H. J. BENTSON.

TRENCHING MACHINE.

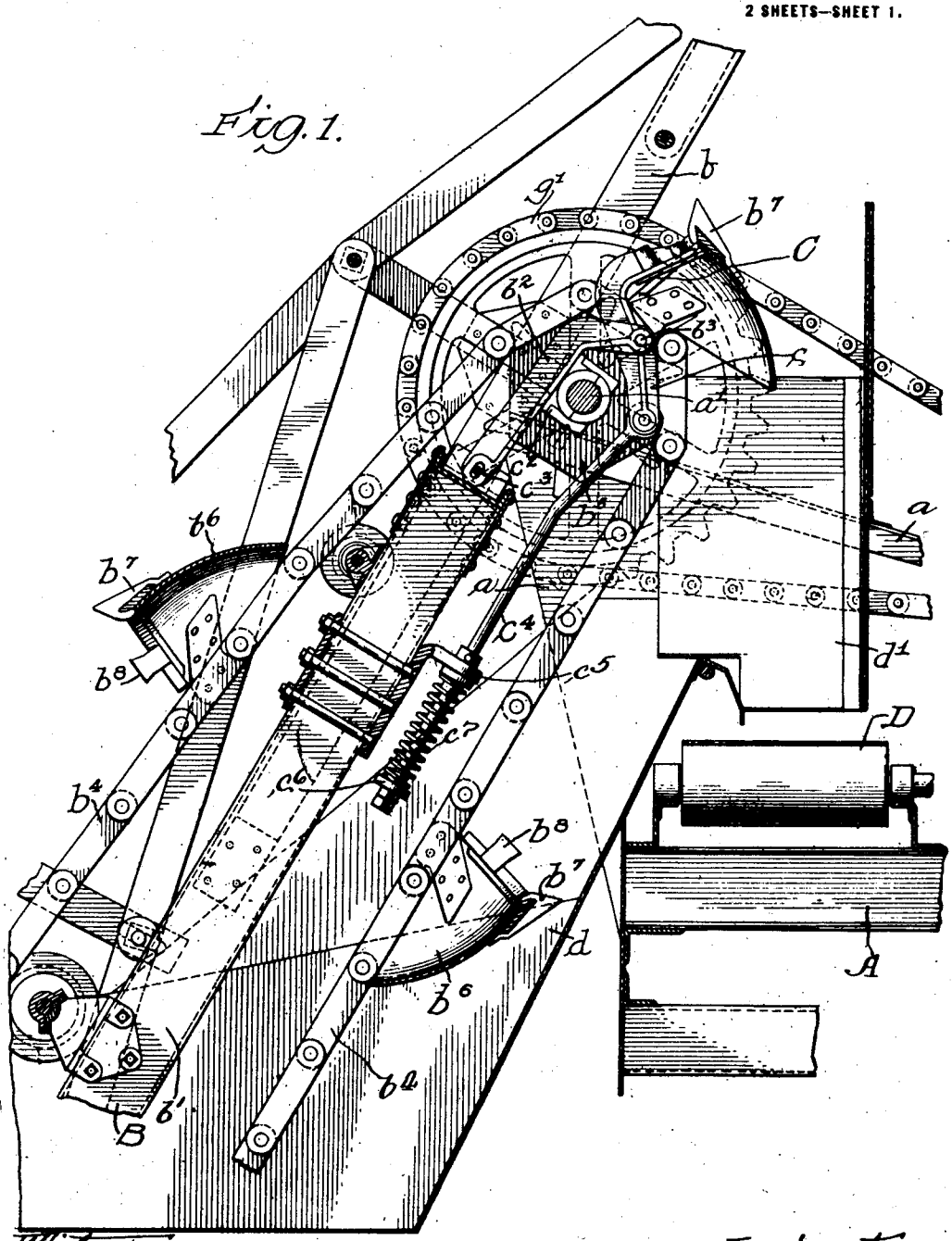
APPLICATION FILED JAN. 10, 1913.

