DEVELOPMENT

OF

ARMORED VEHICLES

VOLUME I

TANKS

AGF BOARD No. 2

1 SEPTEMBER 1947

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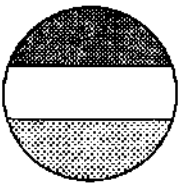

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ERRATA SHEET

INTRODUCTION. The following paragraph should be added: The technical data on the older model tanks have been taken from test data sheets of Aberdeen Proving Ground and on the recently standardized or developed models from Office Chief of Ordnance Development Manual. No attempt has been made to give complete characteristics or to quote additional sources where there is conflicting data. Major characteristics only have been listed in an effort to show the trend of development. Supplements to this volume will be published from time to time showing armored vehicles, other than tanks, and the latest developments in the field of armored vehicles.

Item No. 8, CHRISTIE, M1919, the following note should be added under remarks:
Remarks: . . . This tank is not a typical Christie suspension. For a photograph of the more familiar model see Item No. 22.

Item No. 34, LIGHT TANK, M2A2, should be changed to read:
Remarks:
M2A2E3 — Same as M2A2E2 but with GM 671 diesel engine and trailing idler.

Item No. 47, LIGHT TANK, M3, should read:
Engine: . . . or Guiberson T-1020

Item No. 53, MEDIUM TANK, M3A1, should read:
Engine: . . . or Continental R-975-EC2

Item No. 58, LIGHT TANK, M5, should read:
Engine: . . . Twin Cadillac V-8

Item No. 63, MEDIUM TANK, M3A4, should read:
Engine: 5 Chrysler 6-cylinder engines

Item No. 64, MEDIUM TANK, M3A5, should read:
Engine: 2 General Motors 6-cylinder (diesel) Model 6046.
Remarks: M3A5E2 instead of M3A522.

Item No. 66, MEDIUM TANK, M4A1, should read:
Engine: . . . or Continental

Item No. 67, MEDIUM TANK M4A2, should read:
Engine: 2 General Motors 6-cylinder (diesel) Model 6046

Item No. 69, MEDIUM TANK, M4A4, should read:
Engine: 5 Chrysler 6-cylinder engines

Item No. 75, MEDIUM TANK, T20E3, should read:
Engine: Ford 8-cylinder GAN

Item No. 82, MEDIUM TANK, M26, should read:
Suspension and Tracks: Torsion bar; torqmatic transmission
Remorks: . . . The Medium Tank, T26E2, onother version of this tank but having o 105-mm Howitzer, M4 in lieu of the 90-mm Gun, M3, has been standardized as the Medium Tank M45.

Item No. 85, MEDIUM TANK, M4A3E2, should read:
Engine: Ford V-8 CAA

Item No. 89, FLAME THROWER MECHANIZED, M3-4-E12R3 should read:
Suspension ond Tracks: Same as M4 series tanks

Item No. 94, HEAVY TANK, T30, should read:
Armament: 155-mm Howitzer, T7
Weight: 70 tons, loaded

TABLE OF CONTENTS

ITEM No.	VEHICLE	YEAR OF DEVELOPMENT	PAGES
	Introduction		1-5
1	Gas-Electric (Holt)	1918	6-7
2	Steam Tank, Track-Laying	1918	8-9
3	Steam Tank, Three-Wheeled	1918	10-11
4	Ford, Three-Ton	1918	12-13
5	Skeleton Tank	1918	14-15
6	Mark I, Three-Man	1918	16-17
7	Six-Ton, M1917	1918-1919	18-19
8	Christie, M1919	1919	20-21
9	Mark VIII	1919	22-23
10	Christie, M1921	1921	24-25
11	Medium A, M1921	1921	26-27
12	Medium, M1922	1922	28-29
13	Medium, T1	1925	30-31
14	Light Tank, T1	1927	32-33
15	Light Tank, T1E1	1928	34-35
16	One-Man Tank, Experimental	1928	36-37
17	Light Tank, T1E2	1929	38-39
18	Six-Ton, M1917A1	1929	40-41
19	Light Tank, T1E3	1930	42-43
20	Medium Tank, T2	1930	44-45
21	Combat Car, T1	1931	46-47
22	Christie, M1931 (T3)	1931	48-49
23	Combat Car, T2	1931	50-51
24	Combat Car, T2E1	1932	52-53
25	Christie Light Tank, M1932	1932	54-55
26	Light Tank, T1E4	1932	56-57
27	Light Tank, T1E6	1932	58-59
28	Combat Car, T4	1933	60-61
29	Light Tank, T2	1934	62-63
30	Light Tank, T2E1	1934	64-65
31	Medium Tank, T3E2	1934	66-67
32	Combat Car, M1	1935	68-69
33	Light Tank, M2A1	1935	70-71
34	Light Tank, M2A2 (T2E2)	1935	72-73
35	Light Tank, T3	1936	74-75
36	Medium Tank, T4	1936	76-77
37	Medium Tank, T4E1	1936	78-79
38	Combat Car, M1E2	1937	80-81
39	Light Tank, M2A3	1938	82-83
40	Medium Tank, T5, Phase I	1938	84-85
41	Medium Tank, T5, Phase III	1938	86-87
42	Combat Car, M1A1	1939	88-89
43	Car, Convertible Combat, T7	1939	90-91
44	Light Tank, T6	1939	92-93
45	Medium Tank, M2	1939	94-95
46	Light Tank, M2A4	1940	96-97

TABLE OF CONTENTS — Continued

ITEM No.	VEHICLE	YEAR OF DEVELOPMENT	PAGES
47	Light Tank, M3	1940	98-99
48	Medium Tank, M2A1	1940	100-101
49	Medium Tank, M3	1940	102-103
50	Light Tank, M3A1	1941	104-105
51	Light Tank, M3E1	1941	106-107
52	Light Tank, M3E2	1941	108-109
53	Medium Tank, M3A1	1941	110-111
54	Medium Tank, M3A3	1941	112-113
55	Medium Tank, M7	1941	114-115
56	Heavy Tank, T1E2 (M6)	1941	116-117
57	Light Tank, M3A3	1942	118-119
58	Light Tank, M5	1942	120-121
59	Light Tank, M5A1	1942	122-123
60	Light Tank, M3E4	1942	124-125
61	Light Tank, T9	1942	126-127
62	Light Tank, T9E1 (M22)	1942	128-129
63	Medium Tank, M3A4	1942	130-131
64	Medium Tank, M3A5	1942	132-133
65	Medium Tank, T6 (M4)	1942	134-135
66	Medium Tank, M4A1	1942	136-137
67	Medium Tank, M4A2	1942	138-139
68	Medium Tank, M4A3	1942	140-141
69	Medium Tank, M4A4	1942	142-143
70	Heavy Tank, T1E1 (M6A2)	1942	144-145
71	Light Tank, T24 (M24)	1943	146-147
72	Light Tank, T24E1	1943	148-149
73	Medium Tank, M4A6	1943	150-151
74	Medium Tank, M4 (105 How)	1943	152-153
75	Medium Tank, T20E3	1943	154-155
76	Medium Tank, T22E1	1943	156-157
77	Medium Tank, T23	1943	158-159
78	Medium Tank, T23E3	1943	160-161
79	Medium Tank, T25	1943	162-163
80	Medium Tank, T25E1	1943	164-165
81	Medium Tank, T26E1	1943	166-167
82	Medium Tank, M26 (T26E3)	1943	168-169
83	Assault Tank, T14	1943	170-171
84	"Q" Model Flame Thrower Tank	1944	172-173
85	Medium Tank, M4A3E2	1944	174-175
86	Medium Tank, M4A3E8	1944	176-177
87	Medium Tank, M4A3 (76-mm)	1944	178-179
88	Flame Thrower Combat Vehicle, M5-4	1945	180-181
89	Flame Thrower, Mechanized, M3-4-E12R3	1945	182-183
90	Medium Tank, T26E4	1945	184-185
91	Medium Tank, T26E5	1945	186-187
92	Superheavy Tank, T28	1945	188-189
93	Heavy Tank, T29	1945	190-191
94	Heavy Tank, T30	1945	192-193
95	Heavy Tank, T32	1945	194-195

INTRODUCTION

The development of tanks in the United States has been an intermittent process. During times of peace, interest lags and there is always a lack of adequate funds for research. In times of war it becomes necessary to adapt and modify already designed or built vehicles and components in order to produce quickly and in quantity.

Although a Frenchman is generally credited with the invention of the first tank and an American produced the caterpillar traction device which was fundamental to its operation, to the British must go the credit for developing tanks to the extent that they could be used on the battlefield. Due to numerous maintenance difficulties the use of tanks in quantity by the British at Cambrai in 1918 was not a complete success. They were able, however, by capitalizing on the element of surprise, to penetrate the enemy lines a distance unheard of up to that time. This feat served to awaken the allied nations to the many possibilities of such vehicles. Subsequent use of the tanks saved many lives that would otherwise have been lost and helped to bring the war to an early end.

Almost as far back in history as we can trace, man has sought for the perfect combination of the three variables: firepower, mobility, and protection. From the ancient war chariots to the present-day tanks these three characteristics have existed in almost endless combinations and variations. If one or two of the elements are overemphasized it must be at the expense of the third; for example, in heavy tanks increased firepower and protection bring about decreased mobility. In vehicles of greater mobility, there is less armor or protection and often less effective firepower. The perfect relationship of one to the other is still being sought.

American tanks of World War I ranged in weight from three to fifty tons, with armament varying from a single caliber .30 machine gun to a 75-mm mountain howitzer. Most of the weapons had limited traverse and elevation. Armor was less than 1" in thickness and easily pierced by small-arms fire. These tanks, in general, were slow moving, averaging only about five miles

per hour, and had a very limited cruising range. The two to seven-cylinder power plants used in these tanks were commercial types modified for military use. The suspensions of the early models were rough riding and extremely noisy. A number of the vehicles used a combination of wheel and track systems to prolong the life of the tracks. To summarize, development for the period was based on the "trial-and-error" method. The Army as a whole was not entirely convinced of the usefulness of tanks and saw in them only accompanying units for the Infantry or Cavalry. Their tactical role was not visualized very clearly; hence, the diversity of opinion as to size and type of tank to use.

In the postwar era of 1918 to the early thirties considerable interest was evinced in the future of tanks by inventors as well as military men. Tanks were not built in quantity, but many pilot models and variations thereof were designed and built. Far-fetched plans of flying tanks, flame-throwing tanks, and even swimming tanks were designed, laughed at, and almost forgotten. But many of these seemingly foolish ideas have materialized during World War II.

Among the improvements accomplished in the twenties was the invention of the sprung track which enabled tanks to travel up to 50 or 60 miles per hour. The moving of the final drive sprockets from the rear to the front of the suspension was the second important step and allowed the tracks to partially clean themselves before reaching the drive sprockets.

