

Sept. 27, 1932.

D. B. ASHMAN

1,880,031

PORTABLE FABRIC PUNCHING MACHINE

Filed June 19, 1930

4 Sheets-Sheet 2

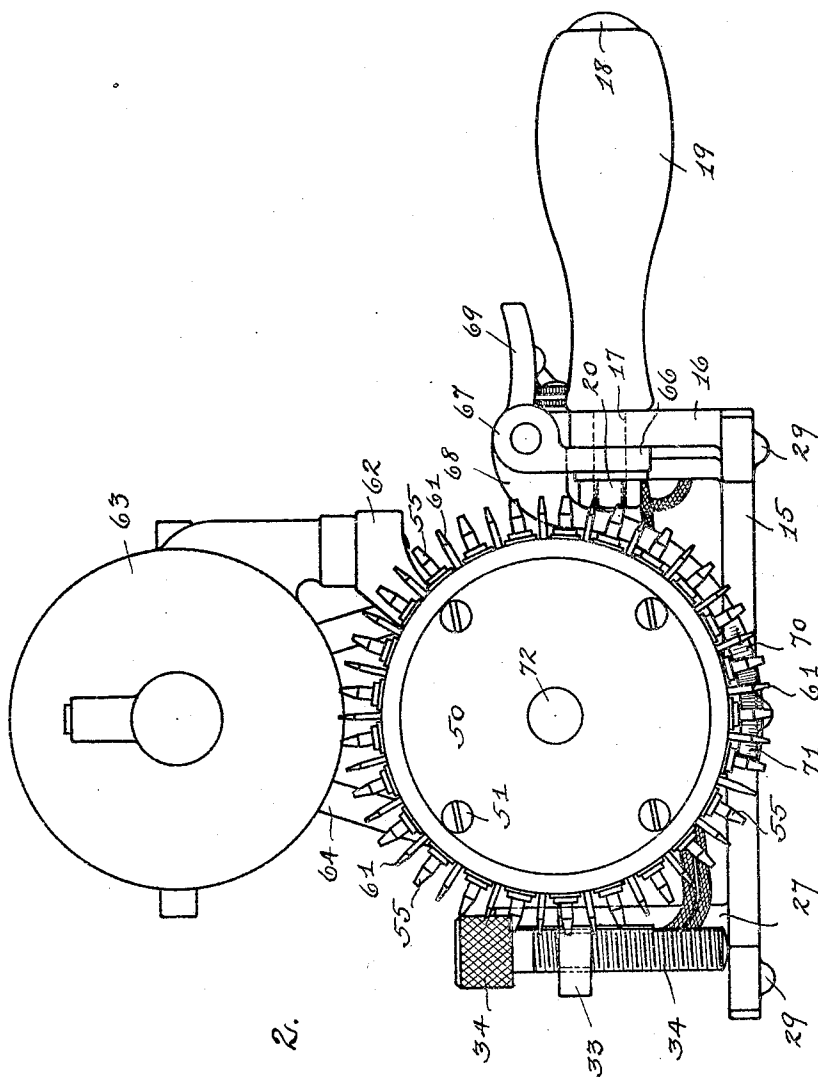


Fig. 2.