1,246,527.

Patented Nov. 13, 1917.

2 SHEETS—SHEET 1.

Fig. 1.



Witnesses:

G. W. Bowman Jr.

P. Burkhardt.

Inventor

Hans J. Bentson

By: Arthur L. Bruns

Atty

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2 SHEETS—SHEET 2.

Fig. 2.

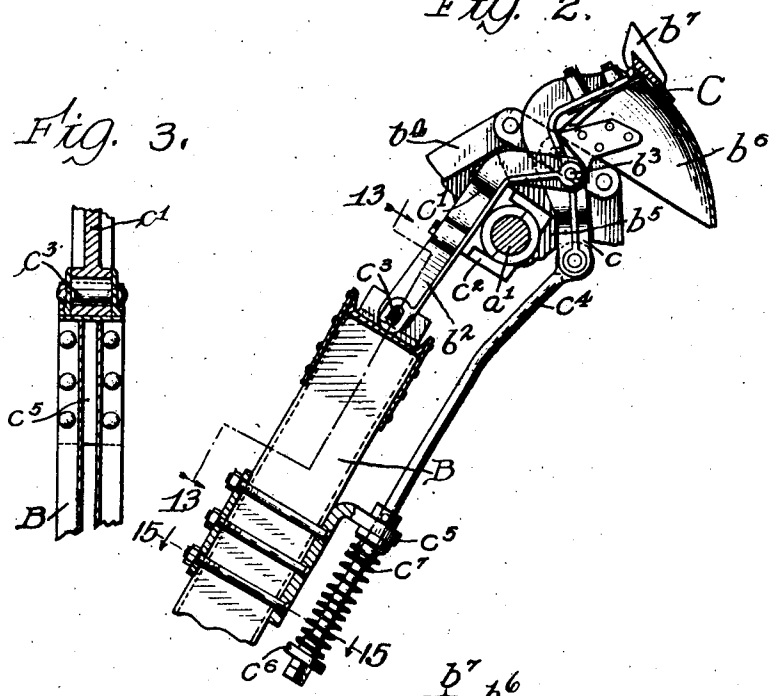


Fig. 3.

Fig. 4.

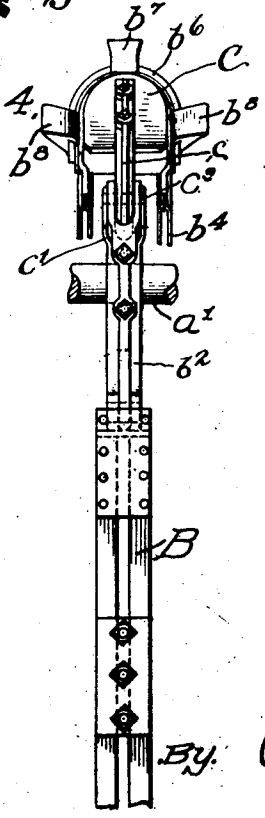


Fig. 5.

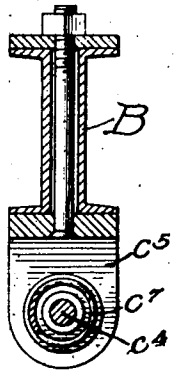
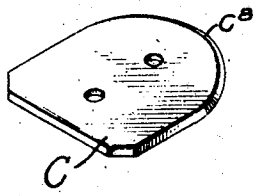


Fig. 6.



Witnesses.

E. W. Bomarus Jr.

A. Burkhardt.

Inventor.

Hans J. Bentson

By Arthur T. Briard

Atty.

UNITED STATES PATENT OFFICE.

HANS J. BENTSON, OF LA JOLLA, CALIFORNIA, ASSIGNOR TO FREDERICK C. AUSTIN, OF CHICAGO, ILLINOIS.

TRENCHING-MACHINE.

1,246,527. Specification of Letters Patent. Patented Nov. 13, 1917.

Application filed January 10, 1913. Serial No. 741,207.