The Christie suspension which appeared for the first time in 1919 merits special consideration. For the first time a relatively stable gun platform was provided along with a smoother riding vehicle. A variety of tanks, including three amphibious models and one unit intended for airborne operations, were built using this basic system. However, American tank specialists were not too favorably impressed with Mr. Christie's invention, and none of the tanks based on this system were produced in quantity. The British, on the contrary, finally purchased the right to produce this suspension and based their medium cruiser tank on its use. US tanks eventually dropped the Christie suspension entirely in favor of the volute spring type (either vertical or horizontal).

In order to define the general lines along which tank development proceeded during the early thirties, the US official weight

classifications are of interest. The definitions of light, medium, and heavy tanks were as follows:

"1. A light tank is a two-man tank that can be transported by tank carrier.

2. A medium tank is one weighing not more than 25 tons but too heavy or too large to be transported by tank carrier.

3. A heavy tank is one of over 25 tons in weight."

By way of contrast let us glance at recent Ordnance action (since the close of World War II) which reclassifies light, medium, heavy, and superheavy tanks, in the light of recent trends, as follows:

"1. Light tanks — up to 25 tons, inclusive.

2. Medium tanks — 26 to 55 tons, inclusive.

3. Heavy tanks — 56 to 85 tons, inclusive.

4. Superheavy tanks — 86 tons and over."

In connection with the weight of the vehicle, a comparison of the horsepower per ton of weight ratio of the tanks of each period is significant. World War I had a ratio of about 4 or 5 horsepower per ton of weight. The Medium Tank, M4A3, produced in 1942, had a ratio of 14.5 horsepower per ton. The heavier M26, produced later, has 10.8 horsepower per ton.

Effective firepower for tanks from those of World War I to the present has depended upon a number of factors: the cannon itself, its mounting, type of ammunition used, and fire control equipment available. The size of weapons has varied considerably in both wars. Although a single caliber .30 machine gun was the sole source of firepower in a number of early tanks, several of the heavier vehicles mounted the 75-mm mountain howitzer. Twenty years later, it was found that the 75-mm gun was the minimum suitable cannon for use in the light tank alone, and the size of the major armament in the heavier vehicles is still increasing. Currently a new heavy tank is being developed to mount a 120-mm gun, a size not dreamed of in early tank production. However, heavier weapons and more powerful explosives have brought with them a new set of problems such as gun tube erosion, limited space for carrying of ammunition, and the need for better recoil mechanisms. Almost every new tank built

has varied from its predecessor in combination of weapons, use, and type of mounting. The use of a rotating turret to obtain maximum traverse of the principal weapon was a comparatively early innovation and continues to be used on the later tanks, although the shape of the turret has changed greatly to conform with space requirements and the new low silhouette.

Sighting equipment has advanced from crude slits in the armor plate of early tanks through many models of telescopes, periscopes, and range finders in an attempt to secure the equipment best suited for each vehicle. The application of the gyroscopic principle, although misunderstood and disliked by many, assisted materially in helping to provide accurate fire from a moving tank by causing the gun, when the sights are trained on a target, to remain in line regardless of the tank's position. The mobile type of warfare employed in many campaigns made the perfection of such a device most urgent. Many new systems and devices first experimented with or used on a small scale during the last few years are now being studied for all possible applications to warfare of the future.

Until 1930 all tanks were assigned to the Infantry. From 1930 to 1940 similar vehicles, under the title of combat cars, were assigned to the Cavalry. Finally in 1940 the separate Armored Command was formed. The change in thought on the tactical uses of tanks was reflected to a great extent in the superior vehicles developed from this time on.

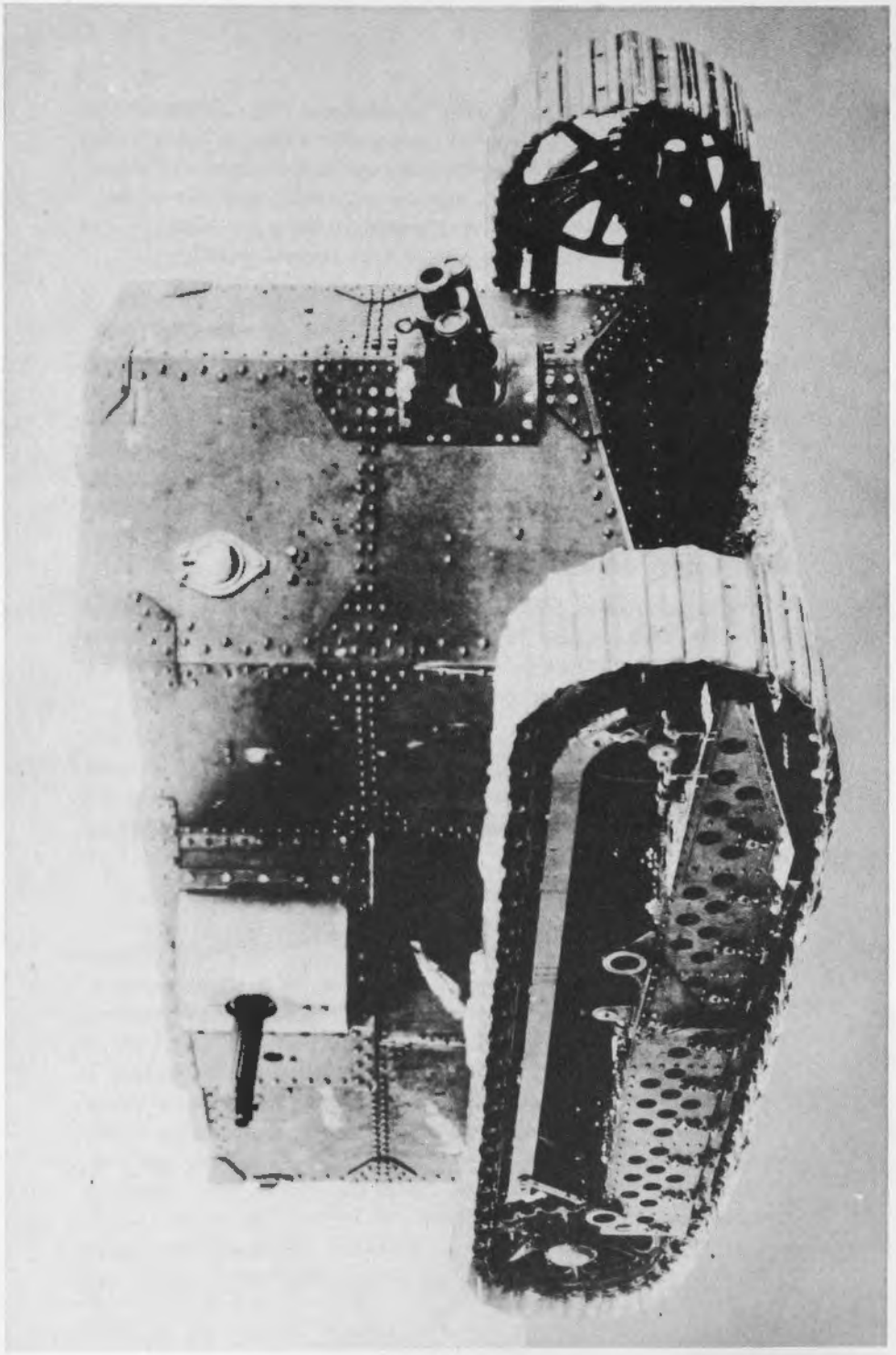
For one thing, those in authority were finally convinced of the necessity of increasing tank firepower comparable to that encountered in enemy tanks. Between the two wars Germany and Russia had been experimenting quite extensively with heavier armored vehicles with greatly increased firepower. The Germans, at the same time, had conceived the blitzkrieg idea and the use of armored vehicles "en masse." It took the United States several years to catch up in thought and production, but with an "all-out" effort by industry and intensified research by the military, the quantity and in some respects, the quality of our fighting tanks not only reached but surpassed those of our enemies. The new Light Tank, M24, and the T26 medium tank series were received with enthusiasm by the using arms and added greatly to our mechanized superiority in the last stages of the war.

In this postwar era our efforts are continuing. The trend toward heavier tanks with even greater firepower is seen in the T26E4, T28, T29, and T34 which are now in the process of development and service test. Military characteristics have been drawn up for an improved light tank adaptable for airborne use and with more effective armament and greater mobility.

One forward step in tank development has been the work of the equipment boards which have met from time to time to declare obsolete undesirable items, retain others with certain modifications, and set up desired characteristics of vehicles for the future. The Palmer Board (October 1942), the Robinett Board (October 1944), the Cook Board (January 1945), and the Stillwell Board (May 1946) have had as members and witnesses numerous outstanding leaders of World War II whose combat experiences have provided an excellent background for future study in tank development.

With competent leaders, adequate funds, and a continued intensive research and development program, the United States can quickly produce the tanks required to meet any future emergency involving ground combat.

The above information and discussion is included in this book to give a general background of the development of tanks in the United States from World War I to the present. Subsequent pages contain detailed data and photographs of the individual tanks.



Item No. 1

VEHICLE NOMENCLATURE: **GAS-ELECTRIC (HOLT)**

Date Produced: 1918

Total Production: 1

Armament: One 75-mm (2.95") mountain howitzer, two cal .30 MGs

Armor: 0.25" to 0.63"

Maximum Speed: 6 MPH

Weight: 25 tons

Engine: Holt 4-cylinder gasoline with water cooling system. 90-HP

Suspension and Tracks: Coil springs, steel tracks, integral grousers

Remorks: This was the first tank built in the United States. Driver sits above the howitzer in forward part of vehicle, engine in the reor.

[redacted]

Item No. 2

VEHICLE NOMENCLATURE: **STEAM TANK, TRACK-LAYING**

Date Produced: 1918

Total Production: 1

Armament: One flame thrower, four cal .30 MGs

Armor: .5"

Maximum Speed: 4 MPH

Weight: 50 tons

Engine: Two-w-cylinder steam engines, one for each track and one kerosene burning bailer for each engine

Suspension and Tracks: Steel tracks

Remarks: This was second tank built in US. Built for purpose of neutralizing pillboxes. In final form flame thrower used 35-HP gasoline engine by means of which oil was put under a pressure of 1600 lbs per square inch, and directed through small hole in the tank. At a range of 90 feet the thin strip of flame became a ball of flame 20 feet or more in diameter.

Flame throwers used during World War I were, for the most part, the portable type.

In the early part of 1944 a study was made of the application of the "Q" model flame thrower to the Light Tank, M5A1, in lieu of the 37-mm gun. In Feb 1945 a similar installation was made in the M4A1 medium tank replacing the 75-mm gun with the E12-7R1 flame thrower gun.