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4 Sheets-Sheet 3

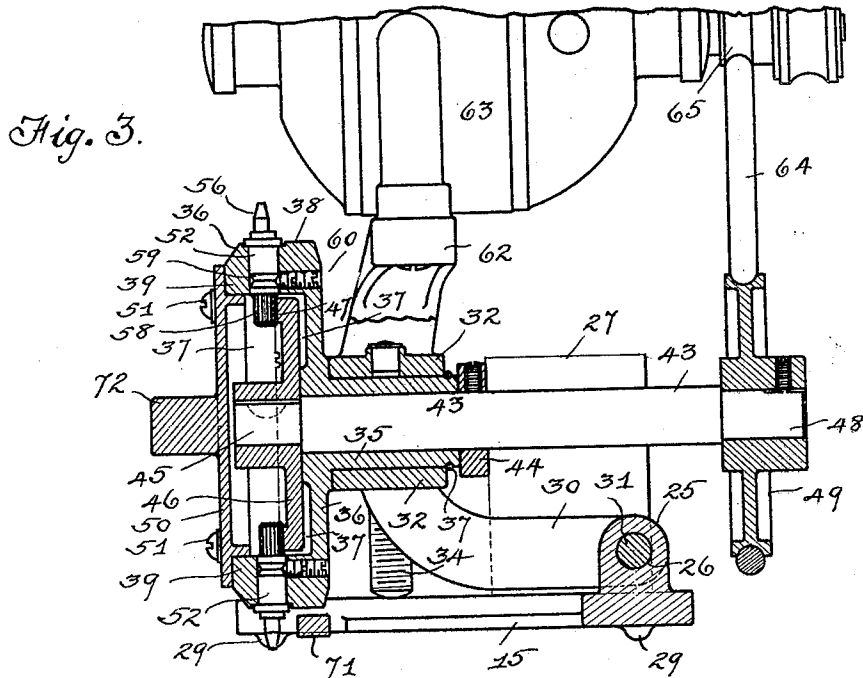
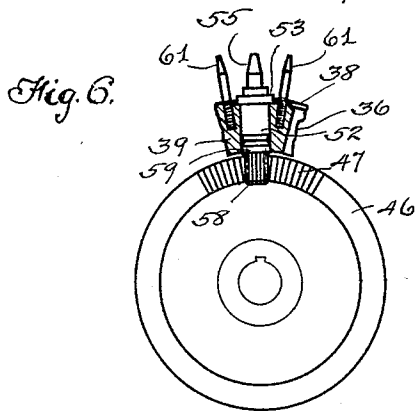


Fig. 7.

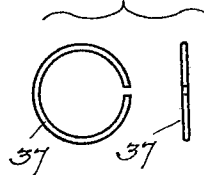


Fig. 8.

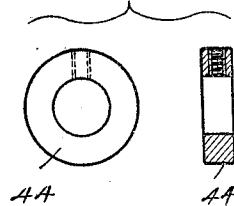


Fig. 13.

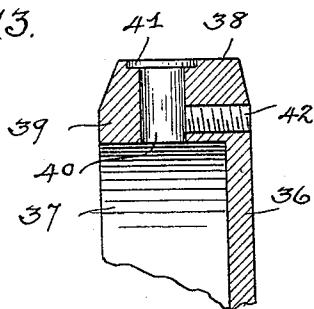


Fig. 14.



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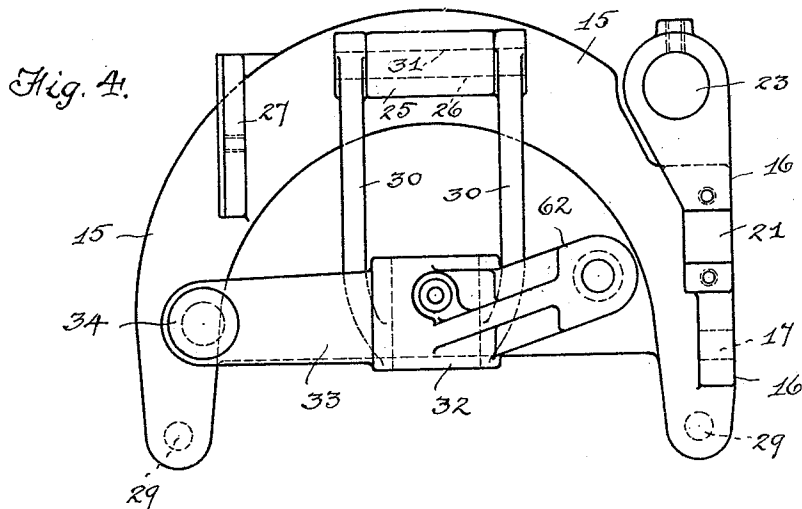
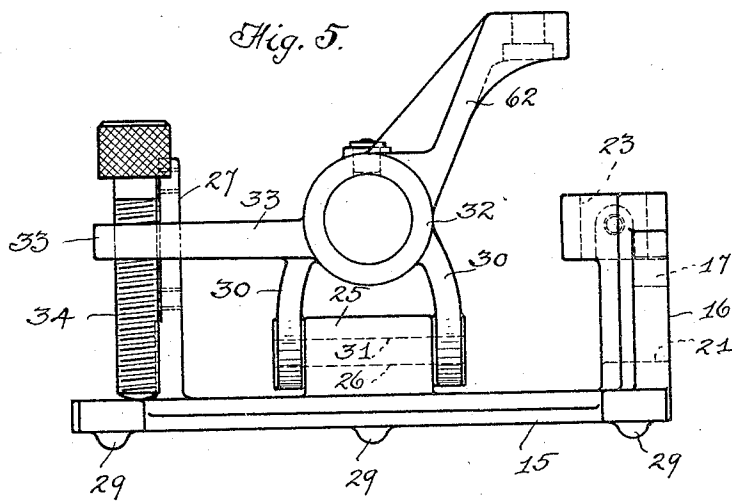
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PORTABLE FABRIC PUNCHING MACHINE

