Jan. 5, 1932. A. H. ZUCKER 1,839,824

FLOOR SCRUBBING MACHINE

Filed May 25, 1929 4 Sheets-Sheet 1

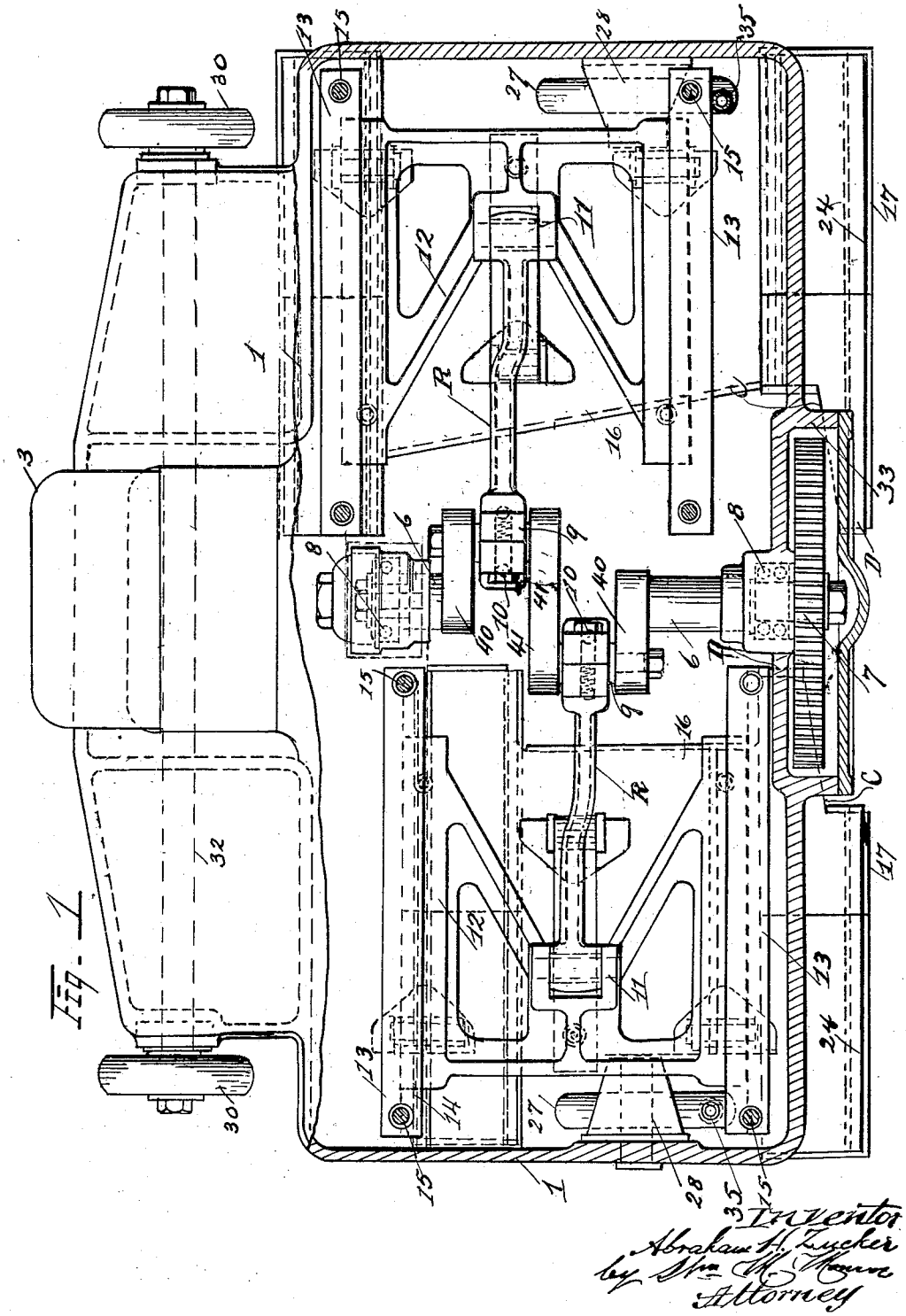

Fig. 1

Inventor
Abraham H. Zucker
by Wm. H. Kenyon
Attorney

