

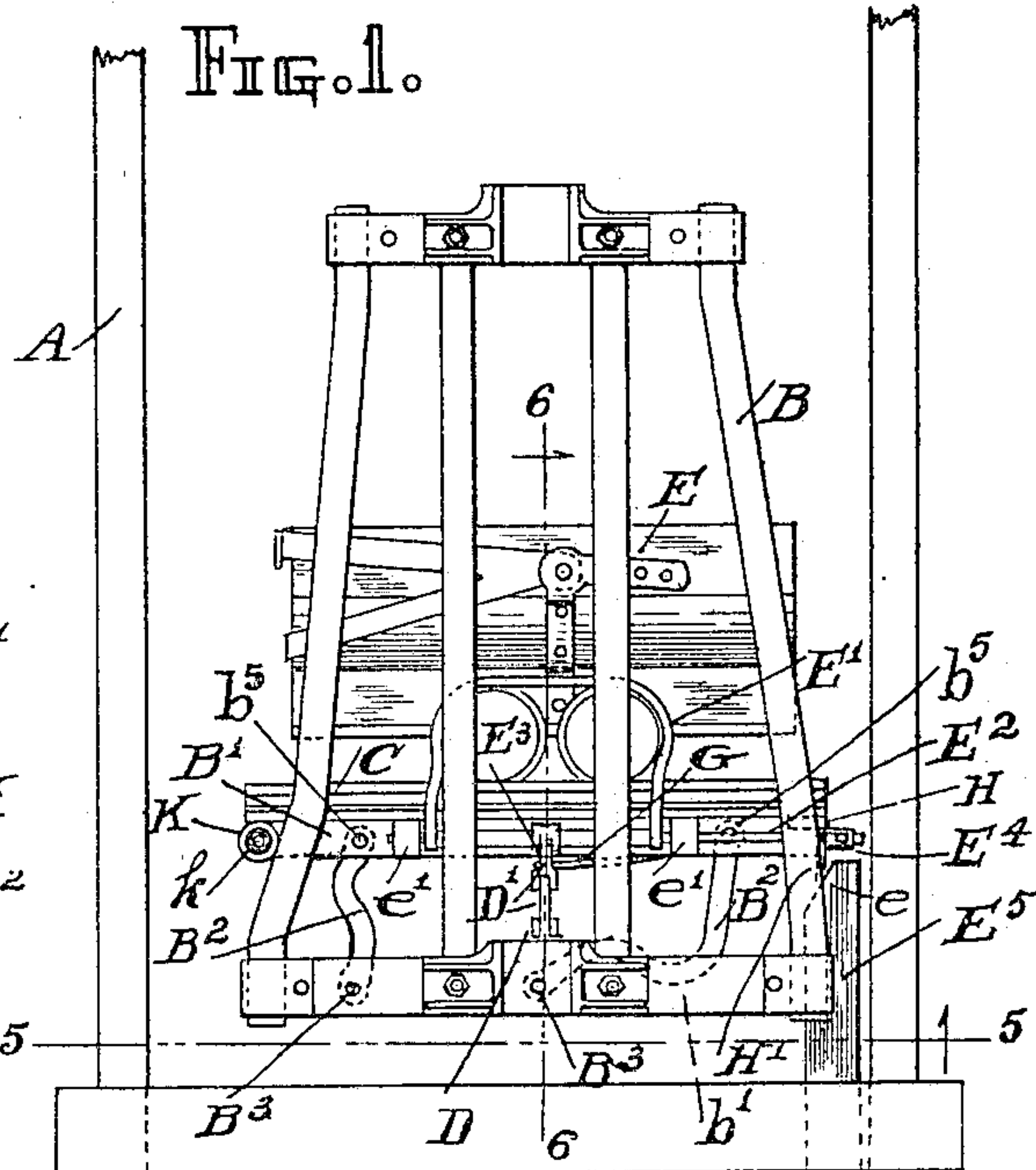
