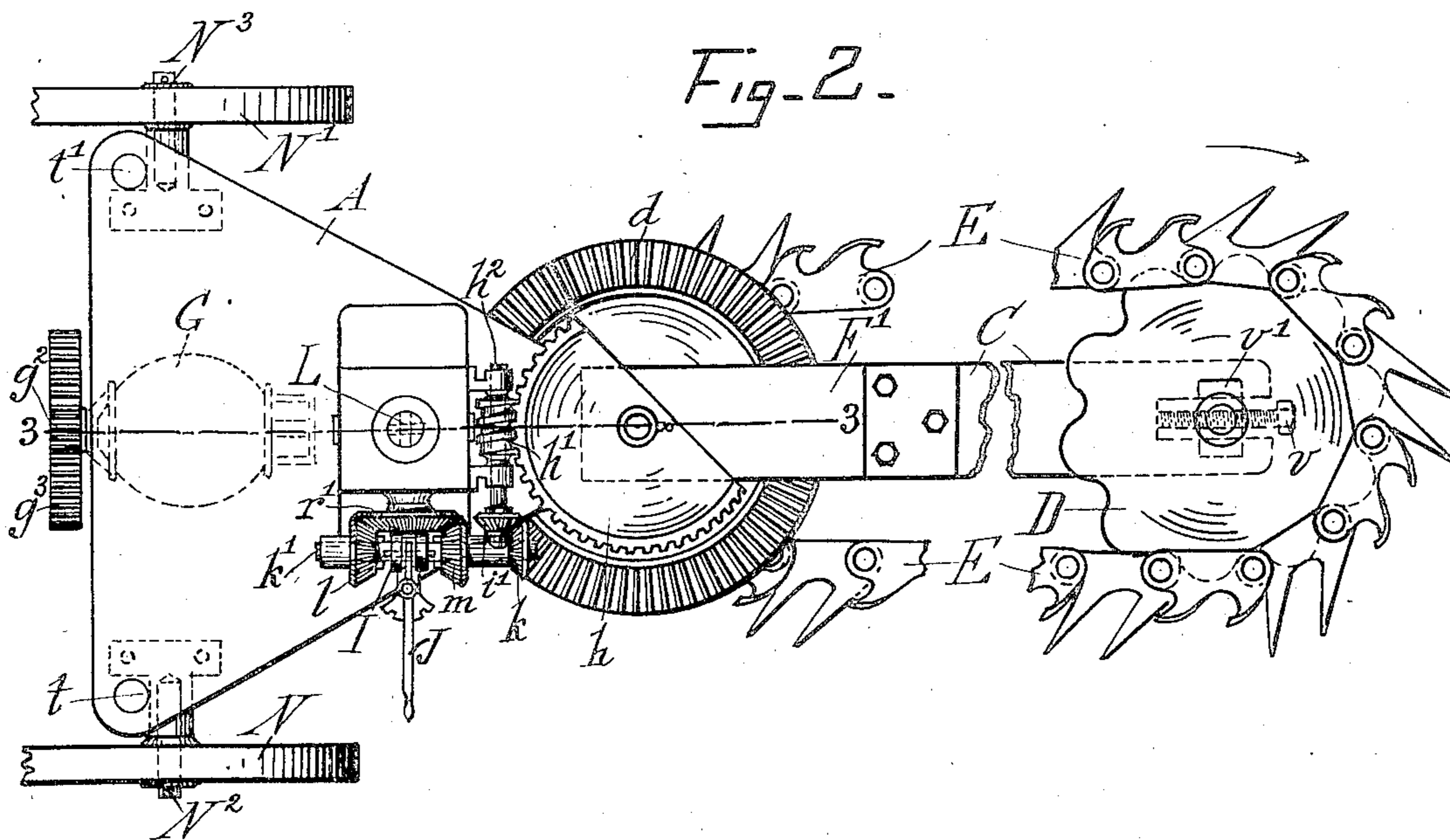
