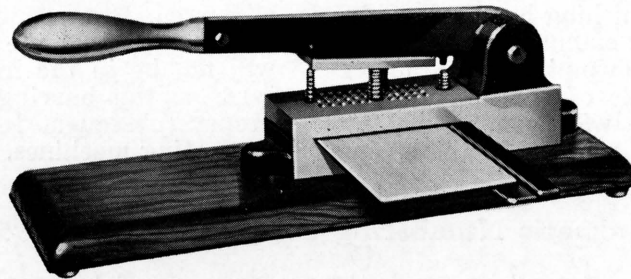


MACHINE METHODS OF ACCOUNTING

GANG PUNCHES

THE prevalence of repetitive punching such as date, branch, department, or similar data in certain cards led to the development and improvement of special machines called Gang Punches, which afford a quick and simple method of transcribing common data to groups of cards. These units are capable of punching two or more columns simultaneously from a setup of the punching mechanism that is retained until manually changed.

It was necessary to set manually the individual punches for each position of the card to be perforated. Double or multiple punching in a column was performed by inserting corresponding punches in the positions desired. As many as ten cards could be placed in the machine and punched simultaneously by depression of the lever handle. Although the capacity of this machine was limited, it satisfied the early requirements of tabulating routines.



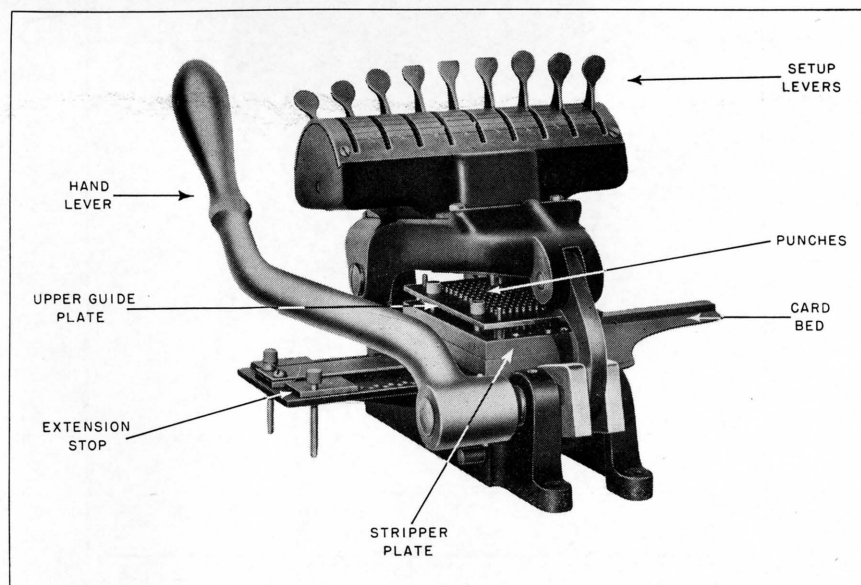
The original hand-operated gang punch was so designed that common information to be recorded in any six adjacent columns of eight to ten cards could be punched simultaneously.

This type of machine has long been obsolete, but its principles of operation have been modified and incorporated in the Lever Set and Motor Drive Gang Punches in current use.

Lever Set Gang Punch (Type 3)

On this machine, from one to ten consecutive columns of data, located in any position of a 34- or 45-column card, may be punched into a group of cards, ranging in number up to eight or ten.

by a single operation of the hand lever. The machine is simple in design, ruggedly constructed, readily portable, non-electric, and simple in operation.



Setup

The quick-setting feature is provided to facilitate the changing of the punching setup of any nine of the ten columns that can be punched in a single operation. In order to change the position of the punching in the one remaining column, the head of the machine must be raised by unhooking the movable toggle link at the front and the change effected manually by placing the individual punch in the required position. The column which must be manually set may be either at the right or the left end, and is the only column in which multiple punching may be effected.

Operation

After the setup for punching has been made, the next step is to set the extension stop for the columns to be punched. Two pins located under the head on the left side of the upper guide plate, when left in place, will permit punching in columns 1 to 10. The removal of these pins

permits punching in any ten columns from 3 to 31, depending upon the position of the stop plate. This plate is held in position by two pins which are removable to allow shifting of the stop. Columns beyond the thirty-first may be punched by reversing the setup and placing cards in the bed face down.