Jan. 5, 1932. A. H. ZUCKER 1,839,824

FLOOR SCRUBBING MACHINE

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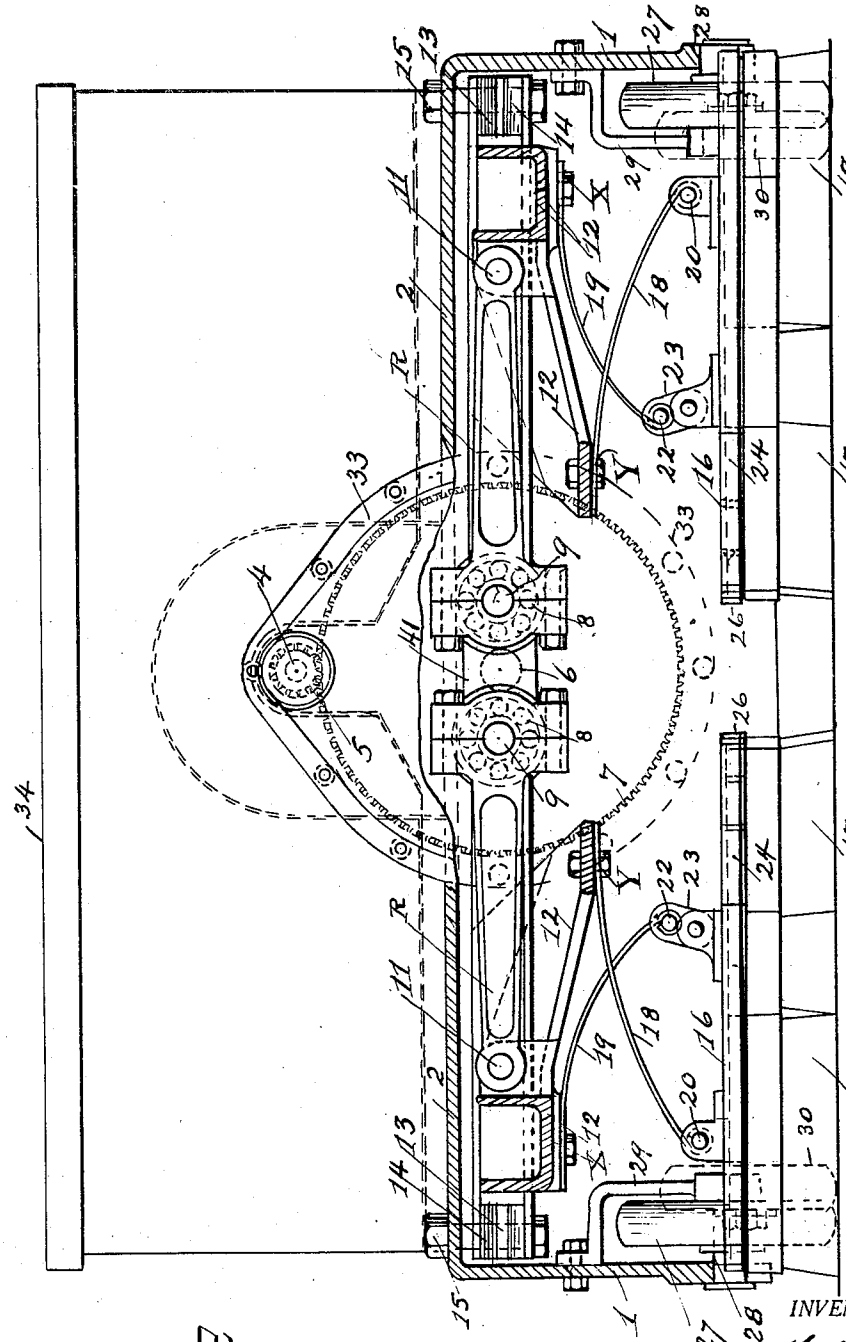

Fig. 2

INVENTOR.

BY Abraham H. Zucker

ATTORNEY.