To all whom it may concern:

Be it known that I, HANS J. BENTSON, a citizen of the United States of America, and resident of La Jolla, San Diego county, California, have invented a certain new and useful Improvement in Trenching-Machines, of which the following is a specification.

My invention relates to trenching machines of that particular kind in which the body of the machine is provided at the rear end thereof with a swinging support, and in which the excavating is done by an endless series of buckets which are caused to travel up and down the said support, by means of sprocket chains or other endless members, whereby the buckets are filled while moving upward against the end wall of the trench, and in which each bucket discharges its load when turned upside down at the upper end of its upward path of travel, each bucket, for this purpose, being provided with an open inner side, whereby the dirt enters the open mouth of the bucket and passes entirely through the latter, in the general operation of filling and discharging its load, the upper end of said support being provided with an adjusting device for tilting the said support about a horizontal axis, in a vertical plane, to thereby vary the working depth of said buckets, depending upon the depth desired for the trench.

Generally stated, the object of my invention is to provide a novel and highly efficient trenching machine of the foregoing general character.

Special objects are to provide novel and efficient mechanism for operating the said buckets; to provide a novel and effective clean-out or ejector for causing each bucket to discharge its load at the proper time; to provide a novel and efficient device for varying the angle of the beam or support upon which the endless series of buckets travels up and down during the operation of forming the trench; to provide a novel and effective device for preserving the grade line of the trench, and for maintaining the machine in position to properly do the work; to provide a novel and improved construction whereby the load passes entirely through each bucket; to provide a novel and efficient construction and arrangement whereby a simple and compact gearing is employed for reversibly operating the adjusting device for the bucket support, for operating the belt or other means for receiving the discharge from the buckets, for operating the said buckets, and for also operating the tractor by which the machine is slowly moved forward during the excavating operation; and to provide certain details and features of construction and novel combinations tending to increase the general efficiency and serviceability of an excavating machine of this particular character.

To the foregoing and other useful ends my invention consists in matters hereinafter set forth and claimed.

In the accompanying drawings:

Figure 1 is a detail sectional view, of the upper portion of the endless series of buckets and the sprocket chains upon which the buckets are mounted, illustrating the operation of the said ejector or clean-out, and the manner in which the buckets discharge while turning upside down at the time when they pass around the upper sprocket wheels of the said sprocket chains.

Fig. 2 is a detail view showing the mechanism of the said ejector or clean-out for the buckets.

Fig. 3 is an enlarged detail section on line 13—13 in Fig. 2.

Fig. 4 is a rear elevation of the parts shown in Fig. 2.

Fig. 5 is an enlarged detail section on line 15—15 in Fig. 2.

Fig. 6 is a perspective of the plate which constitutes the ejector and clean-out, and which is of a shape and character to scrape the entire surface of each bucket, whereby the said ejector or clean-out, by relative movement, passes entirely through each bucket.

As thus illustrated, it will be seen that my invention comprises a body A having a frame or superstructure a at the rear thereof, the top of said frame being provided with a transverse shaft a^1. The swinging beam or bucket support B is suitably mounted upon the said shaft, being com-

posed of an upper section b, and a lower section b^1, which hangs in the ditch. The hanger b^2 of the beam has a pivot b^3 for the cleaner C, as will more fully appear. A shaft is provided at the lower end of said support B, and this shaft is provided with a pair of sprocket wheels for the parallel endless sprocket chains b^4, in a manner that will be understood, the lower end of the beam and the lower buckets being omitted for convenience of illustration. Similar sprocket wheels b^5 are provided for said chains and mounted upon the shaft a^1, whereby a rotation of the shaft a^1 will cause the said sprocket chains to travel up and down the said support. The buckets b^6 are secured at intervals to the said sprocket chains, each bucket being rigid with two parallel links of said chains, and each bucket being open at either side and being tapered toward its rear end, the said chains being spaced apart. Each bucket has its cutting edge or lip provided with teeth b^7, and its sides provided with similar teeth b^8, whereby the trench cut by the buckets is wider than the combined width of said sprocket chains. As the buckets travel upwardly and move around the upper sprocket wheels, their rear ends are tilted away from the sprocket chains, so as to bring their open inner sides downward, as shown in Fig. 1, thereby discharging the load; but while each bucket is traveling upward in a straight line, the position thereof is such that it will carry the load. The buckets pass between the sides of the upper section b of the supporting beam. The axis b^3 of the cleaner is above the axis a^1 of the beam, so that the cleaner has a shorter radius than the buckets.