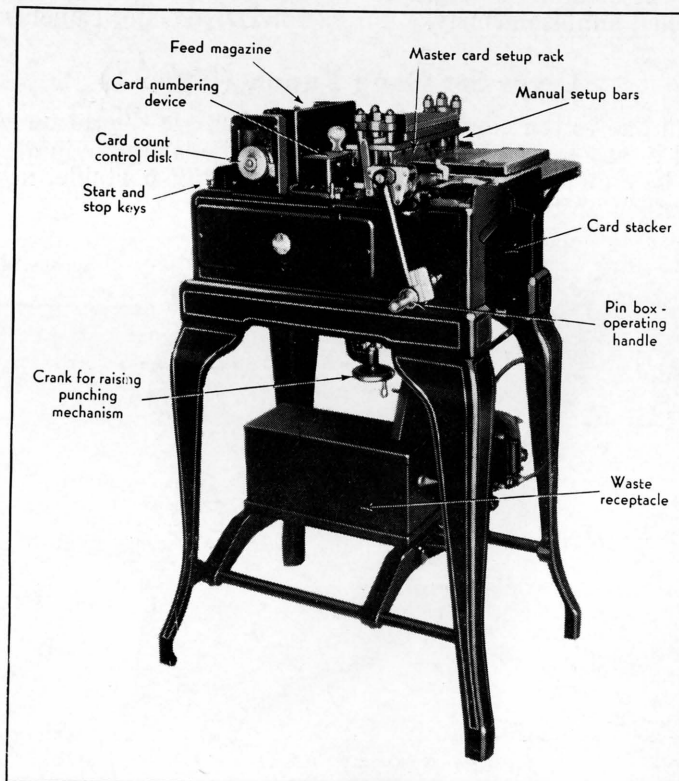
When the cards have been properly positioned face up, 9's toward the front of the machine, the punching is effected by pulling the hand lever forward as far as it will move, and then restoring it to its normal position. The force required for punching the cards is negligible because of the leverage furnished by the handle.

The pressure exerted in punching ten cards simultaneously may cause some of the cards to be burred. Precaution should be taken to design the cards so that the fields to be gang-punched will not be in the five center columns of the cards, as this burring may interfere with their proper subsequent feeding in the sorting and accounting machines.

Automatic Numbering Gang Punch (Type 501)

The development of an automatic gang punch was the next step in simplifying the transcription of common data to tabulating cards. The

setting up of data to be punched and the feeding of cards are accomplished automatically in this machine.



The columns to be punched may be set up in two ways—by using a prepunched master card, or by hand-setting each column individually. A combination of both methods may also be used when desired. Another important feature of this machine is the card-counting device. A dial may be set to register the number of cards to be punched, and when that quantity has been prepared the machine automatically stops. A numbering attachment may also be provided for printing serial numbers or identification numbers on the cards as they are being gang-punched.

The operation of this machine is very simple. The operator is required only to place the cards in the feed magazine, set up the information to be punched according to one of the methods described above, and press the start button. The machine punches the cards automatically at the rate of 125 a minute. Throughout the entire design, careful consideration was given to the advantages of speed, automatic features, and simplicity of operation.

Card Feeding

This machine is equipped with an automatic horizontal card-feeding mechanism which picks the bottom card from the magazine hopper and carries it in successive stages to the numbering and punching positions, after which the card is deposited in the stacker. When the machine is in operation three cards are being moved simultaneously. One is being fed from the magazine to the numbering position; one from the numbering position to the punching position; and one from the punching position to the stacker. When the card-counting device is in operation, the feeding mechanism ceases to function after