[redacted]

Item No. 3

VEHICLE NOMENCLATURE: **STEAM TANK, THREE-WHEELED**

Date Produced: 1918

Total Production: 1

Armament: One 75-mm (2.95") mountain howitzer and two cal .30 MGs

Armor: 0.25" to 0.63"

Maximum Speed: 5 MPH

Weight: 17 tons approx

Engine: Doble 2-cylinder

Suspension and Tracks: Rigid suspension on 2 drive wheels 8' in diameter and one drum-like trailer wheel in rear

Remarks: Third tank built in US. Powered by Doble type boilers condensing in Holt type radiator, located in center of tank. Howitzer and gunner in front lower part with driver above.

Item No. 4

VEHICLE NOMENCLATURE: **FORD, THREE-TON**

Date Produced: 1918

Total Production: 15

Armament: One cal .30 MG

Armor: 0.25" to 0.5"

Maximum Speed: 8 MPH

Weight: 3.1 tons

Engine: Two Model T Ford 4-cylinder engines with forced water cooling

Suspension and Tracks: Leaf springs, steel tracks, integral grousers

Remarks: This tank easily maneuvered. Could cross 5' trenches; streams 21" in depth; slope 25 degrees, vertical wall 20". Intended to utilize standard Ford Model T parts which were available in quantity. One engine for each track. Its defects were limited traverse of machine gun and inadequate firepower.

Item No. 5

VEHICLE NOMENCLATURE: **SKELETON TANK**

Date Produced: 1918

Total Production: 1

Armament: One cal .30 MG

Armor: 0.5"

Maximum Speed: 5 MPH

Weight: 8 tons

Engine: Beaver (2) 4-cylinder each

Suspension and Tracks: Rigid; steel tracks, integral grousers

Remarks: Built for crossing wide trenches.

Item No. 6

VEHICLE NOMENCLATURE: **MARK I, THREE-MAN**

Date Produced: 1918

Total Production: 1

Armament: One 37-mm gun, one cal .30 MG

Armor: 0.39" to 0.5"

Maximum Speed: 9 MPH

Weight: 7.5 tons

Engine: Hudson 7-cylinder 60-HP engine with forced water cooling

Suspension and Tracks: Leaf springs, pivoted bagies of three rollers each, pressed plate tracks with grousers

Remarks: Center of gravity too far to rear to negotiate obstacles satisfactorily. Track adjustment method unsatisfactory because idlers could not be moved independently.

Item No. 7

VEHICLE NOMENCLATURE: **SIX-TON, M1917**

Date Produced: 1918-1919

Total Production: 952

Armament: One 37-mm gun or one cal .30 MG

Armor: 0.25" to 0.6"

Maximum Speed: 5.5 MPH

Weight: 7.25 tons stowed

Engine: Buda 4-cylinder

Suspension and Tracks: Coil and leaf, tracks flat plates with single grouser

Remarks: This tank a copy of French Renault. Canada given a number of these tanks for training purposes in 1940. Has tail piece 2' 7" long which adds to obility to negotiate obstacles. Defects — toa slow, extremely noisy.

Item No. 8

VEHICLE NOMENCLATURE: **CHRISTIE, M1919**

Date Produced: 1919

Total Production: 1

Armament: One 6-pounder in main turret and one cal .30 MG in upper turret

Armor: 0.25" to 1.0"

Maximum Speed: 13 MPH on tracks

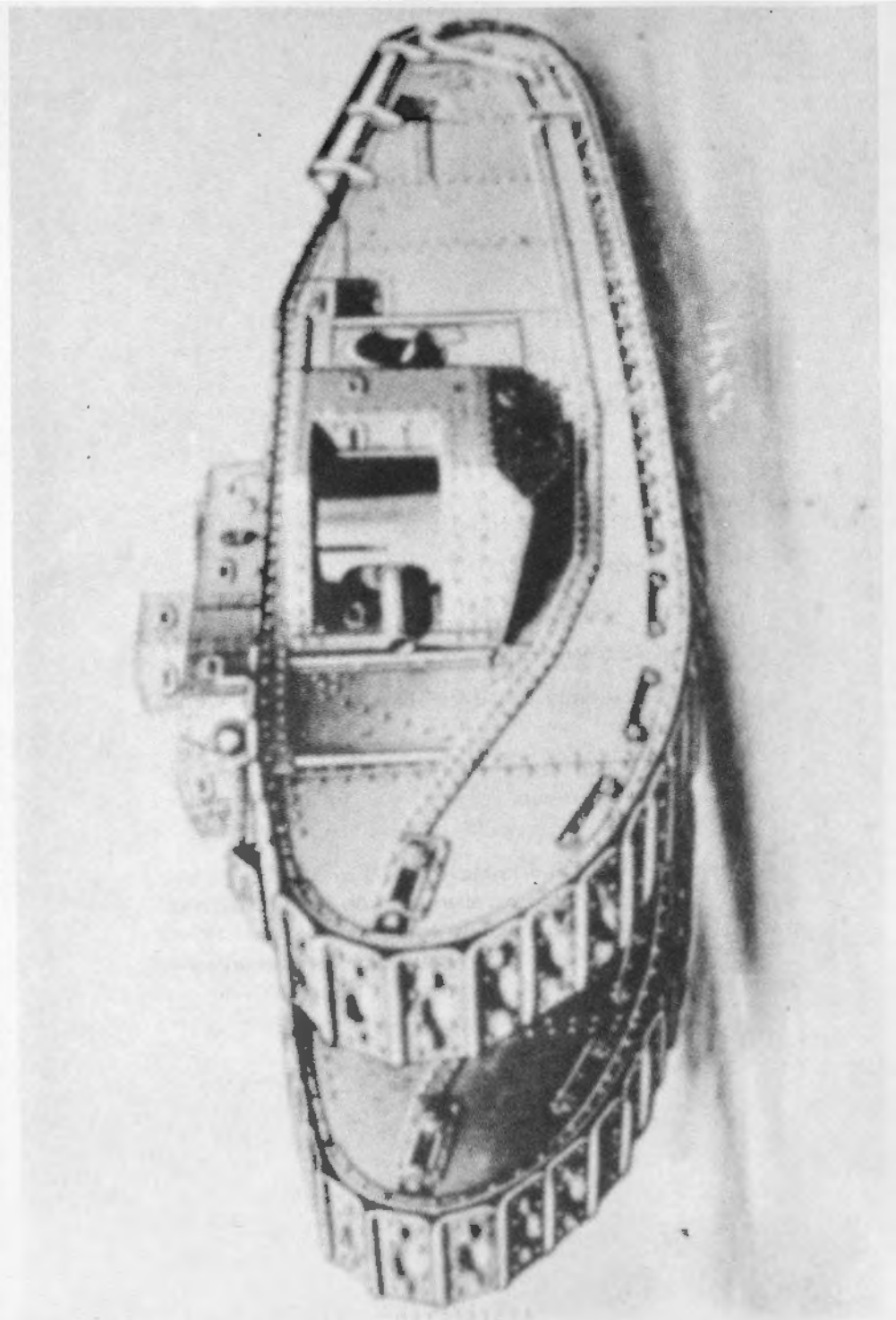
Weight: 13.5 tons

Engine: Christie 6-cylinder vertical

Suspension and Tracks: Coil spring suspension, steel tracks

Remarks: Removable tracks carried above wheels when not in use, 15 minutes required for either change-over.

The Christie suspension employs long coil springs and large bogie wheels in lieu of upper track support rollers. The springs take up valuable space within the vehicle but the suspension has generally improved riding characteristics.



Item No. 9

VEHICLE NOMENCLATURE: **MARK VIII**

Date Produced: 1919 (Partly mfgd by Great Britian, partly by US)

Total Production: 100

Armament: Two 6-pounder guns and five cal .30 MGs

Armor: 0.236" to 0.63"

Maximum Speed: 6.5 MPH

Weight: 43.5 tons stowed

Engine: Liberty 12-cylinder V-type with forced water cooling

Suspension and Tracks: Rigid, pressed steel tracks, integral grousers

Remarks: Had remarkable crushing and tractive ability. Considered excellent vehicle for its day and was standord heavy tank until about 1931. Defects — too slow, thin ormor, mechanically unreliable.

Item No. 10

VEHICLE NOMENCLATURE: **CHRISTIE, M1921**

Date Produced: 1921

Total Production: 1

Armament: One 6-pounder in front and one col .30 MG on each side

Armor: 0.25" to 0.75"

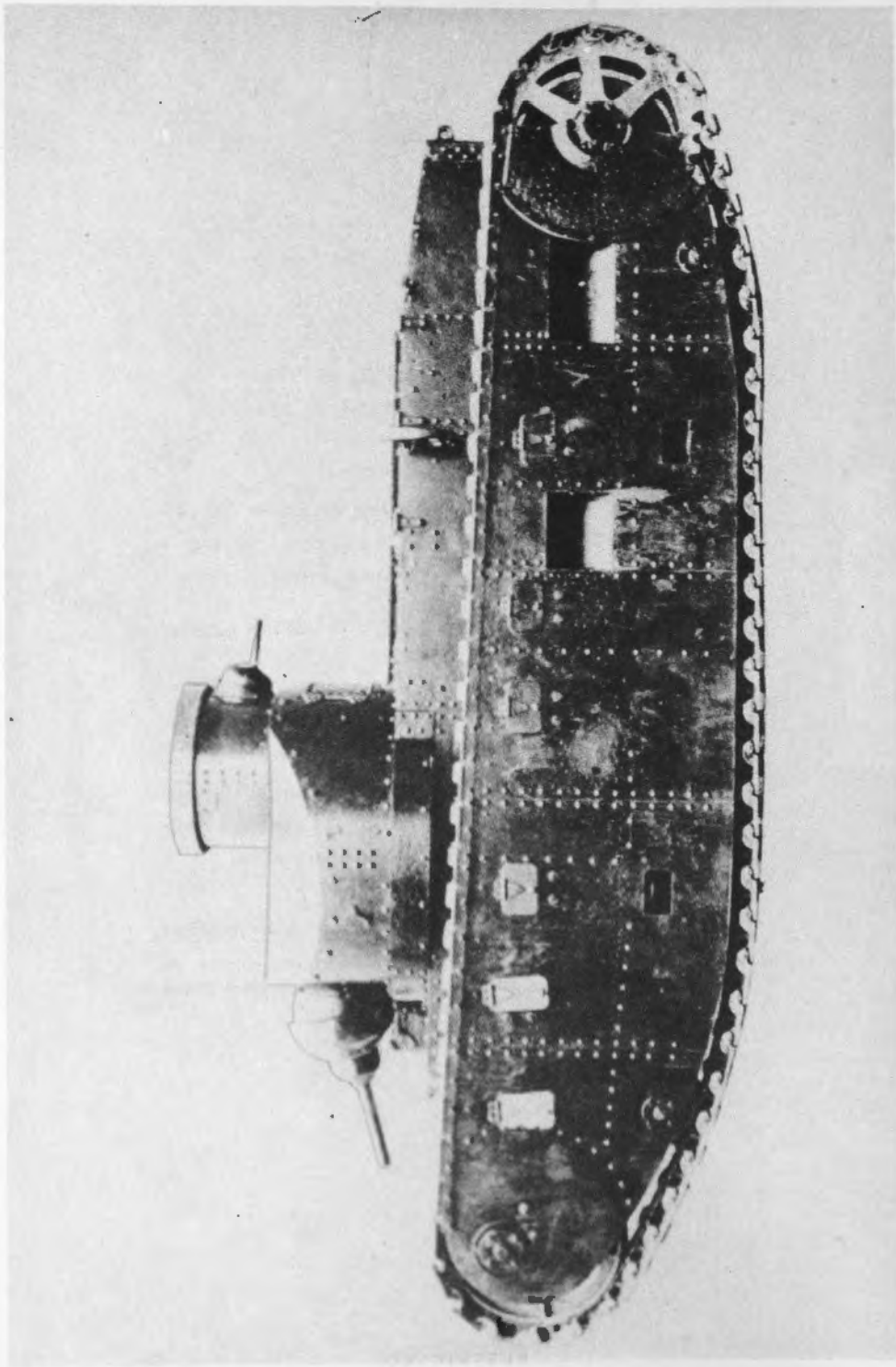
Maximum Speed: 7 MPH (tracks), 14 MPH (wheels)