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4 Sheets-Sheet 4



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UNITED STATES PATENT OFFICE

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PORTABLE FABRIC PUNCHING MACHINE

Application filed June 19, 1930. Serial No. 462,295.

My invention relates to a portable fabric-punching machine and while it may be employed to form openings in various kinds of fabric, it is particularly useful in punching out and forming holes in paper that is used in clothing manufacturing establishments for patterns.

Some of the objects of the invention are to provide an improved portable machine which the operator may guide by hand over the lines previously formed on paper or fabric and produce a series of continuous holes in the paper which when laid on a single thickness, or a pile of fabric comprising a plurality of thicknesses, may be chalked through the perforations and form an outline by which the cutter may be guided in cutting out the parts for a garment.

Another object is to provide a portable hand-operated punching machine having an endless series of punches which are presented successively to the line on the paper as the machine is moved thereover.

A further object is to provide a portable punching machine having an endless series of rotating punches which are brought successively into operative position as the machine is guided over the paper to produce a series of punches in the paper.

A still further object is to provide an improved punching machine wherein the series of punches may be presented in succession but may be readily elevated from punching position to enable the next punch to be properly positioned in an angle where the pattern outline forms a turn.

Another object is to provide improved means whereby the depth of cut may be regulated so that a thin or thick sheet of paper or a plurality of sheets may be punched at a single operation.

With these, and other objects in view, the machine is illustrated in the accompanying drawings, wherein,—

Fig. 1 shows the machine mainly in top view, but portions thereof being broken away to show certain features in section.

Fig. 2 illustrates the machine in side elevation.

Fig. 3 shows the lower portion of the ma-

chine below the motor in central vertical section.

Fig. 4 illustrates the base and pivoted bracket in top view.

Fig. 5 shows the same in side elevation.

Fig. 6 illustrates the gear in side elevation and the punch carrier in section and shows one of the series of rotary punches with a needle-punch at each side thereof.

Fig. 7 shows side and edge views respectively of the split retaining-ring employed on the hub of the punch-carrier.

Fig. 8 illustrates two views of the detached adjusting collar.

Figs. 9 and 10 show end and side views respectively of one of the detached punches.

Figs. 11 and 12 illustrate respectively end and side views of one of the detached cutter pinions.

Fig. 13 shows a sectional detail through the periphery of the punch-carrier, and

Fig. 14 illustrates one of the sleeve-locking screws.

Referring to the drawings, the numeral 15 designates the base-plate which, by reference to Figs. 1 and 4 of the drawings, will be seen to have a substantially semi-circular shape in top outline.

This base-plate carries a vertical block 16 at the rear side of one of its legs which block has a horizontal perforation 17 extending therethrough for the passage of a handle-bolt 18 on which a handle 19 is carried,—a nut 20 being provided on the forward end of the bolt to secure the same in place.

The block 16 also has a cavity 21 for the reception of a switch mechanism 22 and behind said cavity the block has a vertical recess 23 in which an electric switch-socket 24 is fitted.

The particular constructions of switch 22 and the switch-socket 24 are not material and are not herein set forth in detail.

About midway between its two ends, the base-plate has a bearing-lug 25, extending upwardly therefrom which lug has a horizontal bore 26.

A third lug 27 extends vertically above the base which also serves to carry a case 28 containing certain electric devices which are not

a part of the real invention involved and are therefore merely mentioned.