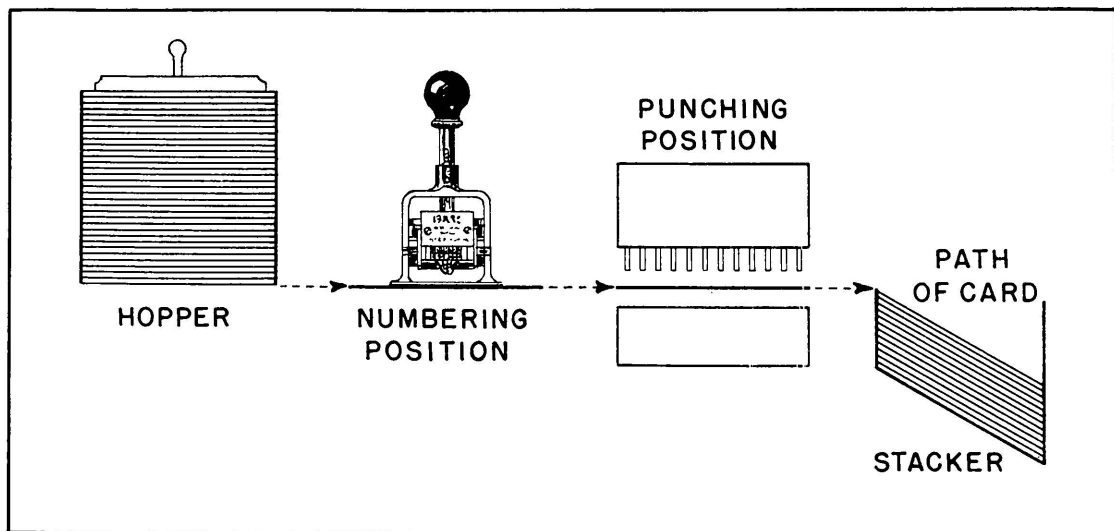
the predetermined number of cards has been punched, but the last card of the group being punched will be fed into the stacker. If the machine is stopped by the operator, cards in the magazine will not be fed completely through until the machine is restarted. The magazine hopper has a capacity of 800 cards and the stacker approximately 1,000 cards. The speed of the machine permits the punching of 7,500 cards an hour.

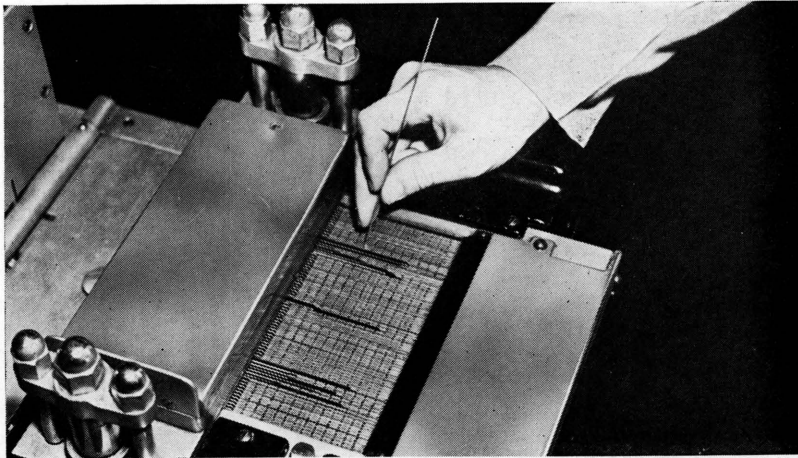
Punching Setup

The punching unit of this machine has a complete die to permit punching in any one position of all columns of a card. The position punched in any column of the card depends upon the position of an interposer located over the punches corresponding to that column.

Each interposer is so positioned that when the punching force is exerted, pressure is applied to only one punch. Consequently, only one hole in a column is perforated—that corresponding to the position of the interposer. The interposer bars, which are visible at the right of the setup head, may be moved either individually by hand, or all of them simultaneously, by revolving the operating handle located on the front of the machine.

The movement of the handle in a counter-clockwise direction raises a pin box and moves the interposer bars to the right. If a punched card is placed in the master card bed under the pin box and the handle is moved in a clockwise direction, the pin box will be lowered and the interposer bars will be moved toward the left by a friction drive. The pins which correspond to the punched position in the card drop through



*Manual Set-up*

the holes and serve as stops for the interposer bars of the corresponding columns. In this manner, all of the columns may be set simultaneously for gang-punching.

