

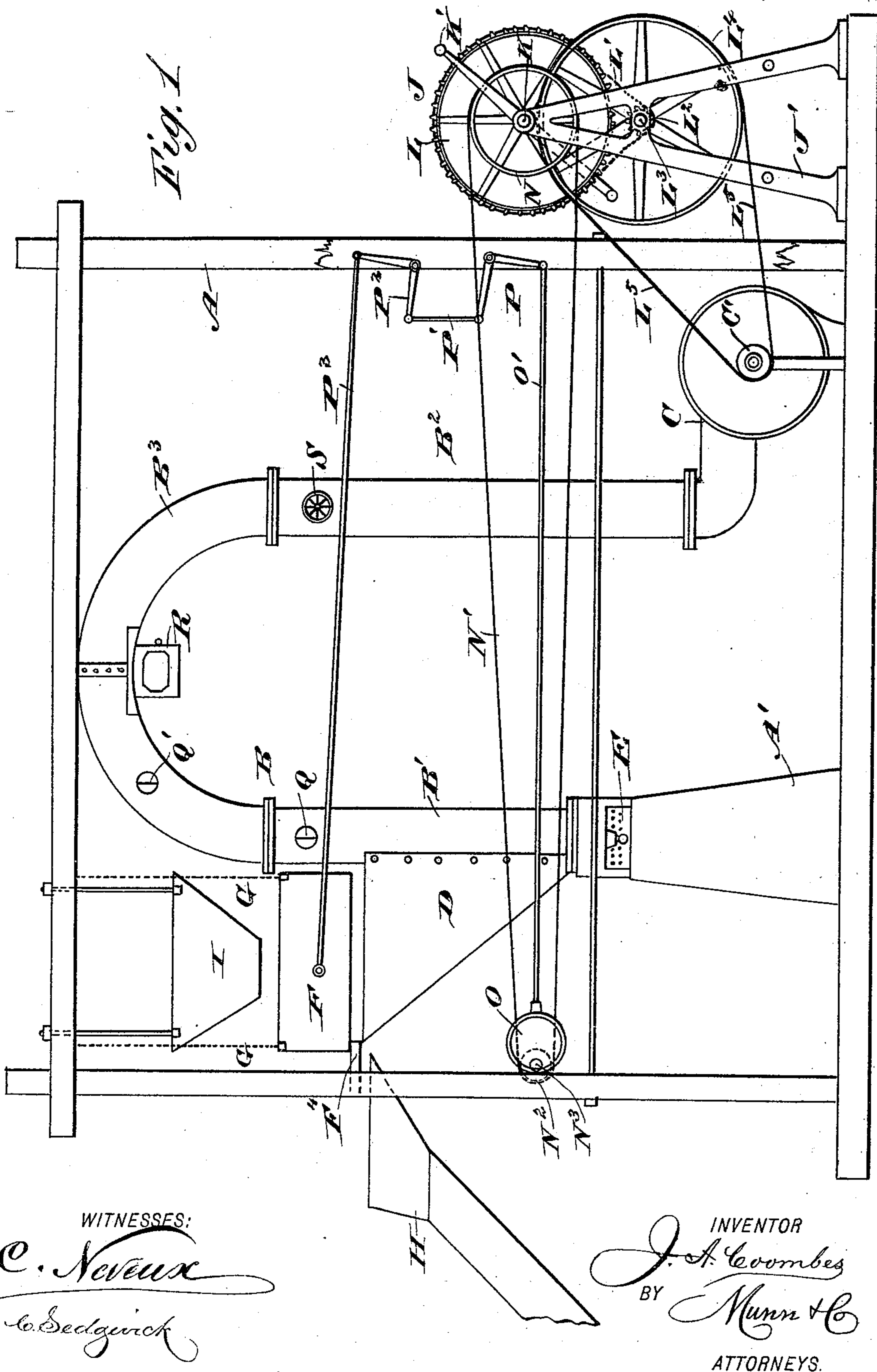
(No Model.)