The bottom of the base preferably has devices 29 projecting therefrom on which the machine rests and which facilitate the movement of the machine over the fabric or paper during the cutting or punching operation.

A yoke-bracket 30 is pivotally carried by the bearing-lug 25,—a pin 31 extending horizontally through the lug whereby the yoke may swing thereon.

This yoke extends laterally toward the open side of the frame 15 and its arms curve upwardly and carry a horizontal bearing 32 whose axis extends in a direction at right angles to the bore 26 of the bearing-lug 25. It will thus be understood that if the yoke 30 is swung vertically, the bearing 32 will make a corresponding movement.

From one side of the bearing 32 there extends an arm 33. This arm extends forwardly from the bearing 32 and overhangs the base at the forward leg thereof and an adjusting screw 34 extends vertically through the forward end of the arm 33 and has its lower end in contact with the upper side of the frame.

By means of this screw the bearing 32 and the yoke 30 may be adjusted vertically with respect to the base-plate for a purpose that will presently be explained.

In the bearing 32, there extends the horizontal hub 35, of a circular punch-carrier 36 and this hub extends all the way through the bearing and has a split retaining-ring 37 extending around its outer circumference and close to the inner side of the bearing 32, so that the hub and carrier may be retained against lateral movement through the said bearing, as can be seen in Fig. 3 of the drawings.

The punch-carrier has a head 36 with a circular recess 37 at the side opposite that from which the hub 35 projects, and an outer circumferential face 38 is formed around the head which serves a useful purpose as will presently be explained.

The formation of the circular recess 37 in the side of the punch-carrier head produces an annular circumferential rim-flange 39 and an endless series of radial passages 40 are formed through the rim-flange which passages extend all the way through the flange from the outer to the inner circumference thereof.

Each passage 40 has a slight enlargement 41, at the outer circumference of the rim-flange, as best shown in Fig. 13, for a purpose that will presently be explained.

With each radial passage 40, of the carrier flange 39, there is a horizontal passage 42 and each horizontal passage is internally screw-threaded, also for a purpose that will presently be explained.

A horizontal shaft 43, extends through

the hub 35 of the punch-carrier and said hub forms the sole bearing for that shaft.

An adjusting collar 44, encircles the shaft 43 at the side of the hub and prevents longitudinal movement of the shaft in the hub in one direction.

The shaft 43 has a reduced end 45 which projects at the recessed side of the punch-carrier and this reduced end carries a gear 46, which has position so it may revolve in said carrier-recess 37.

The gear is keyed or otherwise locked on the shaft 43 and revolves with the latter and the teeth 47 of the gear are near the periphery of the latter and travel in a circular path adjacent to the inner ends of the radial passages 40, as clearly shown in Figs. 3 and 6.

The end 48 of the shaft 43, carries a pulley 49 by which the same is driven, as will also presently be explained.

A cover-plate 50 is secured by screws 51 against the flange 39 of the punch-carrier head and covers the recess 37 and the gearing therein.

It is to be understood that the punch-carrier 36, shaft 43 and gear 46 are all supported from the yoke-bracket 30 and that if the bracket is raised or lowered, a corresponding movement will be imparted to the several parts just mentioned.

Each radial passage 40 of the punch-carrier is to carry a punch and each punch is to be revolved so that the punch effects a cutting and punching action when passing through a sheet.

In each radial passage 40 there is a sleeve-like body 52, see particularly Figs. 11 and 12, which has a slight enlargement 53 at its outer end so that when the body is inserted in the radial-passage the enlargement will seat in the enlarged recess 41 around the outer end of the passage.

The enlarged outer end 53 of the sleeve has a central socket 54 which is internally screw-threaded and a punch 55 has one end screwed into said socket to lock the punch therein.

Each punch has a tapered and cylindrical cutting-end 56 with an opening or port 57 in its tapered wall from the inner to the outer side so that punchings from the sheet may feed through the center of the punch and escape through the side opening.

The punch is locked in the sleeve 52 and the sleeve extends through the passage 40 in the flange 39 of the cutter-head.

The inner end of each sleeve 52, has a pinion 58 thereon which extends into the recess 37 of the punch-carrier and meshes with the gear-teeth 47 of gear 46.