Weight: 14 tons

Engine: Christie 6-cylinder 120-HP forced water cooling

Suspension and Tracks: Wheels with double rubber tires; front wheels sprung with coil springs, center wheels on pivoted bogies

Remarks: Removable tracks, sliding gear transmission with 4 speeds forward, 4 reverse.
Defects — poor maneuverability, crowded crew compartment.



Item No. 11

VEHICLE NOMENCLATURE: **MEDIUM A, M1921**

Date Produced: 1921

Total Production: 1

Armament: One 6-pounder and one cal .30 MG in main turret; one cal .30 MG in upper turret

Armor: 0.375" to 1.0"

Maximum Speed: 10.1 MPH

Weight: 23 tons

Engine: Murray-Tregurtha 6-cylinder. Later replaced by 8-cylinder Packard

Suspension and Tracks: Helicol spring, all steel (cast) tracks, hollow (oil reservoirs) grousers

Remarks: Planetary and sliding transmission, 4 speeds forward, 2 speeds reverse. Upper turret revolved on lower.

Item No. 12

VEHICLE NOMENCLATURE: **MEDIUM, M1922**

Date Produced: 1922

Total Production: 1

Armament: One 6-pounder and one cal .30 MG in main turret; one cal .30 MG in upper turret

Armor: 0.375" to 1.0"

Maximum Speed: 15.7 MPH

Weight: 25 tons

Engine: Murray-Tregurtha 6-cylinder 195 BHP @ 1250 RPM

Suspension and Tracks: Cable; wood shoes in brackets pivoted at center

Remarks: Chain type suspension used; later replaced by cable. Defects — tracks and suspension unsatisfactory.

Item No. 13

VEHICLE NOMENCLATURE: **MEDIUM TANK, T1**

Date Produced: 1925

Total Production: 1

Armament: One 6-pounder and one cal .30 MG in main turret, one cal .30 MG in upper turret

Armor: 0.375" to 1.0"

Maximum Speed: 11.3 MPH

Weight: 22 tons

Engine: Special Packard 8-cylinder

Suspension and Tracks: Helical suspension, all steel forged tracks, integral grousers

Remarks: Low horsepower per ton.

Item No. 14

VEHICLE NOMENCLATURE: **LIGHT TANK, T1**

Date Produced: 1927

Total Production: 1

Armament: One 37-mm gun and one cal .30 MG in one mount

Armor: 0.25" to 0.375"

Maximum Speed: 20 MPH

Weight: 7.5 tons

Engine: Cunningham 8-cylinder V-type

Suspension and Tracks: Suspension consisted of rollers, bogies, and equalizing links, no springs

Remarks: Although this series of tanks showed considerable improvement over earlier models, the rough riding qualities outbalanced other advantages.

Defects — front body projected beyond tracks, poor ventilation.

Item No. 15

VEHICLE NOMENCLATURE: **LIGHT TANK, T1E1 (M1)**

Date Produced: 1928

Total Production: 4

Armament: Same as T1

Armor: Same as T1

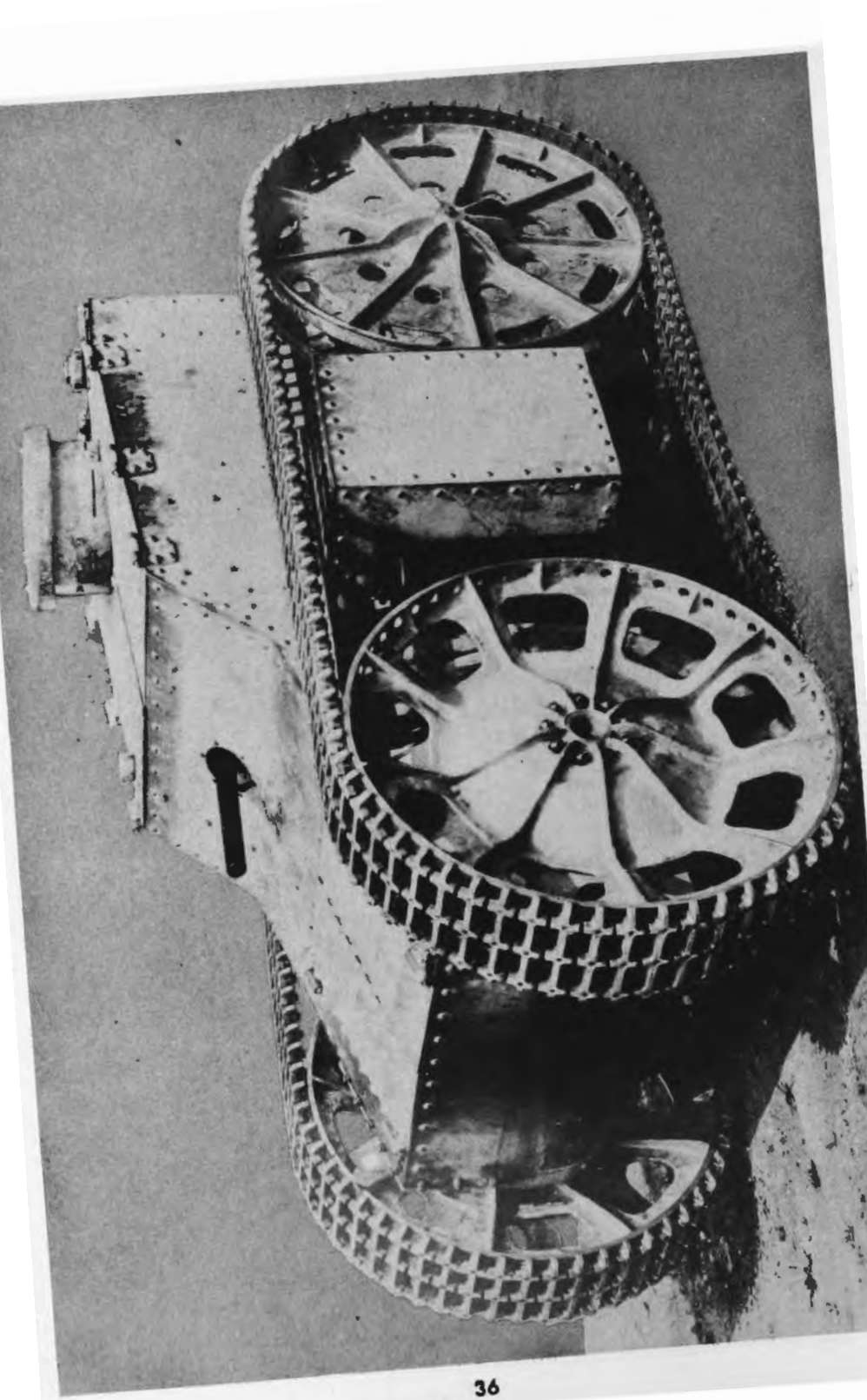
Maximum Speed: 18 MPH

Weight: 7.5 tons

Engine: Cunningham 8-cylinder V-type

Suspension and Tracks: Link suspension, conventional self-cleaning tracks

Remarks: Projection of body front eliminated on this modified tank, fuel tanks placed above tracks. Defects — skeleton type tracks picked up loose objects, causing tank to stall.



Item No. 16

VEHICLE NOMENCLATURE: **ONE-MAN TANK, EXPERIMENTAL (TRACK DEV. CHASSIS, T1)**

Date Produced: 1928

Total Production: 1

Armament: One cal .30 MG

Armor: 0.125"