2 Sheets—Sheet 1.

J. A. COOMBES.
CONCENTRATOR.

No. 493,070.

Patented Mar. 7, 1893.



THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

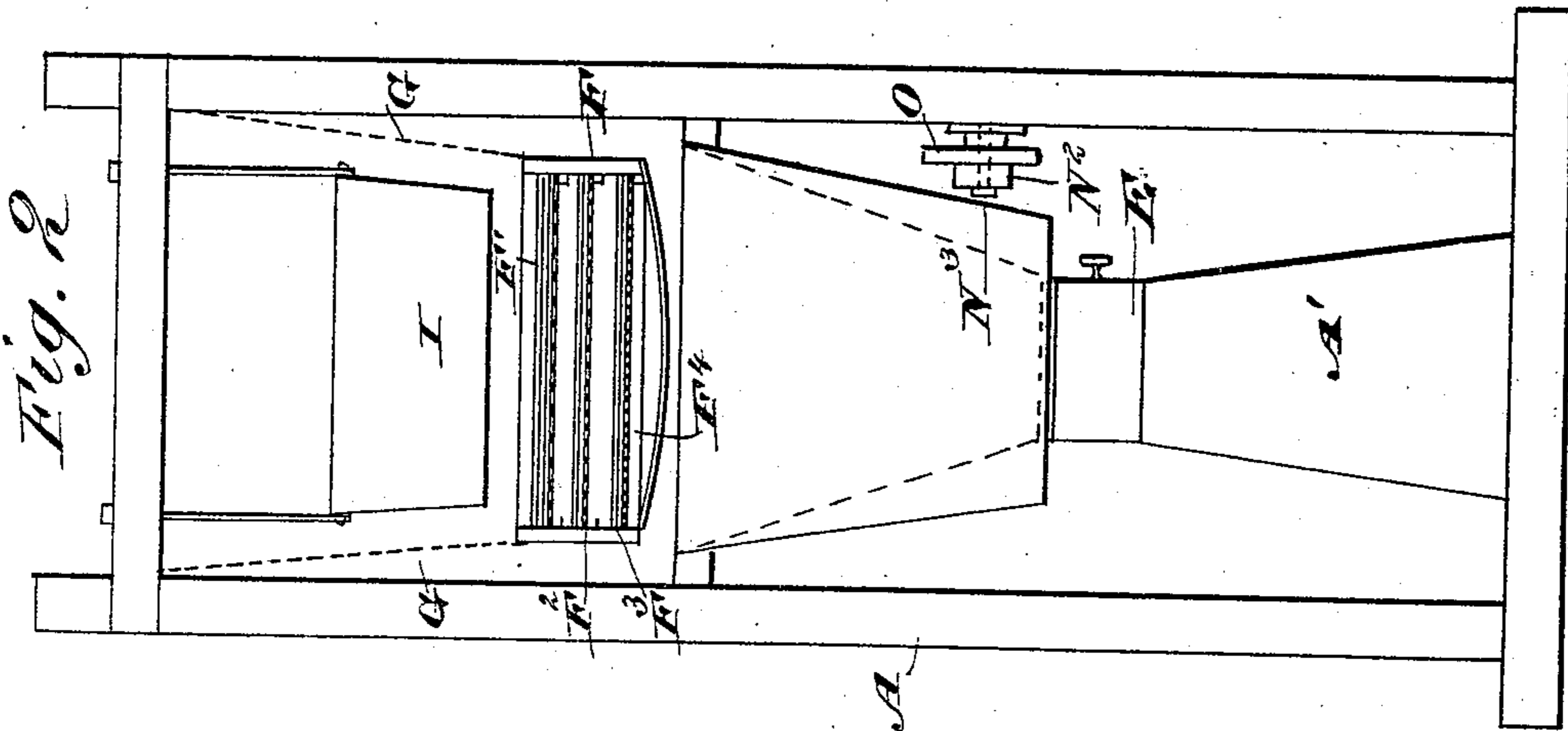
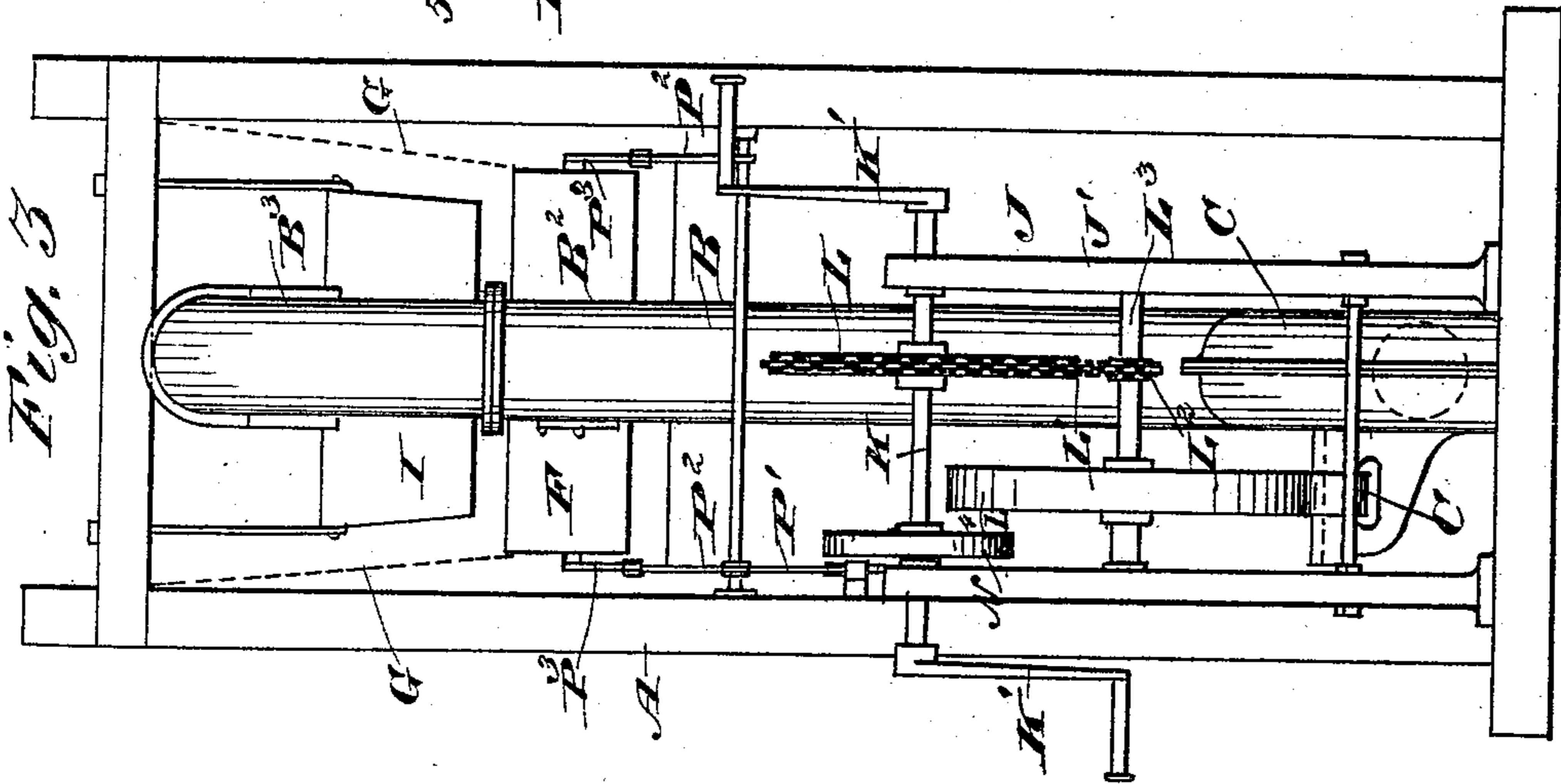