Jan. 5, 1932. A. H. ZUCKER 1,839,824

FLOOR SCRUBBING MACHINE

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Fig. 7

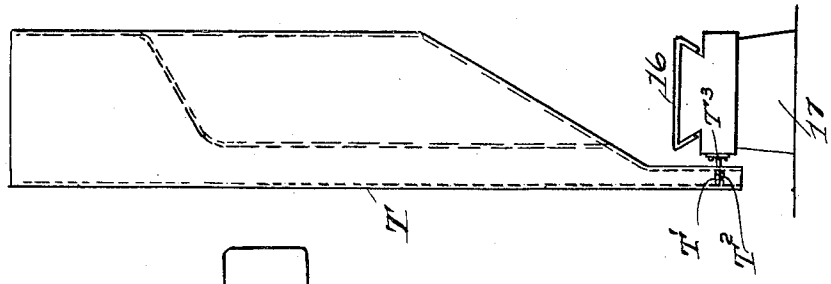
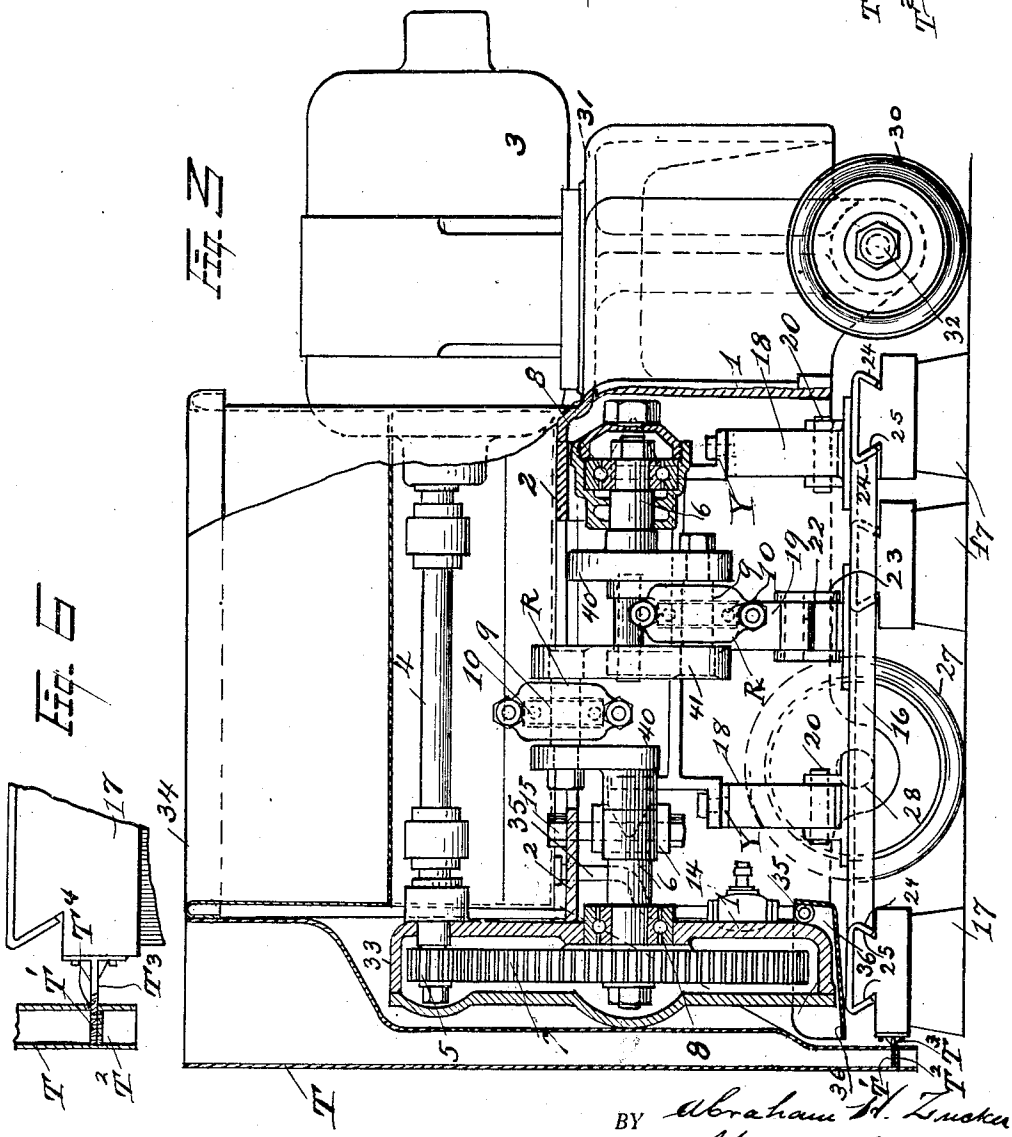