The ejector or clean-out consists of a plate C, shown in Fig. 6, secured to the arm c, said arm being pivoted in the fork c^1 of the hanger b^2, which is mounted partly on the shaft a^1, by means of a bearing c^2, and partly on the beam or support B by a connection c^3 of any suitable character. The lower end of the arm c has a rod c^4 pivotally connected therewith, said rod extending downward and through a guide c^5 secured to the beam or bucket support B in any suitable or desired manner. The lower end of said rod has a collar c^6, and a coil spring c^7 is interposed between the said collar and the guide c^5, whereby said spring is compressed when the plate C is opposed to the load in the bucket. In this way, and if the bucket or anything contained therein strikes the said ejector or clean-out, the latter will, by reason of the spring c^7, yield sufficiently to prevent breakage. The sharp edge c^8 of the plate C is adapted to scrape the inner surface of the bucket, and during the operation, it will be seen this ejector or clean-out passes entirely through the bucket—that is to say, the relative movement is such that it enters the mouth of the bucket and passes out of the open side or rear end thereof. In this way the buckets are successively scraped and cleaned by a device which retains its position at the top of the traveling sprocket chains upon which the buckets are mounted.

The buckets are caused to discharge upon the transverse belt or conveyer D, which latter is disposed at the rear of the machine and directly below the dumping position of the buckets. The buckets, while traveling upward above ground, are inclosed by a shield or guard d, whereby in falling the dirt will be directed back into the trench; and the discharge from each bucket is received by a hood d^1 disposed immediately above the said belt or conveyer. The spring c^7 yields when the cleaner is pressed forward by the load, as while working in sticky clay, and when the load is detached from the bucket the spring quickly moves the cleaner back and thus throws the dirt downward into the hopper.

What I claim as my invention is:—

1. A trenching machine comprising a swinging digging beam, an endless series of rear-end-discharge digging and conveying buckets on said beam, a cleaner supported on the upper end portion of the beam to pass through the buckets, a rod connected to said cleaner, means on the beam to support said rod for endwise movement, and a spring on said rod to yieldingly present the cleaner to the buckets.

2. A trenching machine comprising a swinging digging beam, an endless series of rear-end-discharge digging and conveying buckets on said beam, a cleaner pivotally supported to pass through each bucket where the buckets successively tilt into dumping position, a rod connected to said cleaner, means on the beam to support said rod for endwise movement, and a spring on said rod to yieldingly present the cleaner to the buckets.

3. The structure of claim 2, as specified, in which the pivot of said cleaner is disposed a distance from the axis of said beam, so that the cleaner has a shorter radius than the buckets.

4. The structure of claim 2, as specified, in which said cleaner is movable a distance with each bucket, and said rod being movable upward to compress the spring when the cleaner moves with a bucket.

5. A traveling excavator comprising an endless series of rear-end-discharge digging and conveying buckets disposed in position to form a trench behind the excavator, a cleaner pivotally supported to pass through each bucket where the buckets tilt into

dumping position, so that said cleaner is movable a distance under pressure of the load in any bucket, and means to yieldingly resist said movement of the cleaner and for insuring the return thereof to normal position.

6. The structure of claim 5, as stated, said means being a spring, so that the quick return of the cleaner will throw the detached load from the bucket.

Signed by me at Chicago, Illinois, this 6th day of January, 1913.

HANS J. BENTSON.

Witnesses:
H. KNUDSON,
E. H. CLEGG.