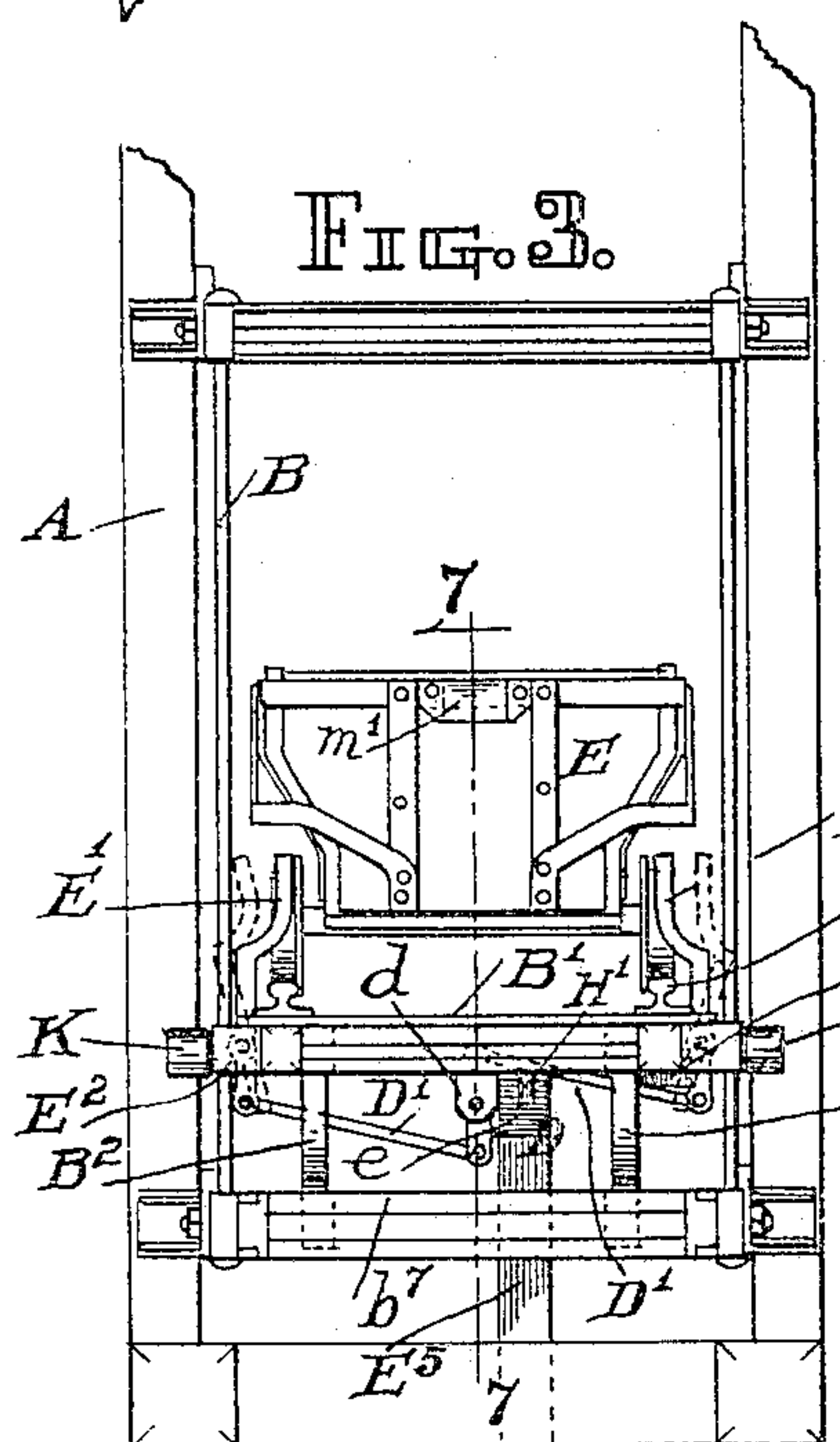
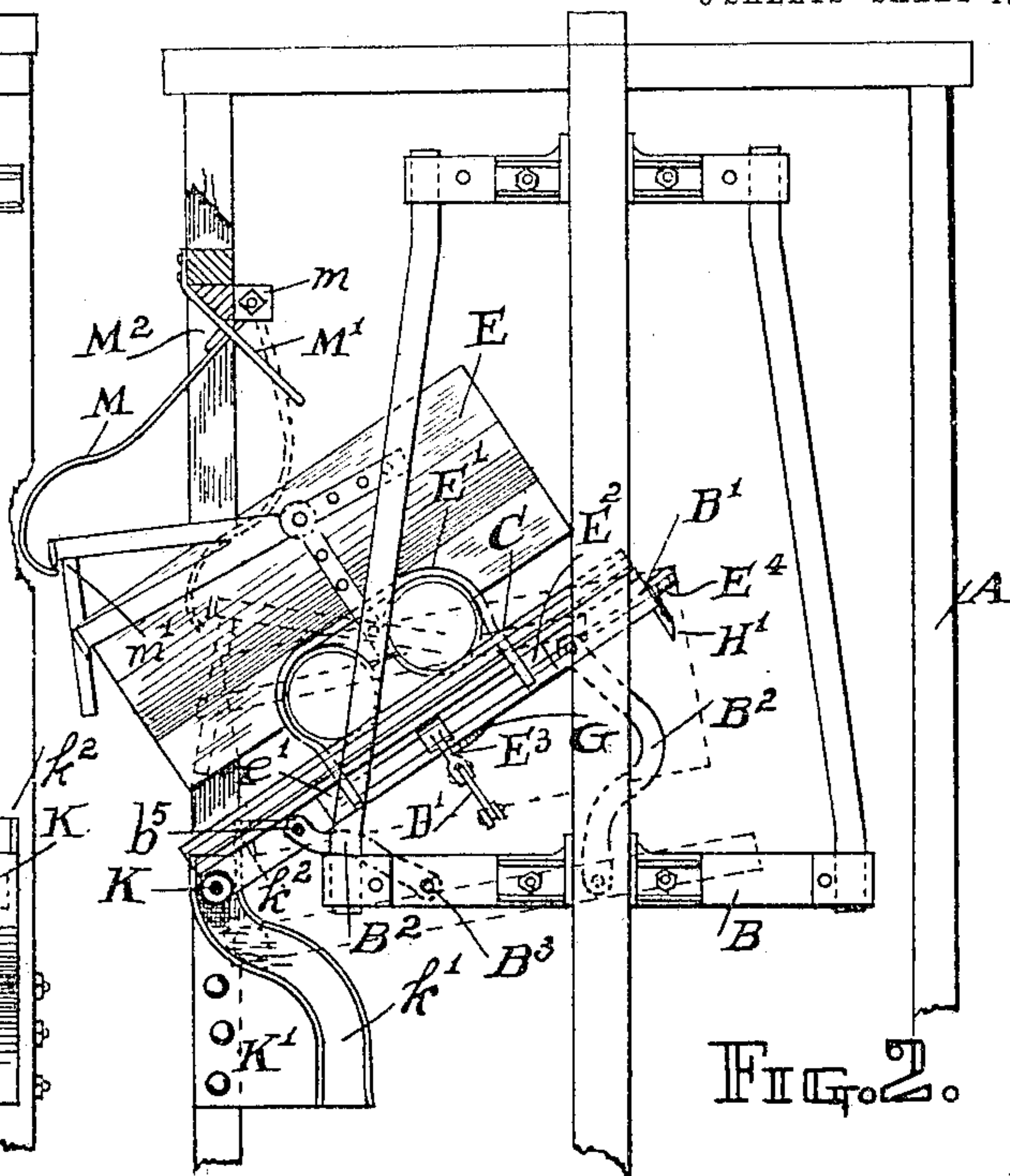