Fig. 5



BY Abraham H. Zucker
Jno. W. Morris
ATTORNEY.

Jan. 5, 1932. A. H. ZUCKER 1,839,324

FLOOR SCRUBBING MACHINE

Filed May 25, 1929 4 Sheets-Sheet 4

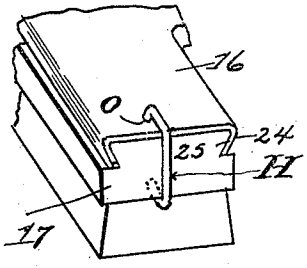


Fig. 3

Fig. 4

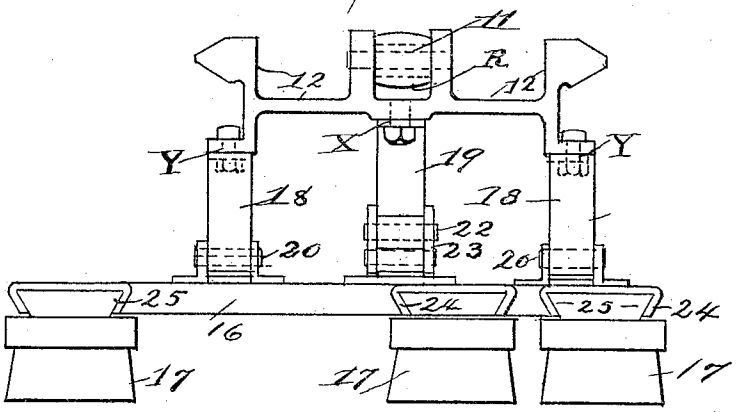
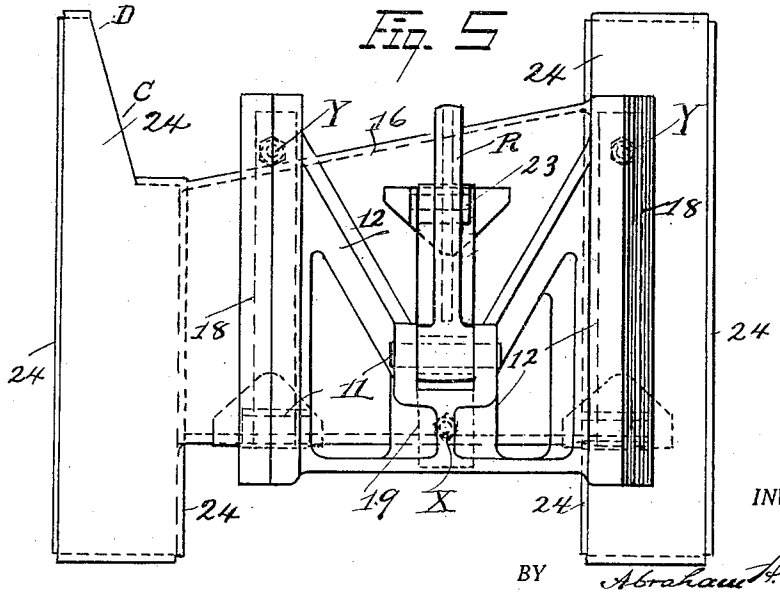


Fig. 5



INVENTOR.

BY Abraham H. Zucker

Wm. M. Mouse

ATTORNEY.