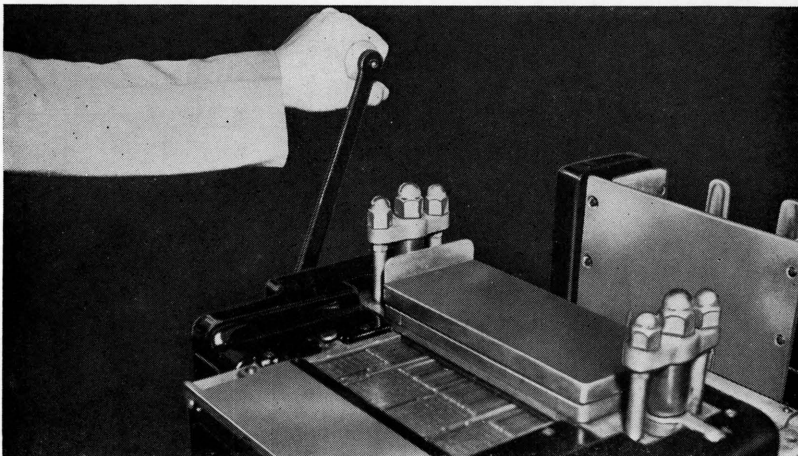
If the setup is to be made manually, an unpunched card should be placed in the master card bed and the operating handle restored by a clockwise movement to the normal position for machine operation. The bar for each individual column may then be set manually by inserting a stylus or other pointed metal object in the hole below the index of the position to be punched, and moving it toward the right end of the machine until the column indicator strip is reached.

Bars which are stopped at either the left or right end of the mechanism will not cause any holes to be punched in the cards passing through the machine.

Double punching may be effected only by the

use of special bars. It is accomplished by setting one rack manually and making the other position setups either automatically or manually. This result is attained by using two setup bars for one column. On 45-column equipment two narrow bars replace the one normal bar. On 80-column equipment this can not be done, and it is therefore necessary to sacrifice punching in one column adjacent to the one being double-punched.

The two methods for setting up the machine just described may be used in combination. If a master card field corresponding to the columns to be manually set up is unpunched, the racks may be set directly. It is obvious that if the master card were punched in the field to be manually set, the pins would fall through the holes appearing in that field and interfere with the manual positioning of the bars. If a fully punched master card is to be used, it is necessary to use the rack locks described below.

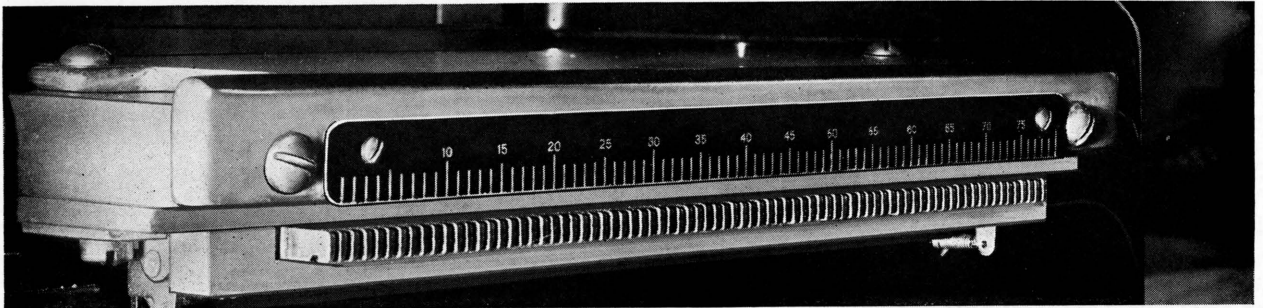
*Raising Set-up Head*

Rack Locks

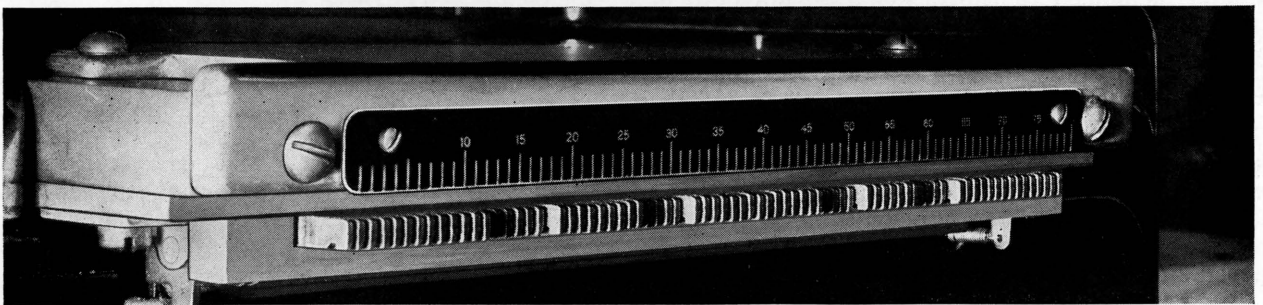
The interposer bars or racks may be locked in fixed positions to permit the omission or substitution of certain data appearing in fully punched master cards. Part of the rack locking mechanism projects on the lower side of the plate at the right end of the machine. When any of these bars are moved toward the feed magazine they prevent the movement of the interposer bar. When in the normal position they permit the free movement of the setup bars.