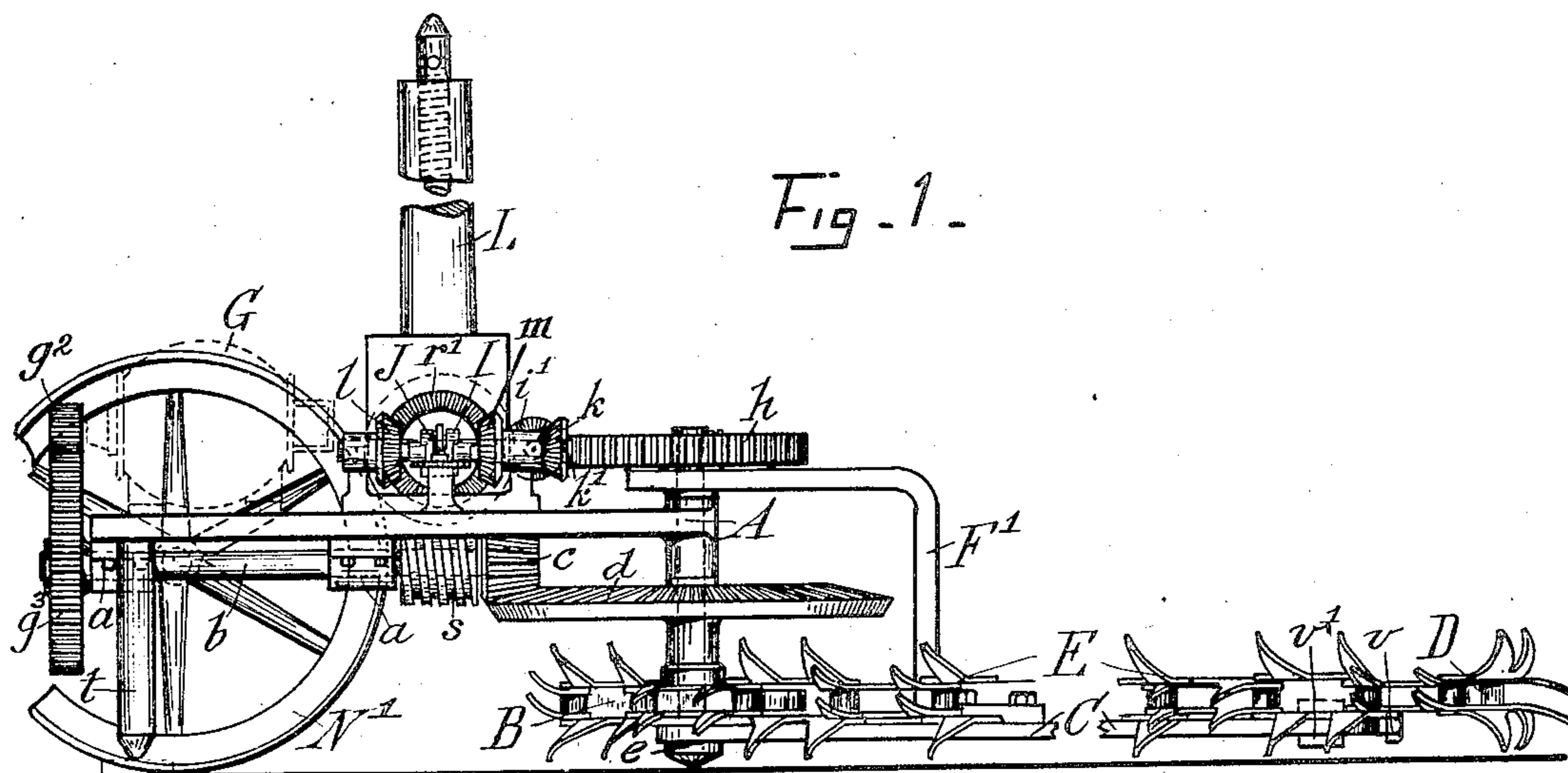
No. 897,415.