Patented Jan. 5, 1932

1,839,824

UNITED STATES PATENT OFFICE

ABRAHAM H. ZUCKER, OF CLEVELAND, OHIO

FLOOR SCRUBBING MACHINE

Application filed May 25, 1929. Serial No. 365,994.

The invention relates to improvements in motor operated floor scrubbing or polishing machines of the type in which the weight of the machine is removed from the brushes and in this instance the brushes are supported upon springs that are attached to frames which are slidably mounted in guides in the machine. The particular objects are to provide an automatically acting machine in which opposed sets of scrubbing brushes are employed that engage with the floor at opposite sides of the machine and operate transversely of the machine in opposite directions, thus alternately approaching and receding from each other.

By this method of construction the strains upon the frame work of the machine are balanced and all vibration of the machine while at work is eliminated.

The invention includes also means for discharging water or cleaning fluid and cleaning powder finely distributed sheets over the floor in advance of the brushes.

It includes also the provision of upper and lower reciprocating frames, brushes attached to the lower frames and resilient means for supporting the lower frames upon the upper frames, the resilient connecting means serving also as a positive propelling means for the lower frames and brushes thereon.

To accomplish these and other useful results, the invention comprises the combination and arrangement of parts and construction of the various details, hereinafter described, illustrated in the accompanying drawings and specifically pointed out in the claims.

In the accompanying drawings, Fig. 1 is a horizontal section of the machine on a horizontal plane beneath the upper wall of the casing Fig. 2. Fig. 2 is a vertical longitudinal section of the machine on center line Fig. 1. Fig. 3 is a vertical longitudinal section on central plane of the machine Fig. 1. Fig. 4 is an end elevation of the upper and lower frames and attached brushes. Fig. 5 is a plan thereof. Fig. 6 is a vertical section of the lower end of the powder container. Fig. 7 is a side elevation thereof. Fig. 8 is a perspective of the brush holding springs.

In these views 1 is the hollow external casing of the machine, which is open below and provided with the marginal horizontal top member 2. Upon a narrowed portion of the top member is mounted the electric motor 3 and longitudinal motor shaft 4 upon the outer end of which is secured the pinion 5.

The pinion provides the driving power for the divided crank shaft 6 by means of the large speed reducing gear 7. The extremities of the shaft are mounted in ball bearings 8, 8.

Upon the crank pins 9, 9 connecting rods R are mounted in ball bearings 10, 10 their opposite ends being pivoted at 11, 11, in separate horizontal upper frames 12, 12, positioned at opposite sides of the machine.

These frames reciprocate in V shaped grooves 13, 13 in transverse guides 14, 14 which are adjustably secured to the top member 2 by means of bolts 15, 15 respectively.

These upper frames reciprocate in their guides towards and from each other and the cranks and crank pins are arranged upon opposite sides of the shaft to produce this action.

Beneath the upper frames 12, 12 are shown the lower horizontal frames 16 to which the scrubbing brushes 17, 17, are attached.

The respective upper and lower frames are resiliently secured together by means of oppositely inclined band springs 18 and 19 respectively, by means of which the lower frames are upheld and are propelled in both directions.

The springs 18 are bolted at Y to the upper frames and are pivoted at 20 in the lower frames respectively, and the reversely inclined springs 19 are bolted at X to the upper frames and are pivoted in shackle links 23 at their lower ends upon the lower frames, thus enabling them to respond readily to the pressure upon them.

The lower frames 16 are provided with parallel downwardly turned longitudinal flanges 24, 24 which are inclined inwardly to provide dovetailed sockets in which the longitudinally grooved upper edges 25, 25 of the brush backs are inserted and also spring H, inserted underneath the brush

backs, extend over the ends of the brush backs 17 and are secured in openings O in the top of the lower frame to prevent end movement of the brushes. See Fig. 7.

In this manner the brushes are made to reciprocate within the sides of the outer frame or casing, and cannot escape therefrom. Front rubber tired wheels 27 are mounted upon the shafts 28 secured in brackets 29 upon the inner sides of the outer casing and rear rubber tired wheels 30 are mounted upon a shaft 32 and appear externally of the rear portion 31 of the frame which is somewhat reduced in width. In this manner the brushes are wholly relieved from the weight of the casing, which rests squarely upon the wheels 27 and 30, which are widely spaced apart as shown in Fig. 1, so there is no danger of tipping the casing.