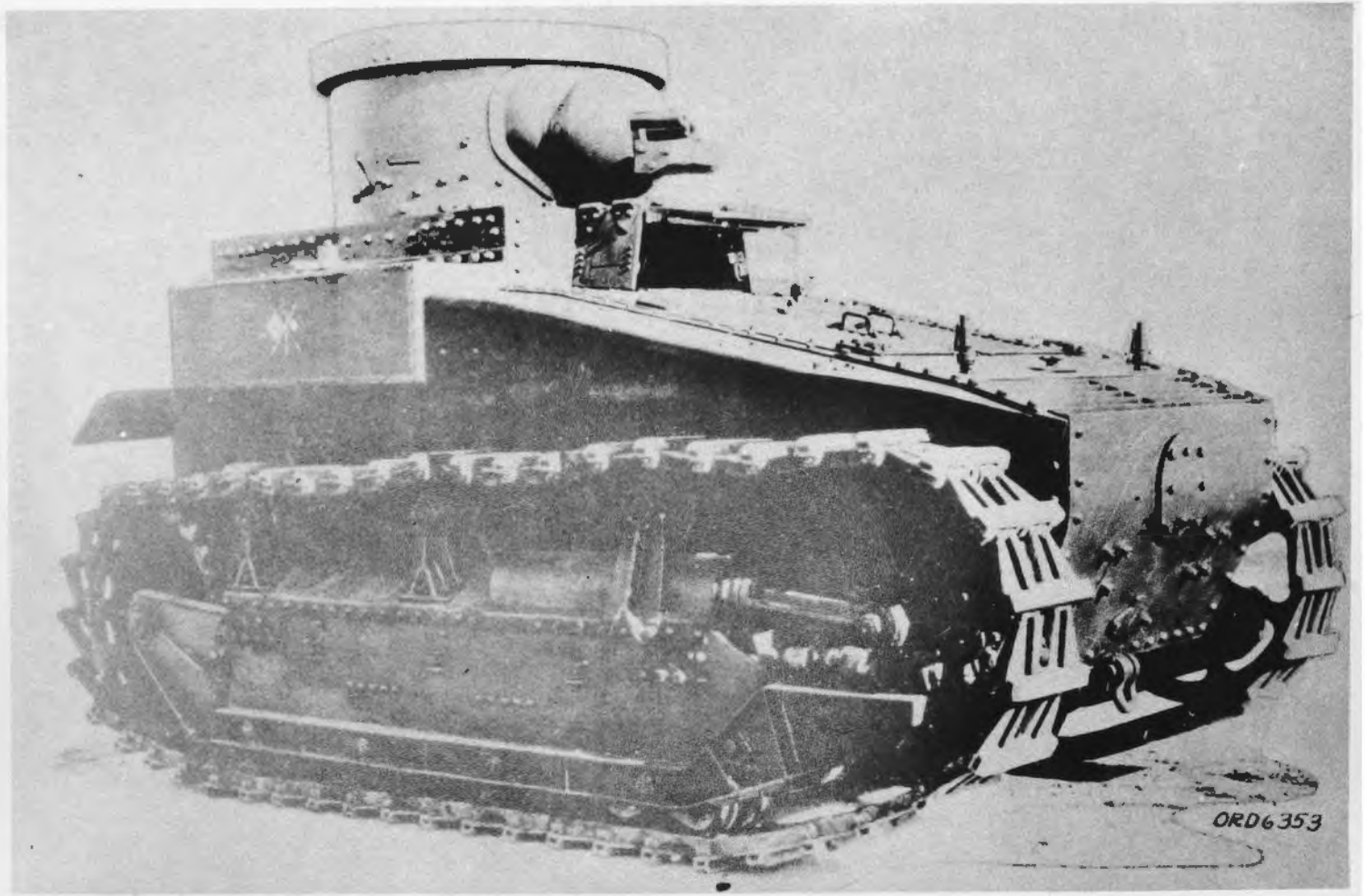
Maximum Speed: 19.5 MPH

Weight: 1.5 tons

Engine: Ford 4-cylinder Model A 42-HP forced water cooling

Suspension and Tracks: Coil spring with wheels slightly sprung; wheels of aluminum, solid rubber tires, 4 1/2" flexible steel band tracks

Remorks: This tank was a project on the experimental development of tracks. Rear wheels sprung slightly, unsprung front wheels drive, wheels of aluminum, solid rubber tires.


ORD6353

Item No. 17

VEHICLE NOMENCLATURE: **LIGHT TANK, T1E2**

Date Produced: 1929

Total Production: 1

Armament: One 37-mm semiautomatic gun and one cal .30 MG in same mount

Armor: 0.25" to 0.625"

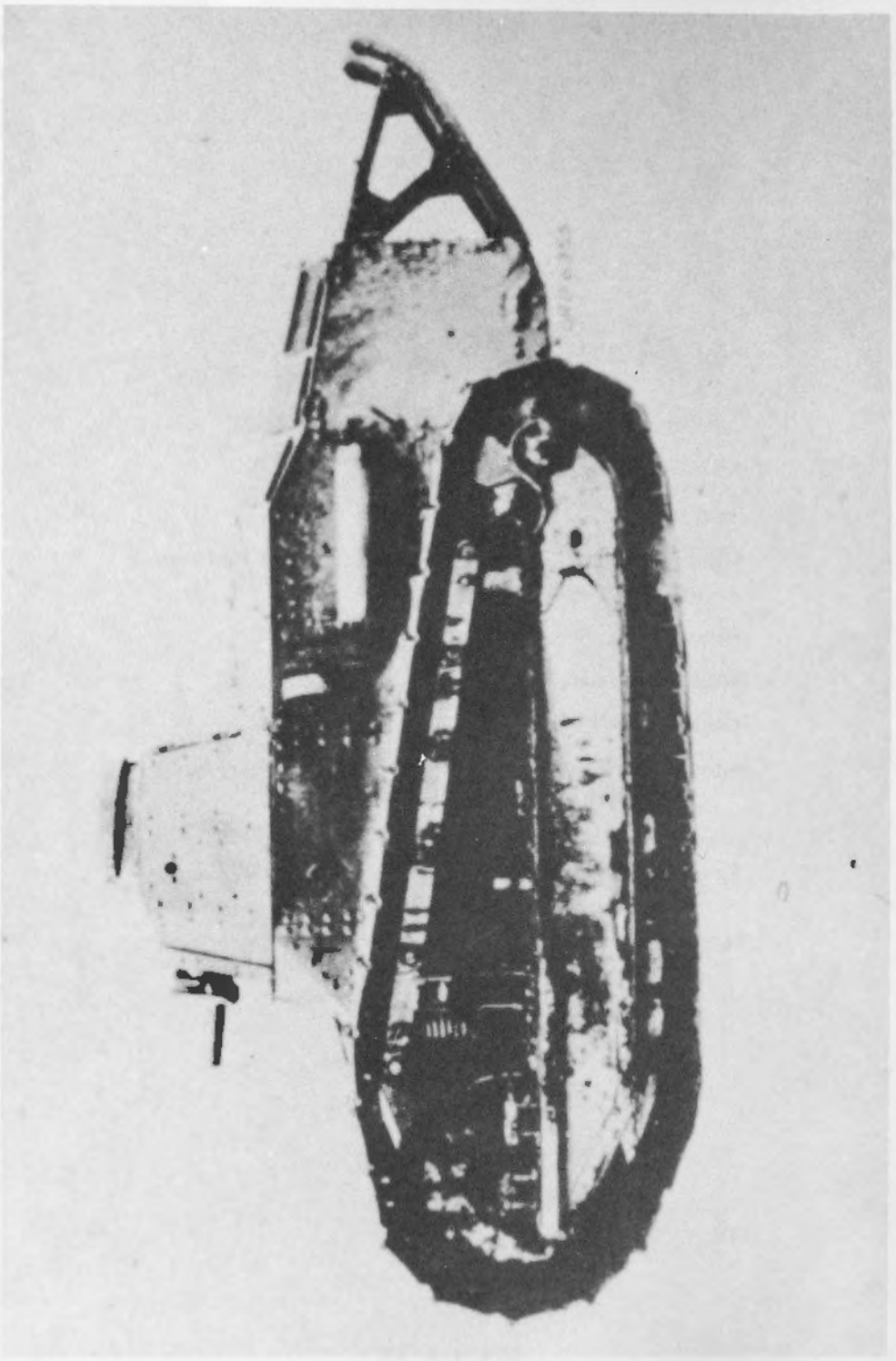
Maximum Speed: 16 MPH

Weight: 8.9 tons

Engine: Used same engine (Cunninghom 8-cylinder) as T1 but increased horsepower

Suspension and Tracks: Link suspension, conventional self-cleaning tracks

Remarks: Similar to T1 but with increased armor and horsepower.



Item No. 18

VEHICLE NOMENCLATURE: **SIX-TON, M1917A1**

Date Produced: Pilot 1929; modified 1930-31

Total Production: 7

Armament: One 37-mm gun or one cal .30 MG

Armor: 0.25" to 0.6"

Maximum Speed: 10.3 MPH

Weight: Approx 6.7 tons without equipment

Engine: Franklin 6-cylinder verticol

Suspension ond Tracks: Coil and leaf suspension; steel tracks

Remarks: This "A1" model differed from M1917 in the changeover from the Buda engine to a Franklin 6-cylinder, air-cooled engine. Modified idlers used to reduce noise of track bushings striking idlers and driver sprockets.

Item No. 19

VEHICLE NOMENCLATURE: **LIGHT TANK, T1E3**

Date Produced: 1930

Total Production: 1

Armament: One 37-mm semiautomatic gun and one cal .30 MG

Armor: 0.25" to 0.625"

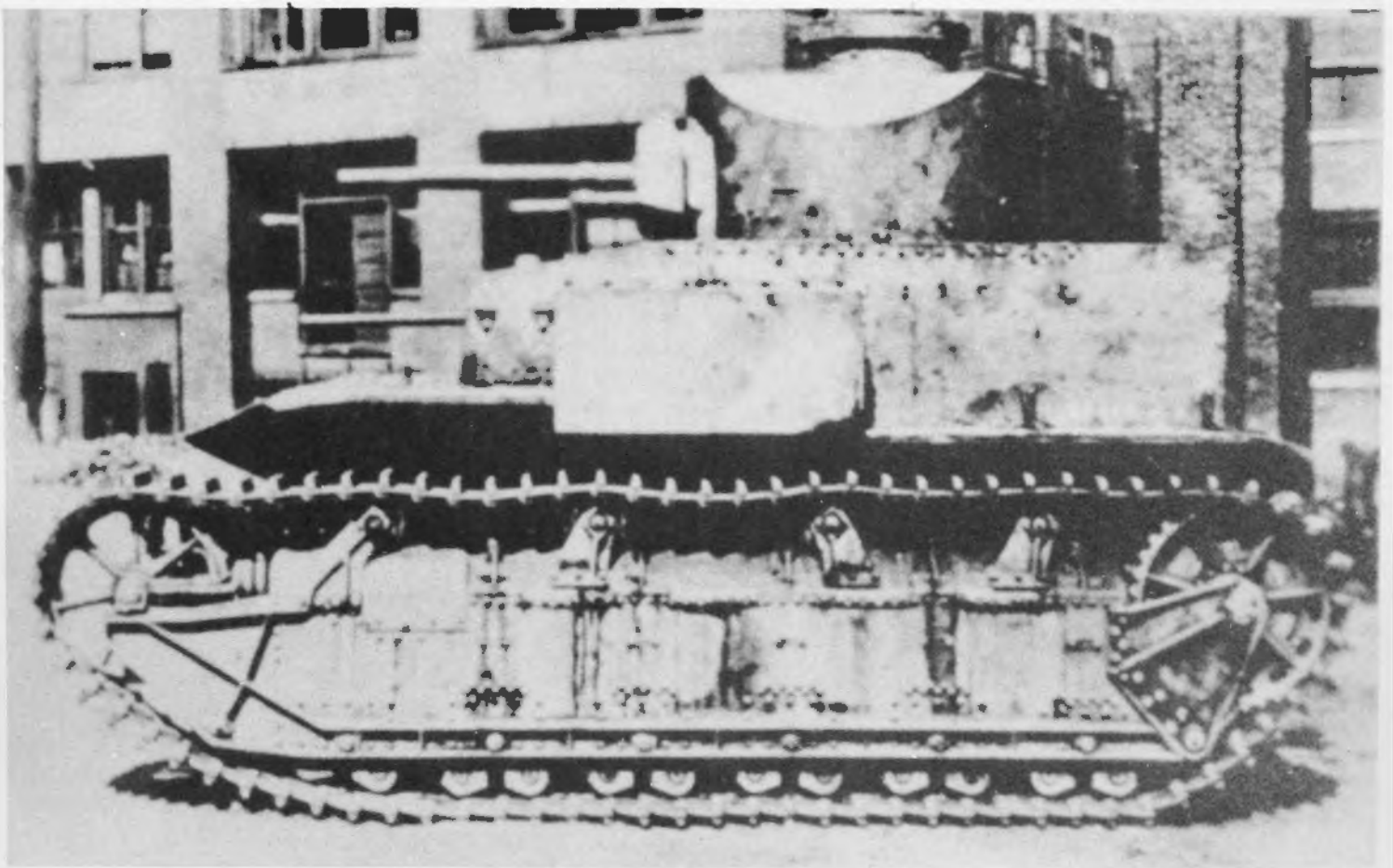
Maximum Speed: 21.9 MPH

Weight: 8.5 tons

Engine: Cunningham 8-cylinder V-8

Suspension and Tracks: 1/4 spring, 3/4 spring hydraulic; conventional self-cleaning tracks

Remarks: In general, characteristics same as T1. Suspension with vertical coil springs within hydraulic shock absorbers, improved riding qualities. Considerable dead space forward for both driver and gunner. Engine in front.