PATENTED SEPT. 1, 1908.

G. SANTA.
MINING MACHINE.

APPLICATION FILED SEPT. 17, 1907.

2 SHEETS—SHEET 1.



WITNESSES.

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INVENTOR
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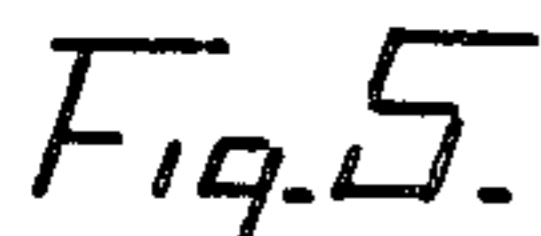
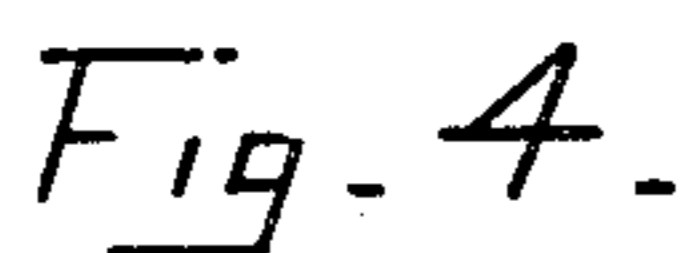
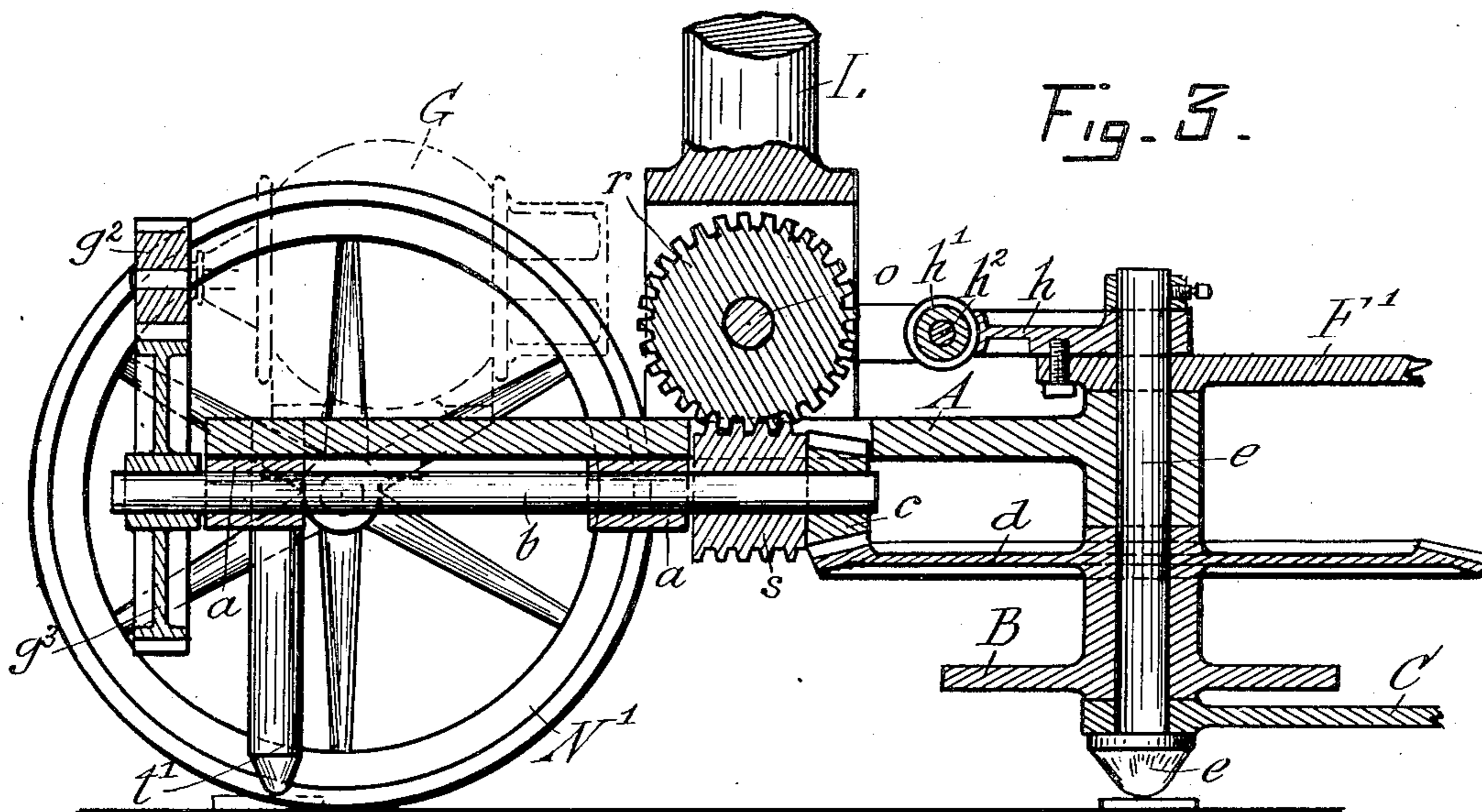
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2 SHEETS—SHEET 2.



WITNESSES

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UNITED STATES PATENT OFFICE.

GESA SANTA, OF SAN FRANCISCO, CALIFORNIA.

MINING-MACHINE.

No. 897,415.

Specification of Letters Patent.

Patented Sept. 1, 1908.

Application filed September 17, 1907. Serial No. 393,365.

To all whom it may concern:

Be it known that I, GESA SANTA, of the city and county of San Francisco, State of California, have invented certain new and useful Improvements in Mining-Machines, of which the following is a specification.

The invention relates to mining-machines of that class having as the cutting element a movable cutting-chain.