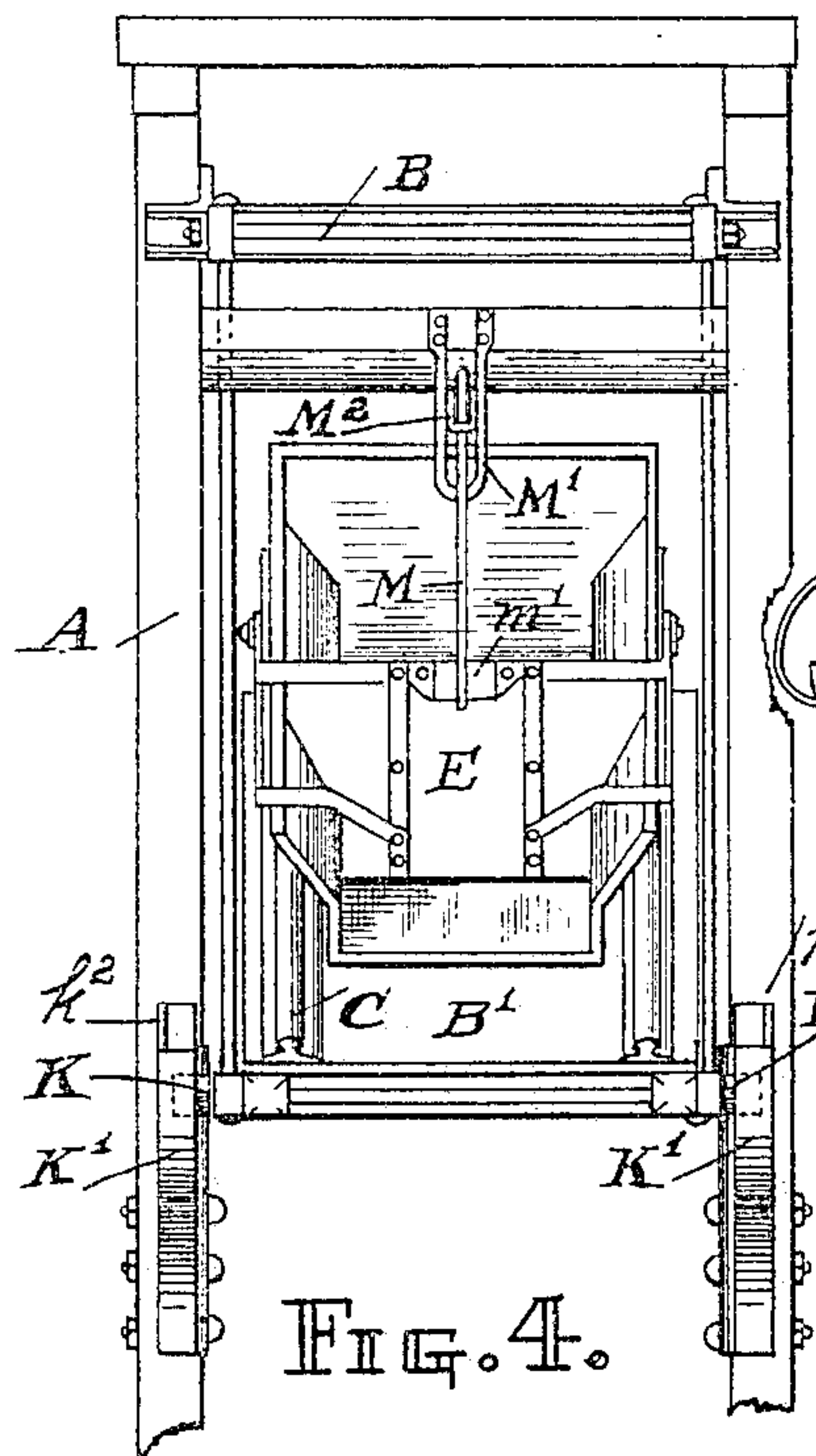
F. G. KERST, DEC'D.