Once the rack lock is pushed in, the setup will be retained until the rack lock release thumb lever is depressed, restoring the rack locks to the normal position, as shown.

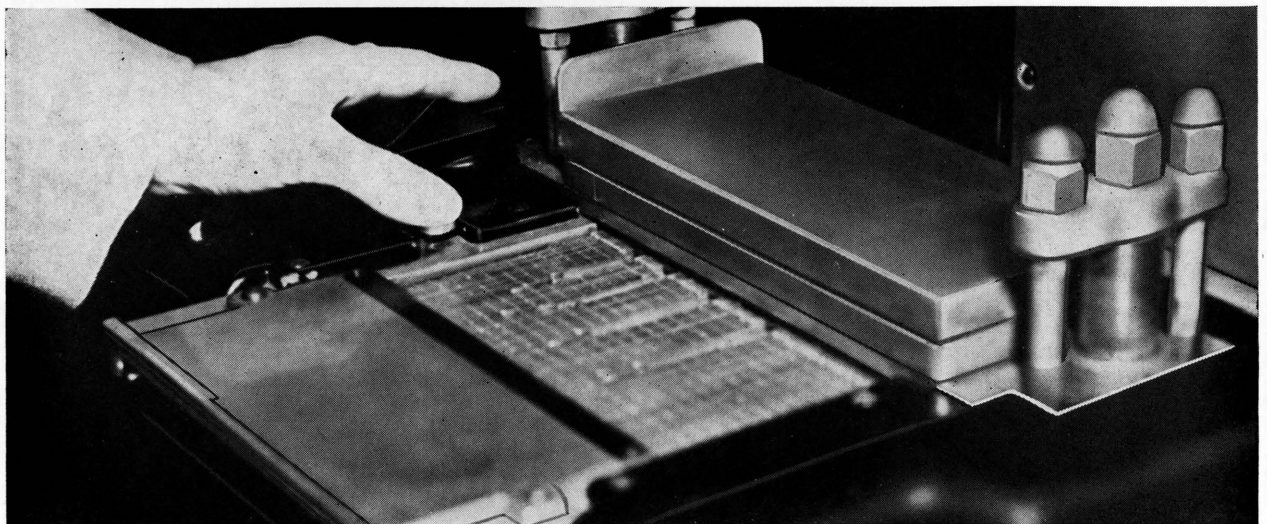
When a combination setup is to be made, using a fully punched master card, a blank card may be inserted first to permit setting up the data to be substituted for that appearing in the master card. The rack locks for these columns should then be set to retain these data. The blank card may then be removed and the fully