10 Objects of the invention are improved means of support, operation and control of the operative parts of the machine.

The nature of the invention will appear from the following description and claims, 15 read in connection with the accompanying drawings, in which

Figure 1 shows in side view, with parts broken away, a coal-mining machine embodying my invention, Fig. 2 is a plan of the machine of Fig. 1, Fig. 3 is a vertical longitudinal section on line 3—3, Fig. 2, on a larger scale, and with the cutting-chain removed, and Figs. 4 and 5 are respectively a face view and a side view of a portion of the 25 cutting-chain, on a larger scale than the preceding figures.

Similar letters of reference indicate corresponding parts in the several views.

30 The bed A of the machine is supported on the mine-floor by leg or post *e* and legs or posts *t*, *t'*, or removable wheels N, N', on short axles N², N³, of the bed, and above by a jack L rising from the bed between the lower supports and adjustable against the mine- 35 roof.

Bearings *a*, *a*, of the bed support longitudinally below the same a shaft *b*, carrying a bevel pinion *c*, meshing with a bevel gear *d*, loose on leg *e*, to which is connected integrally or otherwise a driving sprocket-wheel B, upon which sprocket-wheel and a sprocket-wheel D at the outer end of a chain-boom C is carried the cutting-chain E. The chain has thereby an axis of support lying 45 within the axis of the driving sprocket. Boom C is pivoted at the leg *e*, and is supported between the swinging axis and its outer end by an arm F¹ swinging upon an extension of the leg *e* above the bed. The 50 boom C extends within the chain and is continuous and rigid throughout its length and thereby secures to the chain the rigidity of support afforded by the post *e*.

55 From an electric or other motor at G upon the bed, controlled in any manner, power is transmitted through a pinion *g*² upon the

motor-shaft and gear *g*³ upon drive-shaft *b*, to said shaft *b*, and thence through pinion *c*, and gear *d*, to sprocket B, whereby chain E is moved in cutting direction according to the 60 direction of its teeth, as indicated by arrow in Fig. 2, or in reverse direction, according to the direction of motion of the motor.

Adjustment of the chain is effected by a screw *v* in a headblock *v*¹ slidably supported 65 on the boom and carrying sprocket-wheel D, said screw bearing at its inner end against the boom and when rotated in one or the opposite direction forcing the headblock and sprocket-wheel D from sprocket-wheel B, or 70 permitting approach, and thereby tightening or loosening the chain.

Fixed upon the arm F¹ is a segment-gear *h*, with which meshes a worm *h*¹ upon a shaft *h*² 75 mounted in standards upon the bed and carrying a bevel gear *i*¹, meshing with a bevel gear *k* fast upon a gear-shaft *k*¹ mounted in standards of the bed and supporting loose thereon oppositely-disposed bevel gears *l*, *m*, each constructed to form at its inner face a 80 clutch-member adapted to be engaged by a corresponding member of a clutch I splined to shaft *k*¹ and of such width as to stand in median position between and free from both 85 gears *l* and *m*, as shown in Fig. 2, but to be moved by means of a controlling handle J into engagement with either gear, while remaining in rotative connection with shaft *k*¹. A worm *s* on shaft *b*, drives wormwheel *r* on shaft *o*, mounted above the bed and carrying 90 a bevel gear *r*¹ meshing at opposite sides with and driving in opposite directions constantly gears *l* and *m*. Motion is thence transmitted in one direction or the opposite, clutch I being in engagement with one or the other of 95 gears *l*, *m*, to shaft *k*¹, gears *k* and *i*¹, shaft *h*², worm *h*¹ and gear *h*, whereby arm F¹ is swung, correspondingly swinging boom C and chain E in one or the other direction 100 about the swinging axis.

Control of swinging movement is by means of handle J, by movement of which in one direction or the other clutch I is thrown at will into connection with either constantly-moving bevel gear *l* or *m* and thereby swinging 105 motion in one or the opposite direction imparted; or withdrawn to median position, in which position swinging movement is discontinued and no such movement imparted to the boom and chain. The chain comprises links, alternately wide and narrow, 110 each link composed of opposed parallel link

members, the link-members r^2 of the narrow links having each teeth, one at each end of the link-member, projecting outwardly, forwardly and laterally in the same direction from the body of the link, the teeth of each member in the same direction as the teeth of the other member; and the link-members r^3 of the wide links having each teeth, one at each end of the link-member, projecting outwardly, forwardly and laterally in the same direction from the body of the link, the teeth of each member in divergent direction from the teeth of the other member; and all the teeth of each narrow link in divergent direction from the teeth of the succeeding narrow link. The teeth of the wide links project laterally at each side of the chain, beyond the teeth of the narrow links. The links are successively open links. Pins r^4 in openings in the link-members space the link-members and connect the same and the links. Any suitable form of chain may be employed.