J. KERST, ADMINISTRATRIX.

MINER'S DUMPING CAGE.

APPLICATION FILED AUG. 17, 1904.

3 SHEETS—SHEET 1.



Witnesses.

Louise Kerst.

WITNESSES.  
Louise Kerst.  
Emma Sharp

Inventor.  
Julia Kerst.  
Administratrix of  
FREDRICK C. KERST. DEC'D

F. C. KERST, DEC'D.  
J. KERST, ADMINISTRATRIX.  
MINER'S DUMPING CAGE.  
APPLICATION FILED AUG. 17, 1904.

3 SHEETS—SHEET 2.

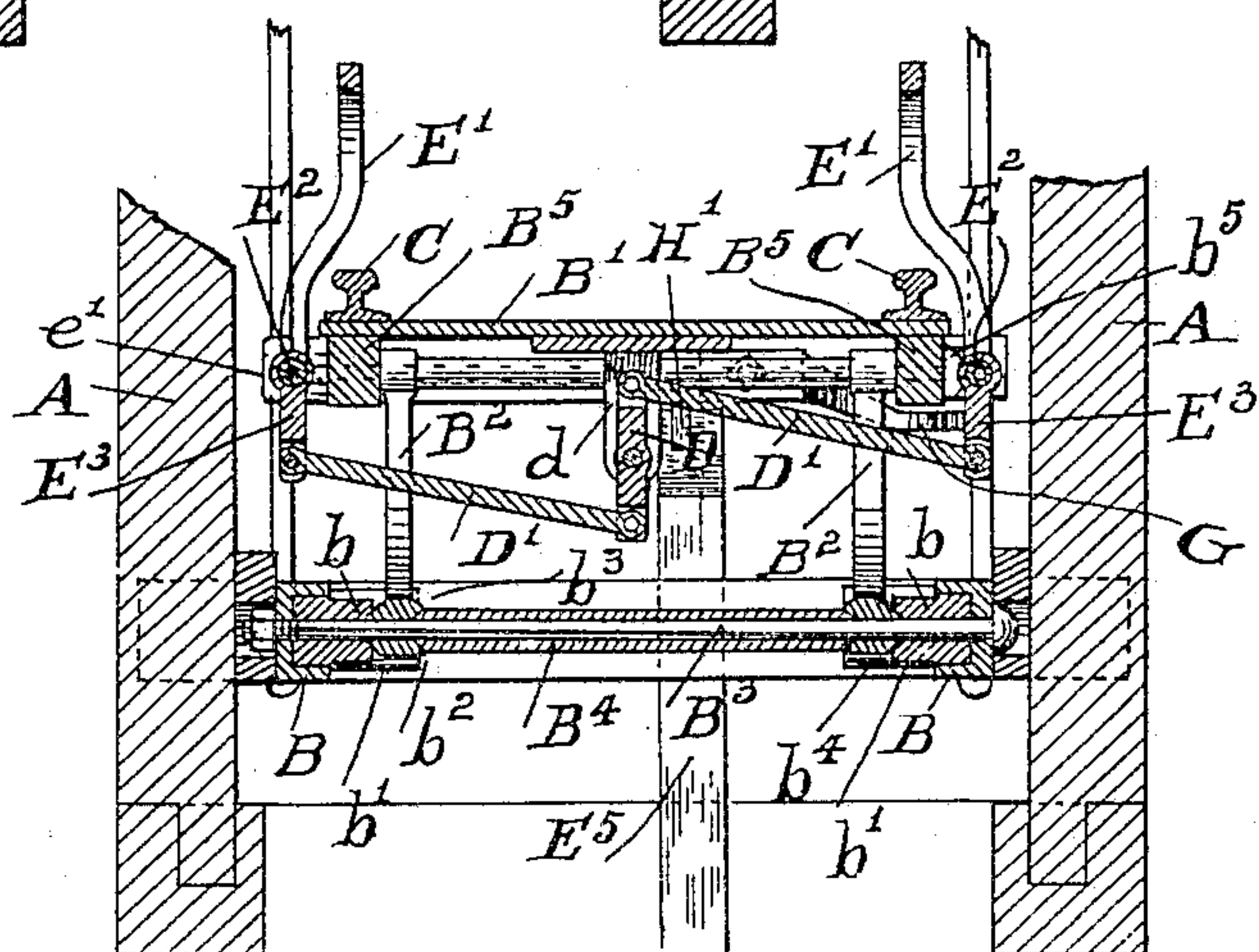
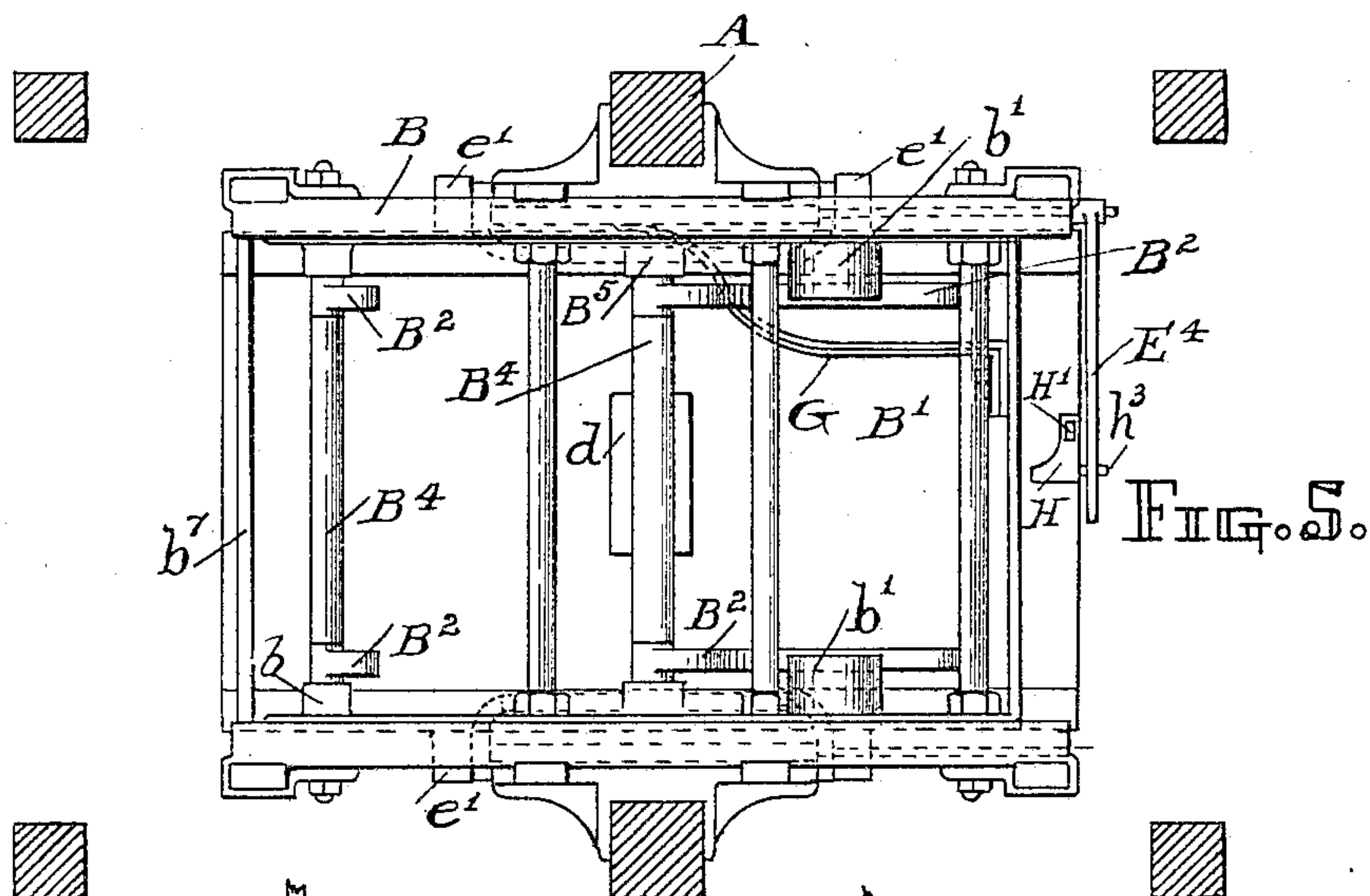


FIG. 6.