Item No. 20

VEHICLE NOMENCLATURE: **MEDIUM TANK, T2**

Date Produced: 1930

Total Production: 1

Armament: One 47-mm (1.85") gun & one cal .50 MG in one mount in turret, one 37-mm gun and one cal .30 MG in one mount in hull

Armor: 0.25" to 0.875"

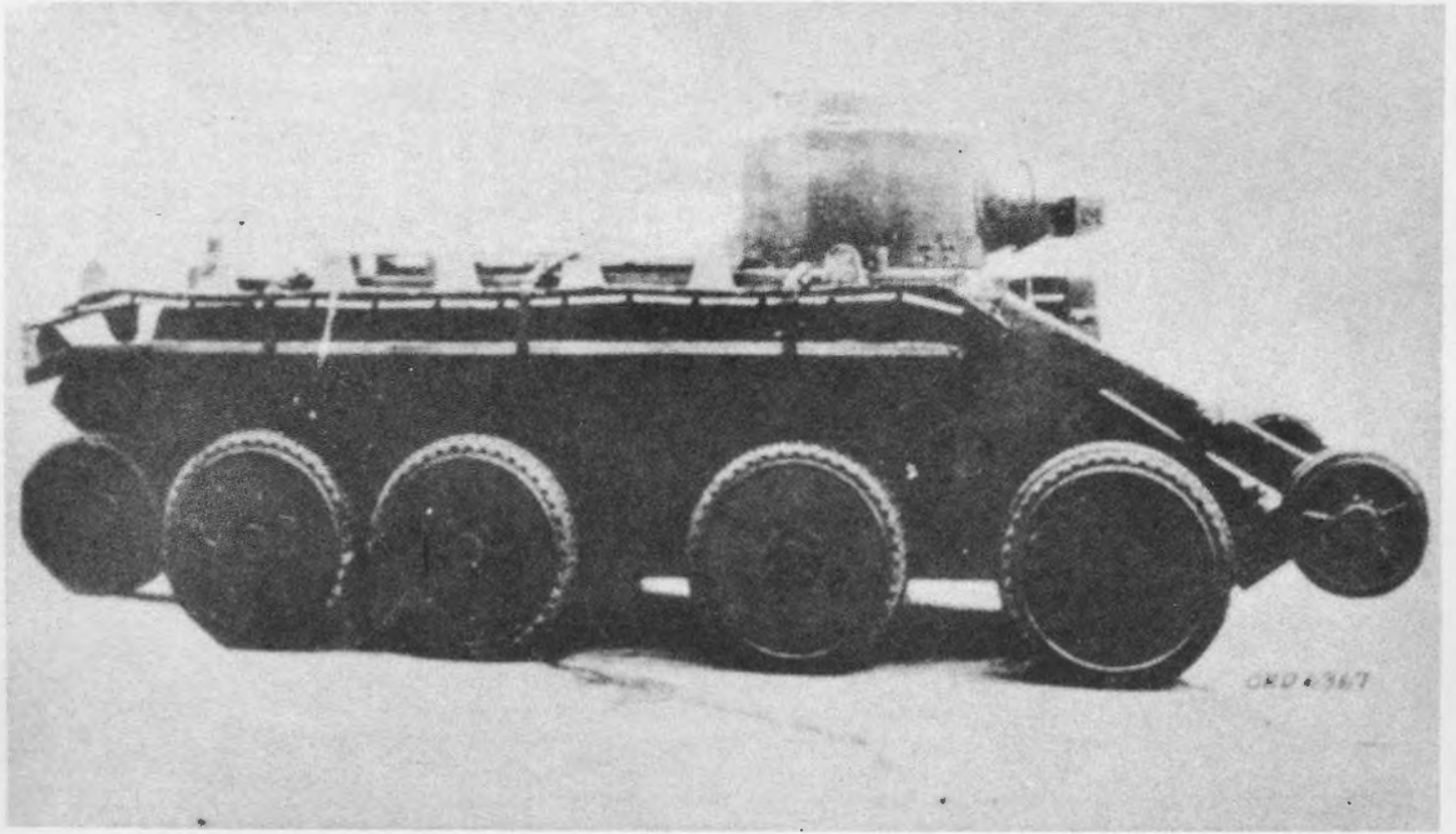
Maximum Speed: 25 MPH, governed 20 MPH

Weight: 15 tons

Engine: Modified Liberty 12-cylinder V-type

Suspension and Tracks: Vertical spring suspension, open track

Remarks: Steering brakes operated through vacuum booster. A Sperry electric-driven gyroscopic direction indicator installed in this tank. Defects — gunners interfered with each other. Guns in hull have limited traverse.



Item No. 21

VEHICLE NOMENCLATURE: **COMBAT CAR, T1**

Date Produced: 1931

Total Production: ?

Armament: One cal .50 MG, one cal .30 MG, 360° traverse

Armor: 1/2" to 5/8"

Maximum Speed: 46.8 wheels; 27.3 tracks

Weight: 22,220 lbs loaded

Engine: Liberty 12-cylinder

Suspension and Tracks: Individually sprung helical spring suspension, flat tracks, selective sliding gear transmission

Remarks: Nos. 1, 2, 4, 5 delivered to Fort Knox in 1932. These differ from Medium Tank, T3, in that 37-mm gun has been replaced by cal .50 machine gun.

[redacted]

Item No. 22

VEHICLE NOMENCLATURE: **CHRISTIE, M1931 (CONVERTIBLE MEDIUM TANK, T3)**

Date Produced: 1931

Total Production: 7

Armament: One 37-mm gun and one cal .30 MG in one mount

Armor: 0.25" to 0.625"

Maximum Speed: 40 MPH, 70 MPH

Weight: 10 1/2 tons

Engine: Ordnance Liberty 12-cylinder V-12

Suspension and Tracks: Individually sprung helical spring suspension, flat track

Remarks: Removable tracks, require 30 minutes for change. Six models have chain drive from sprocket to rear road wheel. Four large weight-bearing wheels on each side are distinctive feature of these tanks. Two chassis of this type bought by Russia. In February 1931 one of these tanks made cross-country run of 141 miles at average speed of 21.1 MPH with no mechanical difficulties. Due to time necessary for change-over from wheels to tracks, change must be made before coming into hostile fire area.

[redacted]

Item No. 23

VEHICLE NOMENCLATURE: **COMBAT CAR, T2 (FORMERLY CONVERTIBLE ARMORED CAR, T5)**

Date Produced: 1931

Total Production: 1

Armament: One cal .50 MG and one cal .30 MG in turret mount; one cal .30 MG in front of crew compartment

Armor: 0.25" to 0.50"

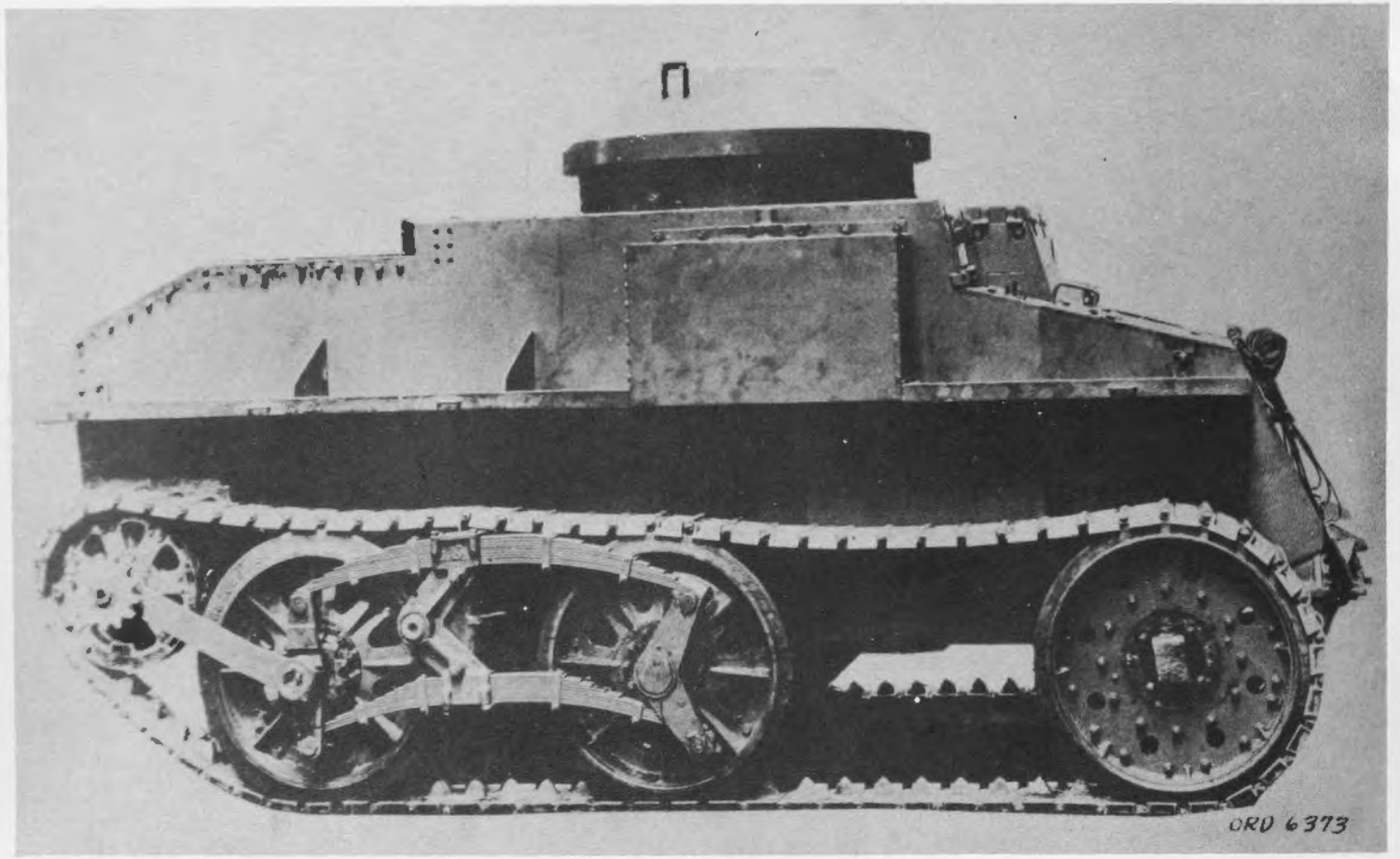
Maximum Speed: 30 MPH on wheels, 20 MPH on tracks

Weight: 8 1/2 tons

Engine: Continental 7-cylinder radial

Suspension and Tracks: Leaf spring suspension, Lynite—steel pin tracks

Remarks: Operates on wheels on road and on tracks across country. Steering brakes operated through hydraulic booster.