The leg e is located at the forward, narrow end of the bed A. The lower end of said leg e is pointed, and the point is rounded or otherwise formed so as to engage the mine-floor at different angles, thereby affording a universal support at the swinging axis of and within the chain, with which cooperate the supports t , t^1 , arranged equidistantly from and triangularly therewith, rearwardly and at each side thereof, and at the opposite side of the swinging axis from the cutting field of the chain, to determine by engagement with the mine-floor or a rest thereon the level arrangement or desired inclination of the cutting-chain.

By constructing the bed with a narrow end, as described, and pivoting the chain-boom at the said narrow end, the axis of the boom is enabled to be brought close to the working face of the coal, and rigidity of support is afforded for the boom close to the face, thereby enabling deep and effective cutting to be accomplished by the chain.

The wheels N, N^1 , extend downwardly below the legs t , t^1 , and provide supports higher than the legs, thereby when applied increasing the rear height of the machine and lowering the chain height. They facilitate transfer of the machine between successive cutting operations.

The invention is not limited to the details of construction shown and described.

I claim.

1. A post adapted to engage the mine-floor, a driving-sprocket wheel upon the said post, a cutting-chain upon the said driving-sprocket wheel and having an axis within the said post, means supporting the said cutting-chain in position for cutting, means for operating the said driving-sprocket wheel for driving the said cutting-chain for cutting, and means for swinging the said cutting-chain about the said post.

2. A post adapted to engage the mine-floor, a driving-sprocket wheel upon the said post, a boom pivoted upon the said post, a cutting-chain upon the said driving-sprocket wheel and carried by the said boom and having an axis within the said post, means for operating the said driving-sprocket wheel for driving the said cutting-chain for cutting, and means for swinging the said boom about the said post.

3. A bed, a post supporting the said bed, a driving-sprocket wheel upon the said post, a boom pivoted upon the said post, a cutting-chain upon the said driving-sprocket wheel and carried by the said boom and having an axis within the said post, means carried by the said bed for operating the said driving-sprocket wheel for driving the said cutting-chain for cutting, and means carried by the said bed for swinging the said boom and the said cutting-chain about the said post.

4. A bed, posts supporting the said bed, a driving-sprocket wheel upon one of the said posts, a boom pivoted upon the said post, an arm pivoted to an extension of the said post and supporting the said boom, a cutting-chain upon the said driving-sprocket wheel and carried by the said boom and having an axis lying within the said post, means carried by the said bed for operating the said driving-sprocket wheel for driving the said cutting-chain for cutting, means carried by the said bed for swinging the said boom and the said cutting-chain about the said post, and a jack connected with the said bed for bracing the same.

5. A cutting-chain, a post, a boom pivoted upon the said post and carrying the said cutting-chain, said post being adapted at its lower end to engage the mine-floor within the said cutting-chain, means for operating the said cutting-chain for cutting, and means for swinging the said boom about the said post.

6. A cutting-chain, a post, a boom pivoted upon the said post and carrying the said cutting-chain, the said post being adapted at its lower end to engage the mine-floor within the said cutting-chain and in line with the swinging axis of the said boom, means for operating the said cutting-chain for cutting, and means for swinging the said boom about the said post.

7. A cutting-chain, a bed, posts supporting the said bed, a boom pivoted upon one of the said posts and carrying the said cutting-chain, said post being adapted at its lower end to engage the mine-floor within the said cutting-chain, means for operating the said cutting-chain for cutting, and means for swinging the said boom about the said post.

8. A cutting-chain, a post adapted at its lower end to engage the mine-floor within the said cutting chain, a boom continuous and rigid throughout its length pivoted upon the said post and extending within the said cut-

ting-chain and carrying the said cutting-chain; means for operating the said cutting-chain for cutting, and means for swinging the said boom about the said post.

- 5 9. A cutting-chain, a bed, posts below the said bed adapted to engage the mine-floor and supporting the said bed, a boom pivoted below the said bed upon one of the said posts and carrying the said cutting-chain, means
10 for operating the said cutting-chain for cutting, means for swinging the said boom about the said post, and a jack for bracing the said bed located at the upper side of the same between the said posts.

10. A cutting-chain, a bed having a narrow end, a post adapted to engage the mine-floor supporting the said bed and located at the said narrow end of the same, a boom pivoted below the said bed upon the said post and carrying the said cutting-chain, means
20 for operating the said cutting-chain for cutting, and means for swinging the said boom about the said post.

GESA SANTA.

Witnesses:

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J. C. SMITH.