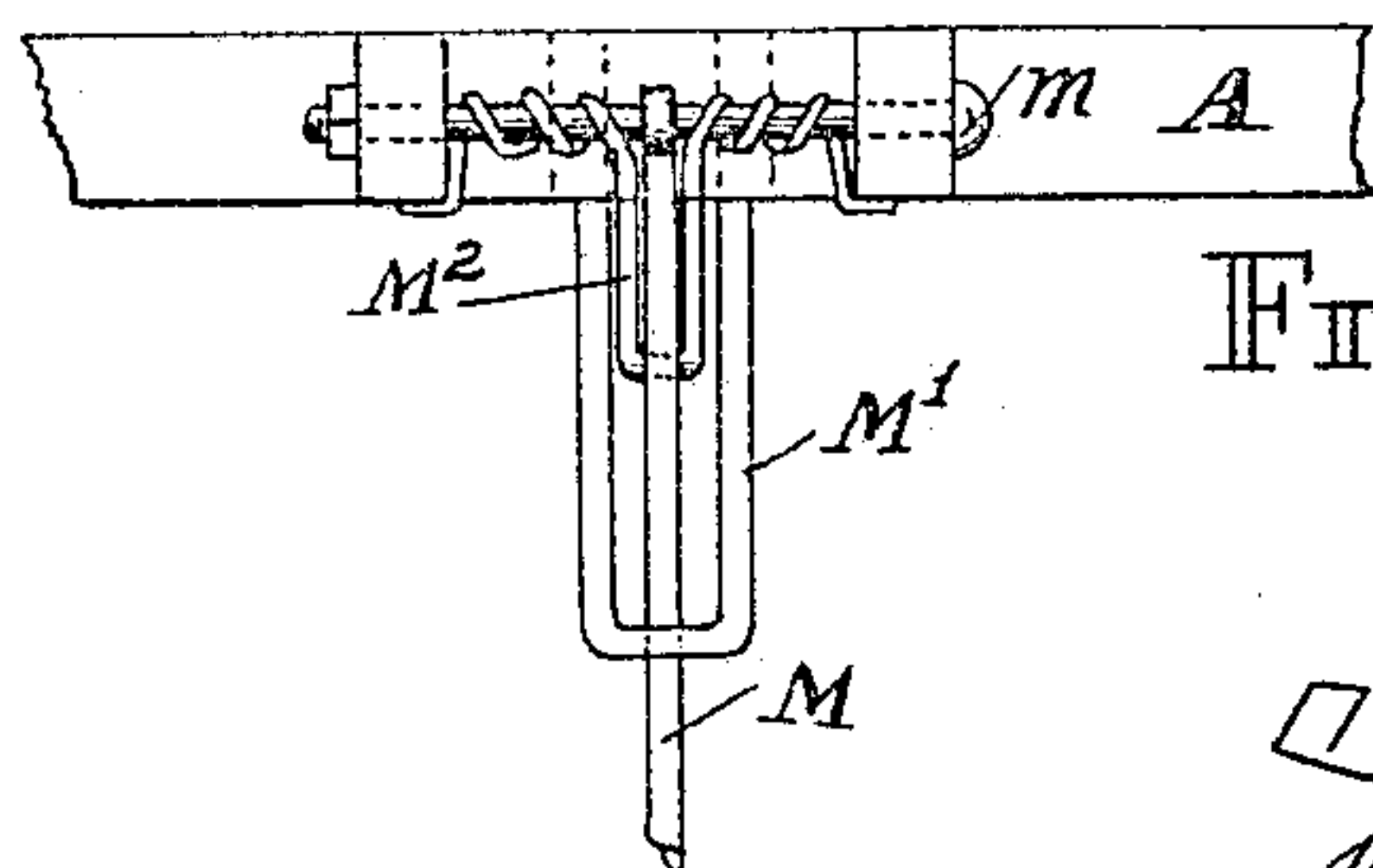


FIG. 9.

WITNESSES.

Louise Kerst.

Emma Sharp

Inventor.

Julio Kerst.

Administratrix of

FREDRICK C. KERST, DEC'D.