The body of the sleeve 52 has an annular V-groove 59 extending around its exterior and when the sleeve is in place in passage 40, this V-groove registers with the threaded horizontal passage 42 that communicates

with the radial passage 40, so that suitable screws 60 may be screwed into said passage 42 and by projecting into the V-groove 59 of the sleeve, hold the sleeve against lengthwise movement in said passage.

It will thus be seen that as gear 46 is revolved, it will drive the continuous series of sleeves 52 and the punches 55, but the punch-carrier 36 will remain at rest.

The radial series of revolving punches 55 are necessarily spaced apart because of the diameters of the sleeves and the pinions which carry and actuate them, and between each two punches I prefer to provide radial pins 61, which latter are screwed or otherwise fastened in the overhanging flange 39. These pins have pointed ends which project from the carrier head a distance substantially equal to the cutting-ends of the punches.

A bracket-arm 62 extends upwardly and laterally from the side of the bearing 32 and supports an electric motor 63, and a belt or other connection 64 extends between the motor pulley 65 and the drive-pulley 49 on the shaft 43 beneath it, whereby the motor may drive said shaft and the gear 46.

Obviously, as the motor is supported by arm 62 that extends up from the bearing 32, the arm and motor will also be raised or lowered as the yoke-bracket 30 is moved.

By reference to Figs. 1 and 2, it will be noted that the bolt 18 and nut 20 which secure the handle to the block 16 also carry and secure a bracket 66 and that this bracket has two spaced-apart eyes 67 between which a combined brake and lifting-bar 68 is pivoted. This brake and lifting bar has a flattened upper end 69 which extends backwardly over the handle so that the thumb of the operator may be used to depress the same when desired.

The forward end 70 of the brake and lifting bar extends or curves downwardly and forwardly so that its extreme lower free end 71 may lie directly beneath the flat circumferential face 38 of the punch-carrier.

When, therefore, the thumb-end 69 of the brake and lifting-bar is depressed, the forward free end 71 of said bar will be lifted under and into engagement with the face 38 of the punch-carrier and by such contact will lift the carrier and hold it against rotation while lifted so as to prevent rotation of the punch-carrier while the same is lifted.

It frequently happens when following the outline of a pattern that the line turns or ends at a point between adjacent punches, and in order to make a punch at that turn or termination of the line a shifting of the machine without rotating the punch-carrier is necessary and by means of the brake and lifting lever, this operation may readily be effected.

It is of course to be understood that the lifting bar will raise, not only the punch-

carrier, but all parts sustained from the yoke-bracket 30.

When operating, the machine will be seated on the sheet or pile of sheets to be perforated or punched.

The adjusting screw 34 will be turned to regulate the depth of the cut by holding the punch-carrier so the lowermost punch will move down only to a certain point. The weight of the parts on the punches, which are revolving, will provide sufficient pressure on the operating punch to make the cut.

If a punch is to be made at a precise point, then the lifter and brake lever will raise the punches while the lowermost punch is being accurately positioned and at that time, the punch-carrier will be held against rotation.

When punching along a pattern line, the machine is simply pushed over the sheets keeping the punches in alinement with the pattern lines, and as the machine is moved forward a punch will make a cut and the continued forward movement will cause the punch-carrier to turn freely on the shaft presenting a pin and a punch in alternation to the sheet and thus making a cut and a prick punch along the pattern line.

The alternate arrangement of pins and punches makes the operation smooth and produces a clear pattern outline in the sheet that is almost continuous.

By reference particularly to Fig. 3, it will be noted that the cover plate 50 is secured to the outer side of the punch-carrier 36 and covers the recess 37 as well as the gearing therein. The outer side of this cover has a central knob 72 projecting therefrom which serves a very useful purpose.

When the operator moves the machine with one hand on the handle 19 and desires to start the first punch at a precise spot on the pattern sheet, he will grasp the knob 72 with his other hand and turn the carrier by his fingers so the lowermost punch will have an exact vertical position over the spot where that first punch is to be made, and the knob therefore enables the carrier to be turned by the operator to effect this exact registration.

Also when the end of a line or an angle in a line is reached, it is often necessary to shift the carrier by hand to bring the last punch accurately on the angle or at said line end. The knob 72 therefore enables this to be done with ease.