The gearing is enclosed in an external casing 33 thus preventing them from catching in the clothing of the operator.

A reservoir 34 for water or a cleaning fluid is mounted upon the top of the casing, and pipes 35, 35 lead downward from this reservoir to a distributing apron 36 in front of the machine and over the front edge of this apron the water or fluid is uniformly distributed over the floor in front of the brushes. Also a cleaning powder is deposited in front of the brushes from a receptacle T and a perforated sifting plate T′ operates over a perforated bottom plate T2 to distribute the powder uniformly. See Figs. 3, 6, and 7. This plate may be operated by means of a rigid connection T3 upon the adjacent brushes and passes through a slot T4 in the receptacle T.

It will be seen by referring to Fig. 1 that the opposed ends of the brushes at the front of the machine are cut away at C, C so as to provide projections D, D that overlap when they approach each other, thus conserving space under the casing and also serving to efficiently operate over all the surface passed over by the machine and to leave no portion thereof not thoroughly scrubbed.

To insure reciprocation of the upper frames in opposite directions, the crank shaft is centrally positioned between the upper frames and is divided, and the connecting rods are mounted upon the crank pins 9, 9 that connect the terminal cranks 40, 40 with the intermediate continuous crank arm 41 which is of double length, thus operating the connecting rods upon both sides of the crank shaft and in opposite directions.

By employing oppositely inclined band springs for giving both resiliency to the brush supporting frames as well as for imparting a thrust thereto, a three point suspension is obtained by means of which the flexibility of the brush when passing over inequalities in the floor is much increased. It also enables the brush to tilt slightly in all directions, and to make close contact with the uneven surfaces of the floor.

Having described the invention what I claim as new and desire to secure by Letters Patent is:

1. A machine for cleaning floors, comprising, a casing open at the bottom and having a top member, transverse guide members secured to said top member, a pair of opposed upper frames reciprocable towards and from each other in said guides, a corresponding number of lower frames, brushes attached to said lower frames, a longitudinal shaft and a motor therefor mounted upon said casing and a crank shaft intermediate of said frames and operatively connected with said motor shaft, rods connecting the cranks thereon with said upper frames on both sides of said shaft, and oppositely inclined springs for connecting each upper frame with its corresponding lower frame.

2. A machine for cleaning floors, comprising, a casing open at the bottom and having a top member, transverse guide members secured to said top member, a pair of opposed upper frames reciprocable towards and from each other in said guides, a corresponding number of lower frames, brushes attached to said lower frames, a longitudinal shaft and a motor therefor mounted upon said casing and a crank shaft intermediate of said frames and operatively connected with said motor shaft, rods connecting the cranks thereon with said upper frames on both sides of said shaft, and resilient means for connecting said upper and lower frames, the opposed brushes at the front side of said machine being cut away upon their meeting ends to permit of their overlapping each other, when they approach each other.

3. In a floor cleaning machine, a casing, brushes movable therein means for moving said brushes, a reservoir for cleaning fluid superimposed upon said casing, a receptacle for powder mounted in front of said casing an apron secured to the lower side of the front wall of said casing, and having its discharge edge horizontal and positioned in advance of said brushes and adjacent to said floor, and delivery pipes leading from said reservoir to said apron, a delivery spout leading from said powder receptacle, and means connected with and operated by the brushes for releasing powder therefrom.

4. In a floor cleaning machine, a casing open at the bottom, a pair of transversely reciprocable upper frames therein, a corresponding number of lower frames, brushes attached to said lower frames and oppositely inclined spring bands connecting each upper frame with the corresponding lower frame to operate the same and means for operating the upper frames.

5. In a floor cleaning machine, a casing open at the bottom, a pair of transversely re-

ciprocable upper frames therein, a corresponding number of lower frames, brushes attached to said lower frames and oppositely inclined spring bands connecting each upper frame with the corresponding lower frame to operate the same, and means for reciprocating said upper frames towards and from each other and means for operating the reciprocating means.