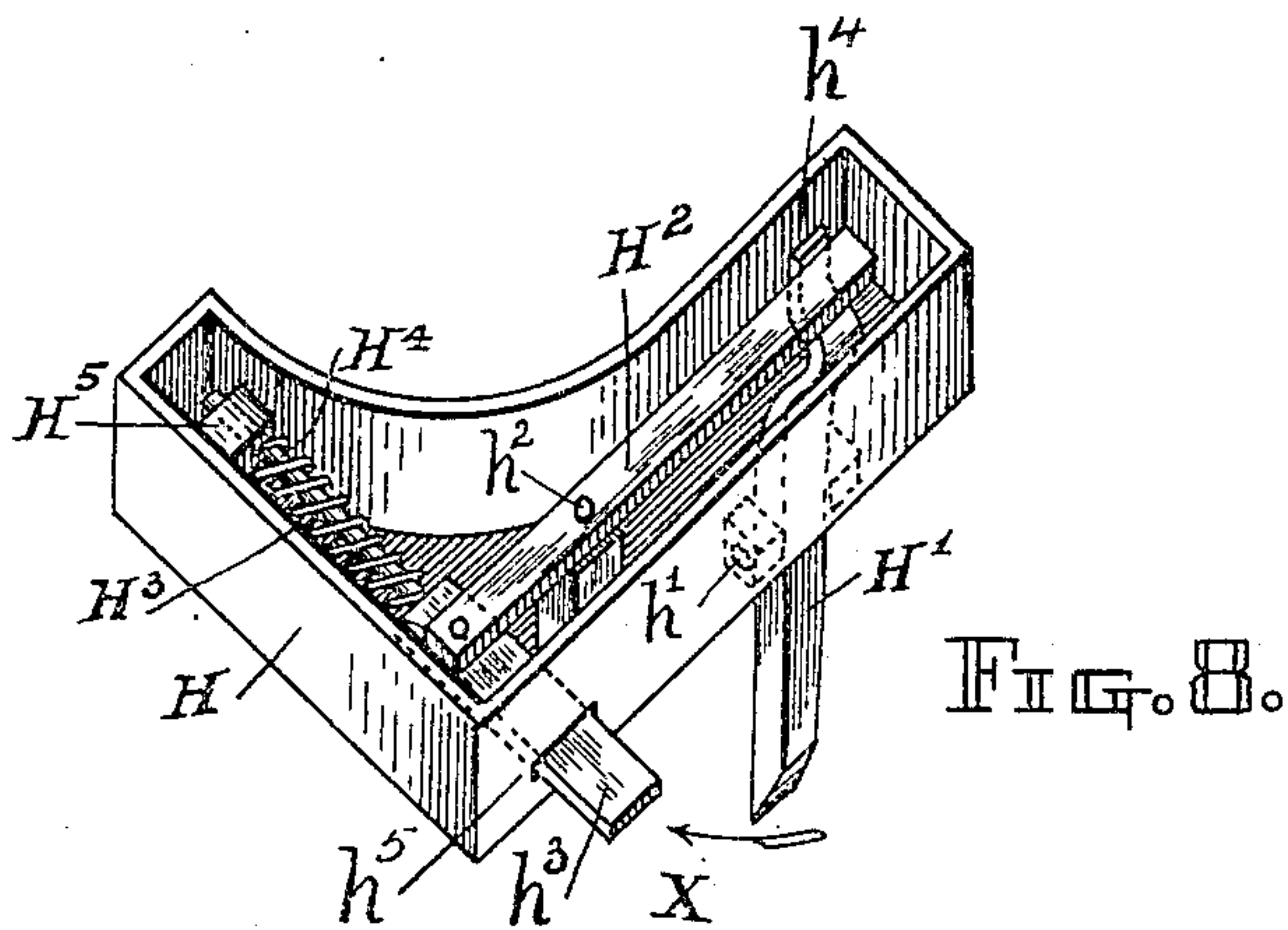
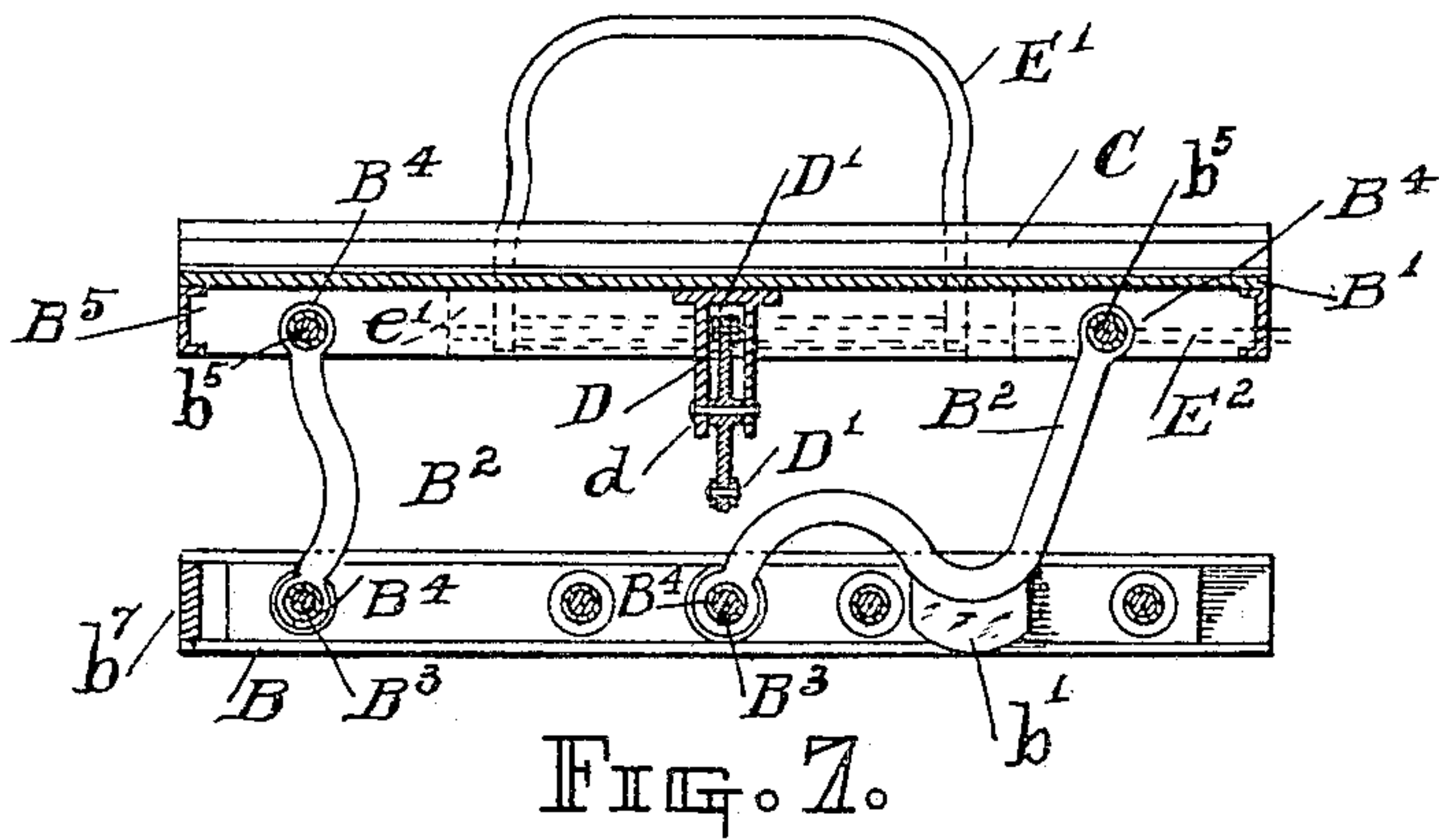


No. 787,189.

PATENTED APR. 11, 1905.

F. C. KERST, DEC'D.  
J. KERST, ADMINISTRATRIX.  
MINER'S DUMPING CAGE.  
APPLICATION FILED AUG. 17, 1904.

3 SHEETS—SHEET 3.



WITNESSES.  
Louise Kerst.  
Emma Sharp.

INVENTOR.  
Julia Kerst.  
Administratrix of  
FREDRICK C. KERST, DEC'D.



# UNITED STATES PATENT OFFICE.

JULIA KERST, OF SPRINGFIELD, ILLINOIS, ADMINISTRATRIX OF  
FREDRICK C. KERST, DECEASED.