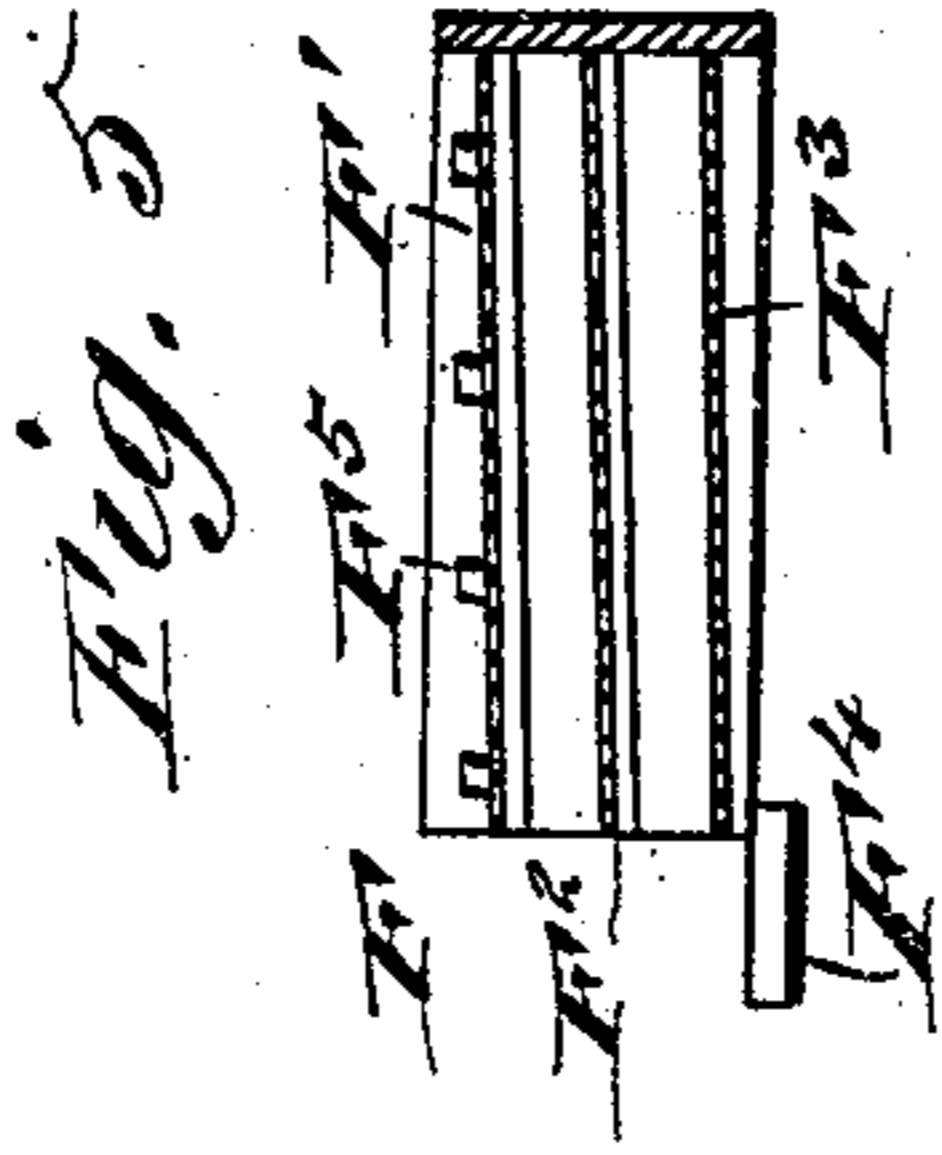
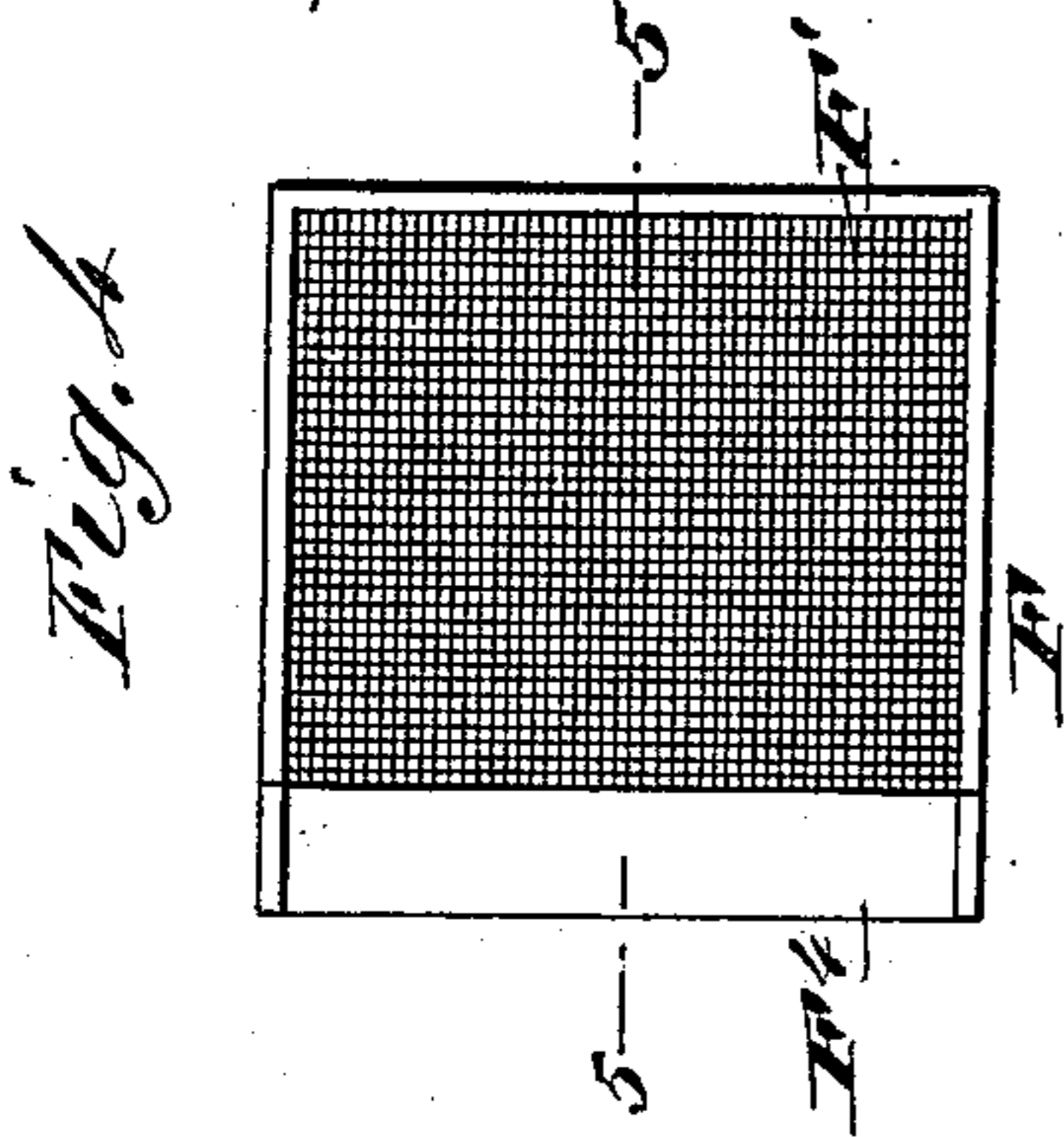
(No Model.)