ORD 6373

Item No. 24

VEHICLE NOMENCLATURE: **COMBAT CAR, T2E1**

Date Produced: 1932

Total Production: ?

Armament: One cal .50 MG; two cal .30 MGs

Armor: 3/8" to 1"

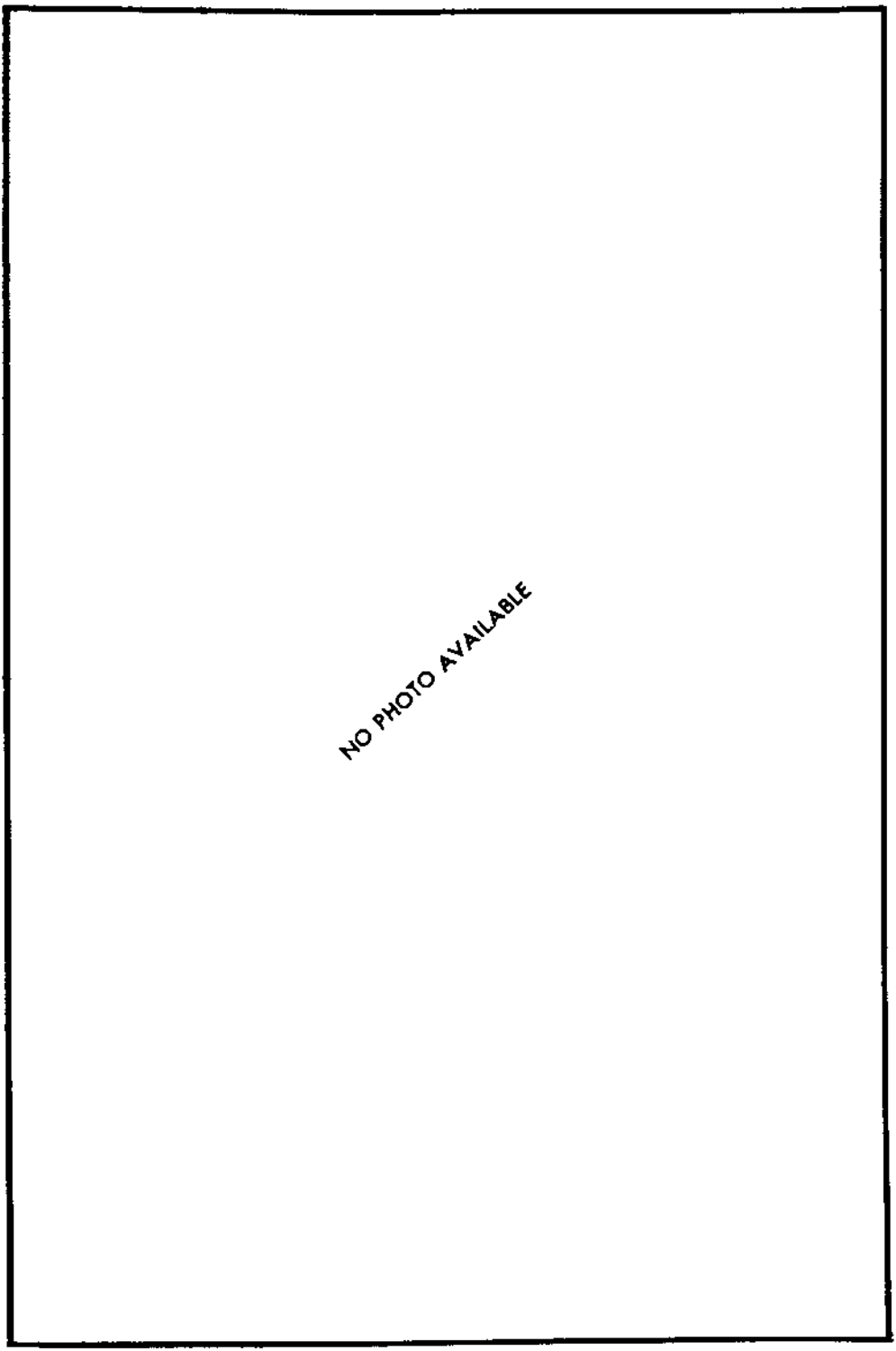
Maximum Speed: 41 MPH on wheels, 27.5 MPH on tracks

Weight: 15,570 lbs unloaded

Engine: Continental 7-cylinder

Suspension and Tracks: Leaf spring, Lynite—steel pin tracks

Remarks: T2 hull modified to redistribute weight and larger Continental radial engine installed. Convertible vehicle.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Item No. 25

VEHICLE NOMENCLATURE: **CHRISTIE LIGHT TANK, M1932**

Date Produced: 1932

Total Production: 1

Armament: Undetermined

Armor: 0.375" to 0.5" (thicker armor may be installed)

Maximum Speed: 60 MPH tracks, 120 MPH wheels

Weight: Unknown. Very light construction

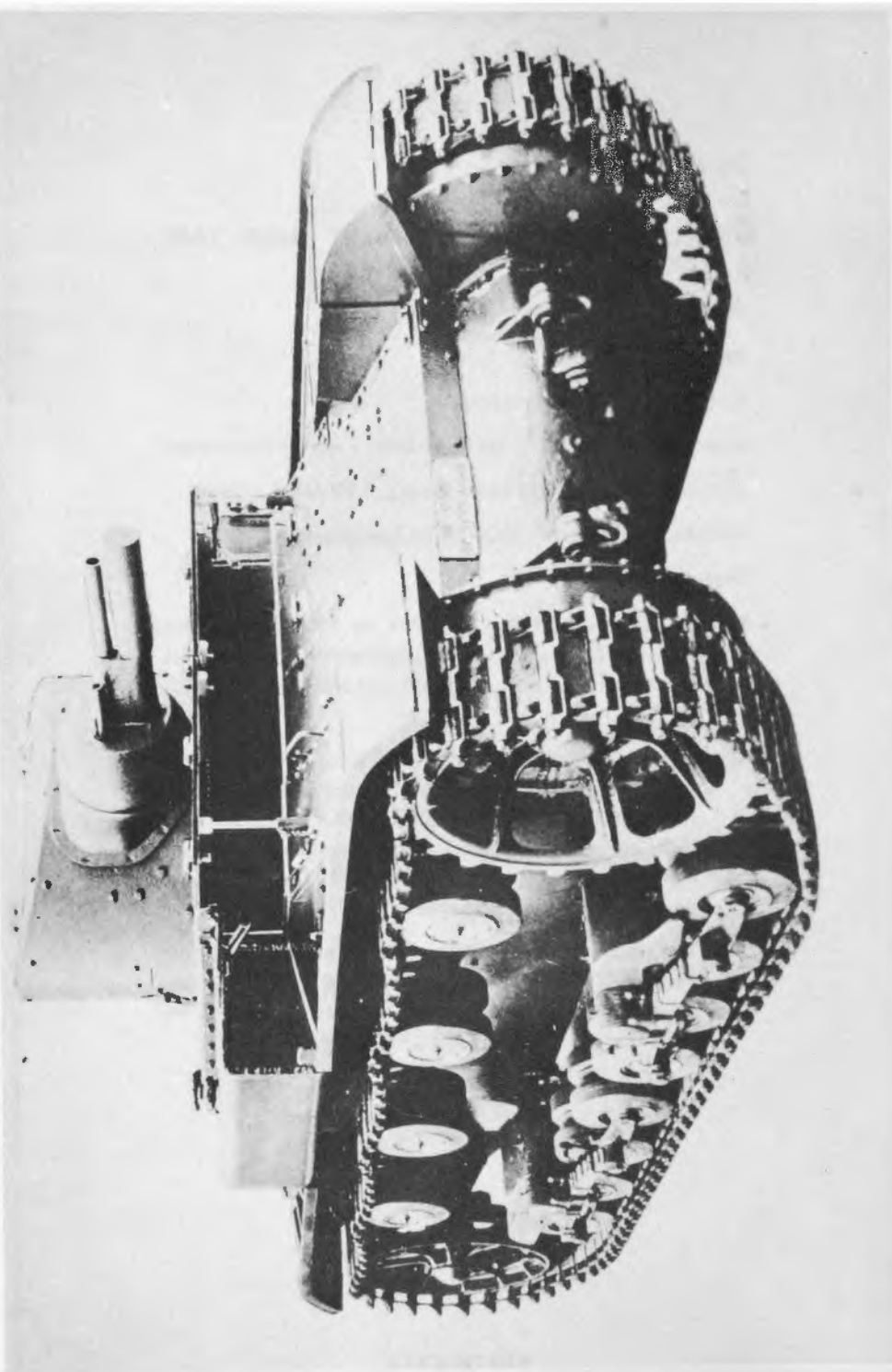
Engine: Unknown

Suspension and Tracks: Similar to 1931 model but with a maximum vertical movement of 24 inches, duralumin wheels with pneumatic tires

Remarks: In this design it was contemplated that this vehicle could be carried by a special airplane carrier and later released close to the ground. Very light construction throughout. Can jump across a 12-foot trench. Power take-off for operating proposed flying propeller.

Ten years later the light tank T9 and its modified version T9E1 were especially designed for airborne operations but were limited standard for only a short time before obsoletion.