## MINER'S DUMPING-CAGE.

SPECIFICATION forming part of Letters Patent No. 787,189, dated April 11, 1905.

Application filed August 17, 1904. Serial No. 221,143.

*To all whom it may concern:*

Be it known that FREDRICK C. KERST, formerly a citizen of the United States, residing at Springfield, in the county of Sangamon and State of Illinois, but now deceased, did invent certain new and useful Improvements in Miners' Dumping-Cages; and I, JULIA KERST, administratrix of said FREDRICK C. KERST, deceased, do hereby declare that the following is such a full, clear, and exact description as will enable others skilled in the art to which it pertains to make and use the said invention.

This invention relates to miners' cages of that class in which a mine-car carried on the cage is by means of dumping devices connected with the cage and operated by means extraneous to the cage caused to dump the contents of the car when the cage is hoisted and when the cage is lowered return the car to position for reloading.

The purposes of this invention are to provide a dumping-platform of improved construction and improved means for connecting the platform with the cage; to provide simple and effective means for retaining the car on the dumping-platform of the cage during the ascent and descent of the cage; to provide means for automatically releasing the retaining devices connecting the car with the dumping-platform when the cage reaches the bottom of the shaft, so as to permit the car to be run off from the cage-platform; to provide in connection with the top works of the shaft improved means for operating the door of the mine-car, and to provide means to prevent premature release of the car from the platform.

With these ends in view this invention consists of the novel features of construction and combinations of parts shown in the annexed drawings, to which reference is hereby made, and hereinafter particularly described and finally recited in the claims.

Referring to the drawings, Figure 1 is a partial side elevation showing the cage in position at the bottom of the pit. Fig. 2 is a

partial side elevation showing the cage raised in the top works and the platform and the car in position for dumping the contents of the car. Fig. 3 is a partial end elevation of the cage in position at the bottom of the pit. Fig. 4 is a partial end elevation of the cage in the same position as shown in Fig. 2. Fig. 5 is an enlarged horizontal transverse section on the line 5 5 of Fig. 1 looking up. Fig. 6 is an enlarged partial vertical transverse section on the line 6 6 of Fig. 1. Fig. 7 is an enlarged partial vertical section on the line 7 7 of Fig. 3. Fig. 8 is an enlarged isometric projection of the lever-locking device detached, and Fig. 9 is an enlarged partial elevation of the hook which operates the car-door.

Similar reference-letters designate like parts in all of the views.

The top works A are of the usual well-known construction and need not be particularly described.

The main structure of the cage B is substantially of the form shown in the drawings and need not be described.

The platform B' is mounted on curved arms B<sup>2</sup>, which oscillate on rods B<sup>3</sup>, secured on the lower part of the frame of the cage B. Gas-pipes B<sup>4</sup>, Fig. 6, inclose the rods B<sup>3</sup>, and the ends b<sup>2</sup> of the pipes are tapered to fit in concave recesses b<sup>3</sup> in the hubs of the arms B<sup>2</sup>.

The outer ends b<sup>1</sup> of the hubs of the arms B<sup>2</sup> are tapered to fit in concave bearings b on the frame of the cage. This construction reduces friction to the minimum and prevents lateral movement of the rocking arms.

By reference to Figs. 6 and 7 of the drawings it will be seen that the arms B<sup>2</sup> are in pairs and that the arms of the front pair are shorter than the arms of the rear pair. When the platform B' occupies a horizontal position, the pivots at the upper ends of the short arms lie somewhat to the rear of the pivots at the lower ends of the arms.

The curvature of the short arms B<sup>2</sup> is such that when the front end of the platform is tilted forward and downward the front edges of the arms will strike against the front cross-piece b' of the frame B to limit the downward



turning of the platform. The form of the arms of the rear pair is such that when the platform is in a horizontal position the upper pivots of the arms will be a considerable distance to the rear of the lower pivots of the arms, and when the platform is tilted the rear end of the platform will be higher than its front end, as clearly shown in Fig. 2. The central parts of the arms of the rear pair are formed so that stops  $b'$ , which project laterally from the bottom frame of the cage, will stop the arms and prevent downward turning of the rear end of the platform.

The upper ends of the arms  $B^2$  turn on bolts  $b^5$ , passing transversely through sills  $B^5$ , which are secured on the under side of the platform.

By reason of the construction shown and described the platform and its load gravitate to prevent accidental upward turning of the arms and consequent displacement of the platform, such as might cause premature dumping of the contents of the car, and excessive tilting of the platform is avoided.

A lever  $D$  is fulcrumed on a hanger  $d$  on the under side of the platform  $B'$ . On top of the platform  $B'$  are rails  $C$ , on which the car  $E$  is supported.

The means for retaining the car on the rails consists of keepers  $E'$ , curved, as shown, to fit round the periphery of the wheels. The keepers  $E'$  are mounted on shafts  $E^2$ , which oscillate in suitable bearings  $e'$  on the under side of the platform.

Arms  $E^3$ , secured to the shafts  $E^2$ , are connected with the lever  $D$  by connecting-rods  $D'$ . A spring  $G$  has one end secured on the under side of the platform, and the other end engages with one of the arms  $E^3$  to operate the arms  $E^3$ , so as to normally hold the keepers  $E'$  in contact with the circumference of the car-wheels. A downwardly-extending curved lever  $E^4$  is secured to one of the shafts  $E^2$ .

The curved lower end of the lever  $E^4$ , engaging with a stationary stop  $E^5$  at the bottom of the pit, raises the lever, and thereby turns the shafts  $E^2$ , so as to swing the keepers  $E'$  outward and remove them from the car-wheels, as indicated by dotted lines, Fig. 3. The stop  $E^5$  has near its upper end an inclined surface  $e$  with which the lever  $H'$  engages, as hereinafter explained.

When the cage is at the bottom of the pit, the lever  $E^4$  acts to retract the keepers, so that the car may be removed from the platform. As soon as the cage starts upward the pressure upon the lever  $E^4$  is removed and the spring  $G$  acts to bring the keepers into position around the wheels, as clearly shown in Fig. 1.