2 Sheets—Sheet 2

J. A. COOMBES.
CONCENTRATOR.

No. 493,070.

Patented Mar. 7, 1893.



WITNESSES:

C. Neveu
C. Sedgwick

INVENTOR.

J. A. Coombes
BY *Munn & Co*

ATTORNEYS

UNITED STATES PATENT OFFICE.

JOSEPH ALLISON COOMBES, OF LONDON, ENGLAND.

CONCENTRATOR.

SPECIFICATION forming part of Letters Patent No. 493,070, dated March 7, 1893.

Application filed July 19, 1892. Serial No. 440,463. (No model.)

To all whom it may concern:

Be it known that I, JOSEPH ALLISON COOMBES, of London, England, have invented a new and Improved Hand-Power Concentrator, of which the following is a full, clear, and exact description.

The object of the invention is to provide a new and improved hand power concentrator which is simple and durable in construction, very effective in operation and designed for conveniently and thoroughly separating gold from gravel and alluvial beds, and also for saving precious metals from pulverized quartz and tailings, without the aid of water, quick-silver or chemicals.

The invention consists of certain parts and details, and combinations of the same, as will be hereinafter described and then pointed out in the claims.

Reference is to be had to the accompanying drawings forming a part of this specification, in which similar letters of reference indicate corresponding parts in all the figures.

Figure 1 is a side elevation of the improvement with parts broken out. Figs. 2 and 3 are end views of the same. Fig. 4 is a plan view of the agitating screen; and Fig. 5 is a sectional side elevation of the same on the line 5—5 of Fig. 4.

The improved hand power mining machine is provided with a suitably constructed frame A, in which is arranged a vertically-disposed U-shaped tube B having the legs B' and B² and the middle or curved portion B³ connecting the upper ends of the legs with each other, as will be readily understood by reference to Fig. 1. The lower end of the leg B² of the tube B is connected with an exhaust fan C and one side of the other leg B' is connected with a hopper D having an inclined bottom and discharging into the said leg B' of the tube B.

In the extreme lower end of the leg B' directly below the hopper D is arranged a drawer E having a perforated front and serving to collect the precious metals as hereinafter more fully described. The drawer E as well as the lower end of the leg B', are supported on a suitable post A' erected in the frame A.

Above the top of the hopper D is arranged an agitating screen F hung on chains or ropes

G suspended from the frame A and arranged to permit the screen to swing longitudinally, the necessary motion being given by a mechanism hereinafter more fully described. The agitating screen F is formed with a series of transversely-extending and inclined sieves F', F² and F³, located one above the other, the lowermost sieve discharging into the open end of the hopper D. The lowermost ends of the sieves F', F² and F³ discharge the tailings onto a foot board F⁴ extending transversely on the bottom of the screen at one end of the same, the said board discharging into a chute H for carrying off the tailings.

In order to impart a swinging motion to the agitating screen F and also to actuate the exhaust fan C, I provide a mechanism J mounted on the frame A and arranged as follows: In standards J' is journaled a shaft K provided on its ends with crank arms K' for imparting a rotary motion to the said shaft. On the shaft K is secured a sprocket wheel L over which the sprocket chain L' passes, also passing over a sprocket pinion L² secured on a shaft L³ journaled in the standards J' and carrying a pulley L⁴ connected by a belt L⁵ with the pulley C' of the exhaust fan C. Thus, when the shaft K is turned, a rotary motion is transmitted to the shaft L³ which by the pulley L⁴, the belt L⁵ and the pulley C' actuates the exhaust fan C, so as to create a draft within the tube B. On the shaft K is also secured a pulley N connected by a belt N' with a small pulley N² secured on a shaft N³ mounted to turn in suitable bearings on one end of the frame A. On this shaft N³ is secured an eccentric O connected by its eccentric rod O' with a bell crank lever P fulcrumed on the frame A and connected by a link P' with a second bell crank lever P², the pivot of which carries another like bell crank lever. The two bell crank levers P² are connected by links P³ with the front and rear of the screen F so that when the shaft K is rotated, a swinging motion is transmitted to the said screen by the mechanism just described. It is understood that the rotary motion of the shaft K is transmitted to the shaft N³ which, by the eccentric O imparts a swinging motion to the bell crank lever P and the latter a like motion to the bell crank levers P² so that the links P³ impart a swinging motion to the screen