Having described my invention, I claim,—

1. In a portable sheet punching machine the combination with a base movable over the sheet to be punched, of a punch-carrier movable with respect to the base and also movable with the base, an endless series of punches carried by the carrier,—said punches by contacting with the sheet as the base is moved thereover causing the carrier to be moved to present the punches in succession to the sheet, means for adjusting the depth of

punch cut and means for elevating the carrier and punches with respect to the base and holding the carrier against movement when the base is moved to position the machine.

2. In a portable sheet punching machine the combination with a carrier mounted to revolve, of a series of punches projecting from the carrier, said carrier being revolved by the advance movement of the punches over the sheet being punched and means for revolving the punches independently of carrier movement.

3. In a portable sheet punching machine the combination with a base, of a carrier mounted to move with and to revolve with respect to the base, an endless series of punches projecting from the carrier, means for revolving the punches independently of the carrier, said punches by contact with the sheet as the base is moved causing the carrier to turn and present another punch to the sheet.

4. In a portable sheet punching machine the combination with a base, of a carrier supported above and movable with the base, an endless series of punches projecting from the carrier, means for revolving the punches independently of carrier movement and means for lifting the carrier and punches with respect to the base.

5. In a portable sheet punching machine the combination with a base movable over the sheet to be punched, of a punch-carrier supported by the base, continuously rotating punch means supported by the carrier and means for moving the carrier and the rotating punch means with respect to the base to permit the base to be moved over the sheet while the rotating punch means is held out of punching position.

6. In a portable sheet-punching machine the combination with a base, of a punch-carrier supported above and movable with the base, an endless series of continuously revolving punches projecting from the carrier, swinging means attached to the base and connected with the carrier, means for operating the swinging means to move the carrier and its revolving punches out of punching position, said punches being arranged with respect to the carrier that they may be rolled over the sheet and by contact with the latter cause the carrier to turn and present the revolving punches successively to the sheet.

7. In a portable sheet-punching machine the combination with a base, of a bearing above the base, a punch-carrier supported by the bearing so as to revolve, a series of punches radiating from the carrier so as to successively engage the sheet as the base is moved, means for revolving the punches independently of the movement of the carrier and means for adjusting the positions of the punches with respect to the sheet to be punched.

8. In a portable sheet-punching machine the combination with a base, of a bearing above the base, a punch-carrier supported by the bearing so as to revolve, a series of punches radiating from the carrier so as to successively engage the sheet as the base is moved, a shaft extending through the bearing and gearing between the shaft and punches to revolve the latter.

9. In a portable sheet-punching machine the combination with a base movable over the sheet to be punched, of a bearing sustained above the movable base, a circular punch-carrier supported by the bearing so as to be revolved, a series of punches radiating from the carrier, gear means carried by each punch, a gear engaging the gears of the punches and means for revolving said gear to revolve the punches independently of carrier movement.

10. In a portable sheet-punching machine the combination with a base movable over the sheet to be punched, of a circular punch-carrier revoluble with respect to the base and also movable with the base, a series of radiating pins extending from the circular carrier, punches also radiating from the carrier,—a punch being located with pins at opposite sides of it and means for revolving the punches independently of carrier movement.

11. In a hand-operated portable punching machine the combination with a base having a handle by which it may be moved over the sheet to be punched, of a punch-carrier revoluble with respect to the base and also movable with the base, an endless series of punches carried by the carrier, said punches being arranged to move the carrier as they contact with the sheet while the base is being moved, means on the carrier for enabling the latter to be turned slightly by hand to effect accurate registration of a punch at a precise spot on the sheet and means for revolving the punches independently of movement of either the base or the carrier.

12. In a hand-operated portable punching machine the combination with a base having a handle by which it may be moved over the sheet to be punched, a circular punch-carrier mounted to turn, a series of punches radiating from said circular carrier to successively engage the sheet and turn the carrier as the base is moved by the hand grasping said handle, a knob projecting from the carrier for engagement by hand to effect a partial rotation of the carrier to present a punch to a precise spot on the sheet and gearing for each punch to revolve the latter continuously and independently of movement of the carrier or the base.

In testimony whereof I affix my signature.
DAVID B. ASHMAN.