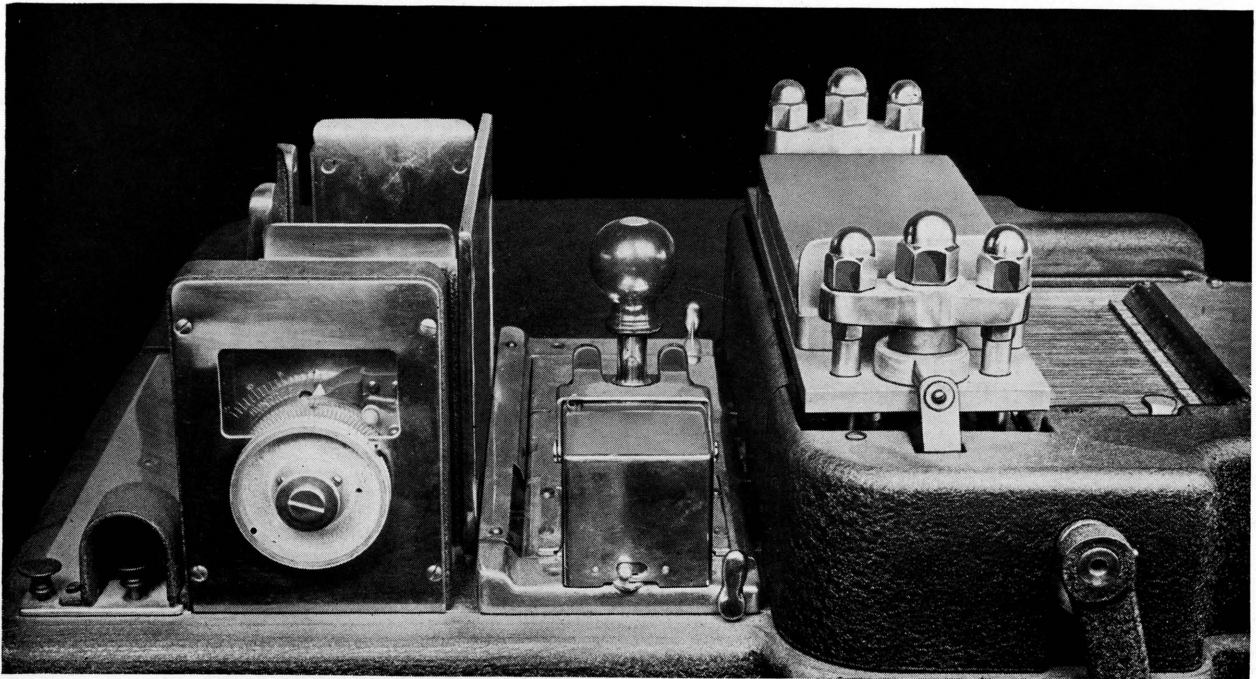
Rack Locks—Normal



Rack Locks—Locked



Rack Lock Release Lever



Numbering Head—Mounted in Position

The Numbering Device

A special numbering device, which is readily removable, may be mounted in the space between the magazine and the punching position for the printing of serial or repetitive numbers (varying from one to eight digits) on the cards as they pass through the machine. The numbering head is placed on the machine so that as the cards pass through (face up) the numbering appears in the position illustrated in the accompanying card. The device may be supplied for a maximum of six or eight digits which measure, respectively, $7/8'' \times 3/16''$ and $15/16'' \times 3/16''$.

The numbering head is a standard numbering device which may be specified to print from the high number down to the low number, or to start at the low number and increase consecutively to the higher. The sequence of numbering of the punched cards as they are taken from the stacker will determine which type should be specified.

The method of setting up the numbering head for the starting number is the same as that followed in setting a standard numbering machine. A small lever may be set to control the action of the device for serial, duplicate, and repetitive numbering. For serial numbering, the type wheels should be set to read one less than the starting number; so that as the unit is placed in the machine it will begin numbering from the proper point of the series.

The printing of zeros to the left of the number being recorded may be suppressed by inserting a stylus in the center of the 0, pulling forward slowly and pressing downward until the character is forced into a special recess in the numbering wheel, and then moving the wheel backward to the position from which it started. As the serial numbering proceeds, these wheels will print 0's after a digit from 1 to 9 appears at the left.

Keys and Switches

This machine is equipped with two keys. The start key is mounted under a semicircular hood on the front of the machine in a position convenient for ready access. The stop key is uncovered and located to the left of the start key.

The main line switch is of the flush button type and is located on the left end of the machine. It should always be "Off" when the machine is not in use.

Operation

After the setup for punching has been made, as previously explained, the next step is to set the card counter for punching the desired number of cards.

The cards to be punched should be placed in the card magazine, after they have been evened at the edges on the joggle plate, so that they appear in the same relative position as the card

in the master card bed. If a manual setup has been made, the cards should be placed in the magazine so that the position of the card corresponds with the arrangement of the setup bars. It is customary to run a single card through the machine to check the setting-up operation.

Depressing the start key sets the machine in operation. A stop key is provided which when depressed causes the machine to stop. The remaining operations are entirely automatic, except for the feeding and removing of cards. The operator should be careful to prevent the accumulation of more cards in the stacker than can be conveniently removed with one hand.

The card counter, pin box, operating handle, start key, and stop key are located on the front and top of the machine so that they are all readily accessible to the operator. The box for punchings is located under the base of the machine. It is easily removed to permit emptying of the chips. An enclosed chute, through which the card punchings pass, leads to this box.

Electrical Energy

This machine operates on direct current only, at 110 or 220 volts. The current consumed at 110 volts is 6 amperes for starting and 1.8 amperes for running.