6. In a cleaning machine, in combination, a casing open at the bottom, an upper pair of frames reciprocable in said casing towards and from each other, transversely thereof, means for reciprocating said frames, a lower pair of frames, oppositely inclined band springs for resiliently connecting each upper frame with its corresponding lower frame, and brushes secured to each lower frame, said oppositely inclined band springs, serving as resilient connections between said frames, and also serving as means for propelling said brushes in opposite directions.

7. In a floor cleaner, a support, an upper and a lower pair of frames reciprocable therein, brushes secured to said lower frames, and band springs resiliently connecting each pair of lower frames with its respective upper frame, said springs being uniformly distributed upon said frames, and alternately inclined in opposite directions, the springs inclined in one direction being pivotally attached to said lower frame, and shackle links pivoted in said lower frame to which the springs that are inclined in the opposite direction are pivoted and means for reciprocating said upper frame.

8. In a floor cleaning machine, in combination, a casing, brushes reciprocable in said casing, an elevated tank for cleaning fluid upon said casing, a receptacle for cleaning powder, means for feeding said fluid upon said floor in advance of said brushes and means operated by the movements of said brushes for depositing said cleaning powder in advance of said brushes and means for reciprocating said brushes.

9. In a floor cleaning machine, in combination, a casing, brushes reciprocable over said floor in said casing, a receptacle for cleaning powder secured to the front of said casing, said receptacle having a perforated bottom wall, and a perforated sifting member reciprocable over said perforated bottom wall, said sifting member being operatively connected with one of said brushes and means for reciprocating said brushes.

10. In a floor cleaning machine in combination, a casing, an upper and lower frame reciprocable in said casing means for reciprocating said frame and longitudinally arranged spring and thrust members connecting said upper and lower frames and alternately inclined in opposite directions, one of said spring and thrust members being centrally positioned, and others being arranged on the sides thereof, providing three points of attachment for said members in each frame.

11. In a floor cleaning machine, a casing, a crank shaft and cranks in said casing, parallel transverse guides upon each side of said shaft, upper frames reciprocable in said guides, means for reciprocating said frames, and rods connecting said cranks and upper frames, lower frames transversely reciprocable in said casing, brushes attached to said lower frames, and springs operatively connecting said upper and lower frames respectively, to push and pull the same.

12. In a floor cleaning machine, a transversely elongated rectangular casing, an operating shaft mounted across the same in the longer sides thereof, opposed cranks thereon, parallel guides in the longer sides of said casing, upper frames reciprocable in said guides in opposite directions, rods operatively connecting said cranks and upper frames, means for rotating said shaft, lower frames equalling in number said upper frames, brushes attached to said lower frames and band springs connecting said upper and lower frames, said band springs being alternately inclined forwardly and rearwardly for the purpose described.

13. In a floor cleaning machine, a transversely elongated casing having parallel sides, a shaft mounted in the longer sides of said casing, opposed cranks thereon, guide members in said longer sides of said casing, upper frames reciprocable in said guides, a lower frame beneath each of said upper frames, a brush attached to each lower frame and resilient members operatively connecting said upper and lower frames to push and pull the same.

14. A floor scrubbing machine, comprising a casing, transverse guides in said casing, upper frames movable in said guides, lower brush carrying frames, and resilient members operatively connecting said upper and lower frames, and means for reciprocating said upper frames.

15. In a scrubbing machine in combination, a frame, pairs of brushes transversely reciprocable therein, one pair being positioned in the rear of the other pair, the brushes in each pair of brushes being reciprocable towards and from each other, the brushes in the rear pair of brushes being staggered so as to overlap each other and the brushes in the front pair of brushes having their opposed ends cut away from opposite sides to permit them to overlap each other and to have their front longitudinal edges in alinement with each other, a common support for the front and rear brushes in each pair of brushes and means for reciprocating said supports, towards and from each other.

In testimony whereof I affix my signature.

ABRAHAM H. ZUCKER.