F suspended on the chains or ropes G. Thus, it will be seen that by the operator turning the crank arms K', the screen F as well as the exhaust fan C are actuated in the manner described.

In the leg B' of the bent tube B and near the upper end of the said leg is arranged a transversely-extending retainer or baffle plate Q and a similar retainer Q' is arranged in the curved part B³ of the tube, the said retainers serving as resistance bars for the lighter material passing through the said tube caused by the suction of the exhaust fan C. The said retainers or baffle plates are constructed of three toothed blades joined to a central rod or axis as shown in Fig. 5. In the underside of the middle or curved part B³ and at the center thereof, is arranged a box R serving to catch any flour gold which may pass through the tube. In the upper end of the leg B² is arranged a damper S for regulating the amount of air drawn through the tube by the exhaust fan C.

The operation is as follows: The gravel or other material to be treated is placed in the hopper I from which it falls onto the uppermost sieve F' of the screen F and as the latter receives a swinging motion, the material is agitated, the finer particles passing through the sieve to the next lower sieve F² and from the latter the still finer material passes through to the bottom sieve and then into the hopper D, while the tailings pass over the ends of the sieves onto the transverse board F⁴ to be discharged into the chute H and carried to one side of the machine.

In order to prevent nuggets or other large pieces of precious metals from passing over the screens to the chute H, I provide the sieves with transversely extending riffles F⁵ which retain the nuggets on the sieves from which they may be removed from time to time. The material passing down the hopper D into one side of the leg B' is subjected to the draft caused by the exhaust fan C so that the light material is drawn up the leg B' through the curved part B³ down the leg B² to be finally discharged through the exhaust fan C. The heavier particles drop down the leg B' into the drawer E from which they are re-

moved from time to time. Any flour gold which may be drawn up by the draft is retained and accumulates in the box R, as previously described. The drawer E is perforated as described, to admit a very light current of air for the purpose of carrying away any dirt or fine sand that may accumulate in the drawer, and thus leave the gold therein clean; and, also, for the purpose of partly breaking up the main air current and thus producing eddies therein, which have the effect of causing it to hold in suspension, as it were, any float gold so that the latter may collect in the receptacle, R, instead of being carried past it.

It is understood that by closing the damper S the draft in the leg B' and middle part B³ is reduced, and by opening the said damper the full force of the exhaust fan C acts on the material passing from the hopper D into the leg B'.

Having thus fully described my invention, I claim as new and desire to secure by Letters Patent—

1. In a hand power mining machine, the combination with an inverted U-shaped tube, of an exhaust fan connected with one end of the said tube, a hopper connected with one side of the other leg of the tube, an agitating screen arranged over the said hopper and discharging into the same, a drawer arranged in the tube below the said hopper and having a perforated front through which air is admitted to produce eddies in the main current and to collect the valuable metal, and a box arranged in the under side of the middle portion of the said tube to collect and retain flour gold as set forth.

2. The improved concentrator, composed of the bent tube having the perforated front drawer E and the box R, arranged as specified, the agitating screen F, and exhaust fan C, the driving gear, and rods, levers and belts connecting the same with the screen and fan, as shown and described.

JOSEPH ALLISON COOMBES.

Witnesses:

G. F. WARREN,

THOMAS LAKE,

Both of 17 Gracechurch Street, London.