In miners' dumping-cages as ordinarily constructed prior to this invention there is great danger of accidental premature displacement of the keepers and the consequent running off of the car. To obviate this difficulty, there is provided means, which will now be described,

for locking the lever  $E^4$ , so as to avoid premature action of the lever. A box-shaped housing  $H$  is secured on the under side of the platform  $B'$ . A bent lever  $H'$  is fulcrumed in the housing, and the lower member of the lever extends downward. A little before the cage reaches the bottom of the pit and immediately before the lever  $E^4$  strikes the stop  $E^5$  the inclined lower end of the lever engages with the curved surface  $e$  of the stop  $E^5$ . The vertical lever  $H'$  oscillates on a horizontal pivot  $h'$ , mounted on a wall of the housing  $H$ . A horizontal lever  $H^2$  oscillates on a vertical pivot  $h^2$  in the housing. The upper member  $h^4$  of the lever  $H'$ , moving to the right, engages with the lever  $H^2$  and moves the outwardly-projecting end  $h^3$  of the lever  $H^2$  to the left when the lower end of the lever  $H'$  is pushed to the left, as indicated by arrow  $X$ . The outer end  $h^3$  of the lever  $H^2$  projects through an opening  $h^5$  in the side wall of the housing and overlaps the lever  $E^4$ . A spring  $H^3$  surrounds a rod  $H^4$ , which has one end connected with the lever  $H^2$ . The rod  $H^4$  slides in a guide  $H^5$ . The spring  $H^3$  is compressed by moving the lower end of the lever  $H'$  to the left and reacts to move the outer end  $h^3$  of the lever  $H^2$  to the left. The projecting part  $h^3$  of the lever  $H^2$  normally overlaps the lever  $E^4$  and prevents upward turning of the lever  $E^4$  except by the engagement of the lever  $E^4$  with the stop  $E^5$ .

During the descent of the cage and immediately before the lever  $E^4$  reaches the stop  $E^5$  the lower end of the lever  $H'$ , engaging with the inclined part  $e$  of the stop  $E^5$ , causes the part  $h^3$  to retract, thereby permitting the lever  $E^4$  to rise. At all other times the part  $h^3$  overlaps the lever  $E^4$  and prevents accidental displacement of the keepers  $E'$ .

Short rollers  $K$  are mounted to turn freely on bolts  $k$ , which connect the side pieces of the platform  $B'$ . The rollers  $K$  fit and travel in curved channels  $k'$  in channel-plates  $K'$ , which are secured in a suitable position on the top work  $A$ . When the cage is raised, the rollers  $K$  enter and travel in the channels  $k'$ . The channels  $k'$  are of such form that as the rollers travel upward in the channels they cause the platform  $B'$  to move forwardly and tilt downwardly into position to dump the contents of the car, as shown in Fig. 2, and as the cage descends the rollers traveling in the channels cause the platform to resume its horizontal position.

It is known that channeled plates connected with the top work and adapted to guide rollers connected with a tilting platform have been used; but the channeled plates heretofore used have in practice proven unsatisfactory and unreliable because they have no means for preventing accidental displacement of the rollers after they leave the upper ends of the channels. To obviate this defect, there is provided on each plate an extension  $k^2$ , ex-



tending vertically upward from the upper end of the rear wall of the channel a distance about equal to the vertical distance between the eye-bolt with which the cable is connected at the upper end of the cage and the sheave-wheel at the upper end of the top work when the rollers K are at the upper ends of the channels in the plates K'.

If by accident the cage be hoisted too far or if it should receive any sudden shock likely to cause displacement of the rollers, the extensions  $k^2$  will guard against the rollers jumping out of the upper ends of the channels and riding on top of the rear walls of the channels. This feature is of great practical value.

A hook M is mounted and turns on a bolt  $m$  on a top piece of the top work and oscillates vertically between the sides of the guide M', secured to the cross-piece.

A looped spring M<sup>2</sup>, substantially of the form shown in Fig. 9, surrounds the bolt  $m$ , and the loop of the spring bears against the upper surface of the hook and presses the hook downward against the guide and prevents unnecessary vibration of the hook, but permits the hook to raise and engage with the plate  $m'$  on the car-door, so as to open the door when the front end of the car is tilted downward.

The guide M' prevents lateral movement of the hook.

Having fully described the invention, what is claimed as new, and desired to be secured by Letters Patent, is—

1. In an apparatus of the class described, the combination of a cage, a tilting platform mounted on said cage, oscillative shafts on said platform, a lever connected with one of said shafts, a stop with which said lever engages, keepers on said shafts adapted to fit around the wheels of a car, arms secured to said shafts, and a lever mounted on the plat-

form and connected with said arms, as set forth.

2. In an apparatus of the class described, the combination of a cage, rods transverse to said cage, pipes surrounding said rods and having tapering ends, rocking arms turning on said rods and having tapering recessed hubs, and a platform connected with said arms, as set forth. 45 50

3. In an apparatus of the class described, the combination of a cage, a platform on the cage, oscillative shafts on said platform, keepers on said shafts, a lever connected with one of said shafts and a locking device on said platform adapted to lock said lever, as set forth. 55

4. In an apparatus of the class described, the combination of top work, channeled plates on said top work, an oscillative hook on said top work, a spring acting against said hook, a guide limiting lateral movement of said hook, a cage traveling in said top work, a tilting platform on said cage and supporting a car having a door operative by said hook, and rollers on said platform traveling in the channels in said channeled plates, as set forth. 60 65

5. In an apparatus of the class described, the combination of top work, channeled plates having vertical extensions and secured on said top work, a cage traveling in said top work, a tilting platform on said cage, and rollers on said platform fitting in channels in said channeled plates, as set forth. 70

In witness that I claim the foregoing as the invention of said FREDRICK C. KERST I have hereunto subscribed my name, at Springfield, Illinois, this 7th day of July, 1904. 75

JULIA KERST,  
*Administratrix of Fredrick C. Kerst, deceased.*

Witnesses:

LOUISE KERST,  
EMMA SHARP.