[redacted]



Item No. 26

VEHICLE NOMENCLATURE: **LIGHT TANK, T1E4**

Date Produced: 1932

Total Production: 1

Armament: One 37-mm semiautomatic gun, M1924, and one cal .30 MG in one mount

Armor: 0.25" to 0.625"

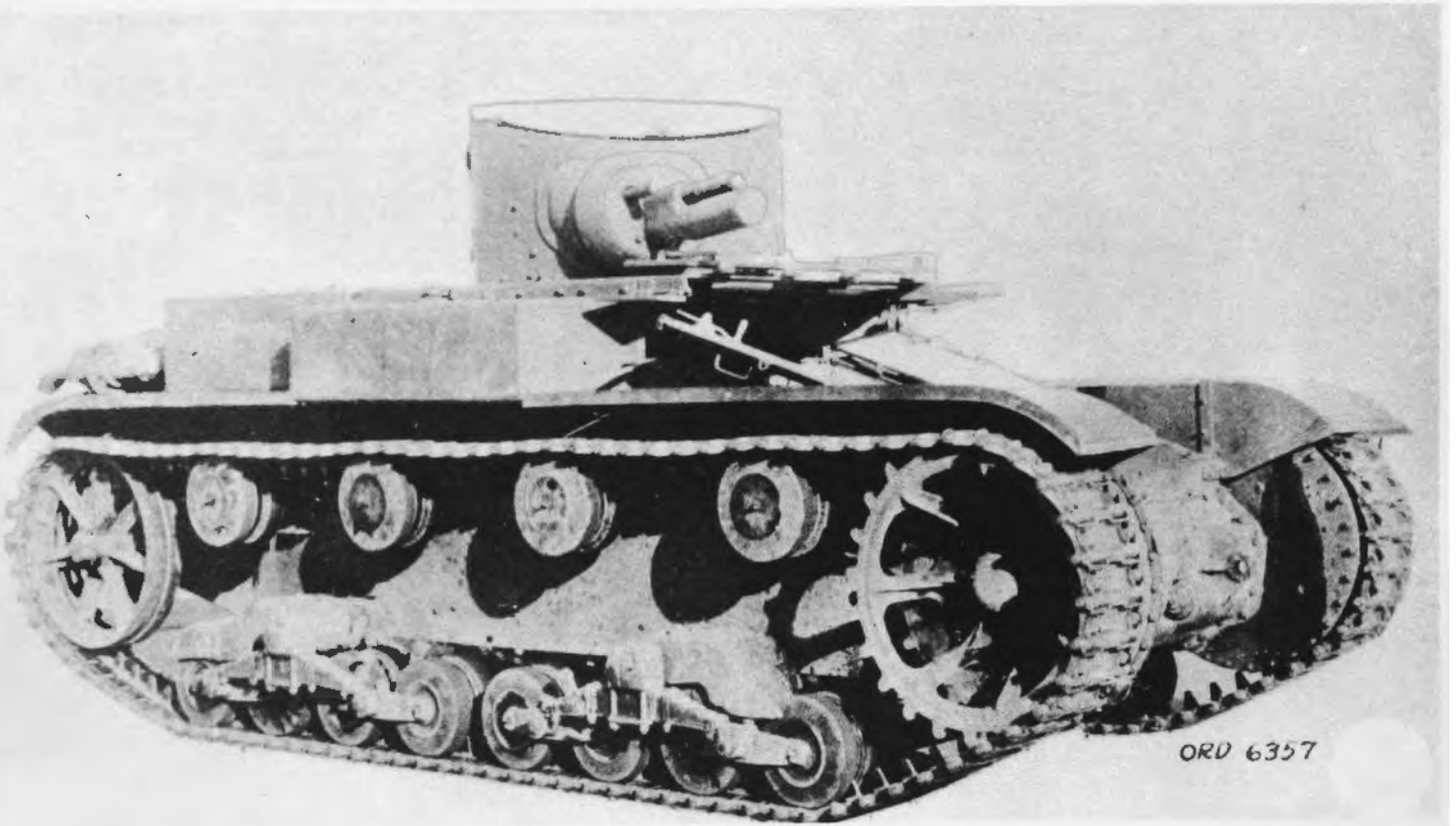
Maximum Speed: 20 MPH

Weight: 8.6 tons

Engine: Cunningham 8-cylinder V-type

Suspension and Tracks: Leaf spring, semi-elliptic suspension; drop-forged steel tracks

Remarks: Final drive, transmission, and driver in front; gunner in center; engine in rear.


ORD 6357

Item No. 27

VEHICLE NOMENCLATURE: **LIGHT TANK, T1E6**

Date Produced: 1932

Total Production: 1

Armament: One 37-mm semiautomatic gun, one cal .30 MG

Armor: 3/8" to 5/8"

Maximum Speed: 20 MPH

Weight: 19,900 lbs loaded

Engine: American La Fronce 12-cylinder

Suspension and Tracks: Leaf spring, semi-elliptic suspension; drop-forged steel tracks

Remarks: Made from T1E4 by replacing Cunningham engine with American La France type.

OR

Item No. 28

VEHICLE NOMENCLATURE: **COMBAT CAR, T4**

Date Produced: 1933

Total Production: ?

Armament: One cal .50 MG, two cal .30 MGs

Armor: 1/4" to 3/8"

Maximum Speed: 52.5 MPH wheels, 26.3 MPH tracks

Weight: 19,240 lbs loaded

Engine: Continental 7-cylinder radial

Suspension and Tracks: Independent helical suspension; rubber-bushed steel tracks

Remarks: Christie type convertible. Smaller than T1.

Item No. 29

VEHICLE NOMENCLATURE: **LIGHT TANK, T2**

Date Produced: 1934

Total Production: ?

Armament: Two cal .30 MGs, one cal .50 MG

Armor: 3/8" to 5/8"

Maximum Speed: 27.1 MPH

Weight: 12,705 lbs unloaded

Engine: Continental Aircraft 7-cylinder radial

Suspension and Tracks: Double-leaf spring, articulating bogie; rubber-jointed tracks

Remarks: Turret has 360 degree traverse.

Item No. 30

VEHICLE NOMENCLATURE: **LIGHT TANK, T2E1**

Date Produced: 1934

Total Production: 9

Armament: One cal .30 MG (bow), one cal .30 MG & one cal .50 MG in turret

Armor: 1/4" to 5/8"

Maximum Speed: 46.6 MPH

Weight: 15,580 lbs

Engine: Continental Aircraft 7-cylinder radiol

Suspension and Tracks: Volute spring; rubber block T16 track

Remarks: Standardized as M2A1, single turret. This is the first departure from a center guide track.

Item No. 31

VEHICLE NOMENCLATURE: **MEDIUM TANK, T3E2**

Date Produced: 1934

Total Production: ?

Armament: One 37-mm gun, five cal .30 MGs

Armor: 1/4" to 1/2"

Maximum Speed: 25.1 MPH wheels, 15 MPH tracks

Weight: 28,500 lbs loaded

Engine: Curtiss 12-cylinder

Suspension and Tracks: Independent sprung track suspension, forged steel track

Item No. 32

VEHICLE NOMENCLATURE: **COMBAT CAR, M1**

Date Produced: 1935

Total Production: ?

Armament: Two cal .30 MGs, one cal .50 MG, one SMG

Armor: 1/4" to 5/8"

Maximum Speed: 45 MPH

Weight: 19,000 lbs

Engine: Continental 7-cylinder

Suspension and Tracks: Volute suspension

Item No. 33

VEHICLE NOMENCLATURE: **LIGHT TANK, M2A1**

Date Produced: 1935

Total Production: ?

Armament: One cal .30 MG & one cal .50 MG (turret), one AA cal .30 MG, one bow cal .30 MG

Armor: 1/4" to 5/8"

Maximum Speed: 45 MPH; 20 MPH cross country

Weight: 18,790 lbs loaded; 16,530 unloaded

Engine: Continental 7-cylinder W-670

Suspension and Tracks: Selective sliding gear transmission. Articulating lever volute spring suspension; rubber block, rubber bushed track

U.S.A.
W-30110

Item No. 34

VEHICLE NOMENCLATURE: **LIGHT TANK, M2A2 (FORMERLY T2E2)**

Date Produced: 1935

Total Production: ?

Armament: Same as M2A1

Armor: Same as M2A1

Maximum Speed: 45 MPH; 20 MPH cross country

Weight: 19,100 lbs loaded; 16,965 unloaded

Engine: Continental 7-cylinder radial

Suspension and Tracks: Volute articulating, rubber bushed track

Remarks: Two turrets; otherwise same as M2A1.

M2A2E1 — Same as above with Guiberson Diesel engine.

M2A2E2 — Similar but with heavier armor.

M2A2E3 — Same but with G. S. unit.

Item No. 35

VEHICLE NOMENCLATURE: **LIGHT TANK, T3**

Date Produced: 1936

Total Production: ?

Armament: One cal .30 MG

Armor: 3/16" to 3/8".

Maximum Speed: 35 MPH

Weight: 7080 lbs loaded

Engine: Ford 8-cylinder V-type

Suspension and Tracks: Rubber torsion or volute spring; rubber block track

Remarks: Front sprocket drive. Aluminum used at least vulnerable parts.

T3E1 — Same as T3, but volute spring suspension and Menasco engine. Not completed.

T3E2 — Similar to T3, but heavier armor. Designed but not built.

T3E3 — Designed, not built.

T4 — Similar to T3, but with Guiberson engine. Designed, not built.

Item No. 36

VEHICLE NOMENCLATURE: **MEDIUM TANK, T4**

Date Produced: 1936

Total Production: 16

Armament: One cal .50 MG, two cal .30 MGs

Armor: 1/4" to 5/8"

Maximum Speed: 35 MPH, 15-20 cross country

Weight: 27,000 lbs loaded

Engine: Continental 7-cylinder

Suspension and Tracks: Coil spring independent suspension; steel tracks, rubber bushed

U.S.A. W-30261

Item No. 37

VEHICLE NOMENCLATURE: **MEDIUM TANK, T4E1**

Date Produced: 1936

Total Production: ?

Armament: One cal .50 MG, five cal .30 MGs

Armor: 1/4" to 5/8"

Maximum Speed: 40 MPH (wheels), 25 MPH (tracks)

Weight: 30,000 lbs loaded

Engine: Continental 7-cylinder

Suspension and Tracks: Independent coil spring suspension; rubber bushed tracks

Item No. 38

VEHICLE NOMENCLATURE: **COMBAT CAR, M1E2**

Date Produced: 1937

Total Production: ?

Armament: One cal .50 MG, three cal .30 MGs

Armor: 3/8" to 5/8"

Maximum Speed: 45 MPH

Weight: 19,530 lbs loaded

Engine: Continental 7-cylinder

Suspension and Tracks: Volute suspension; rubber block, rubber bushed tracks

Remarks: Manufactured by Rock Island Arsenal. M1 with modified engine space and rear bogie moved back 11 inches.

U.S.A. W-30311

Item No. 39

VEHICLE NOMENCLATURE: **LIGHT TANK, M2A3**

Date Produced: 1938

Total Production: ?

Armament: One cal .50 MG, two cal .30 MGs

Armor: 5/8" to 7/8"

Maximum Speed: 38 MPH, 25.7 MPH cross country

Weight: 19,460 lbs unloaded

Engine: Continental 7-cylinder

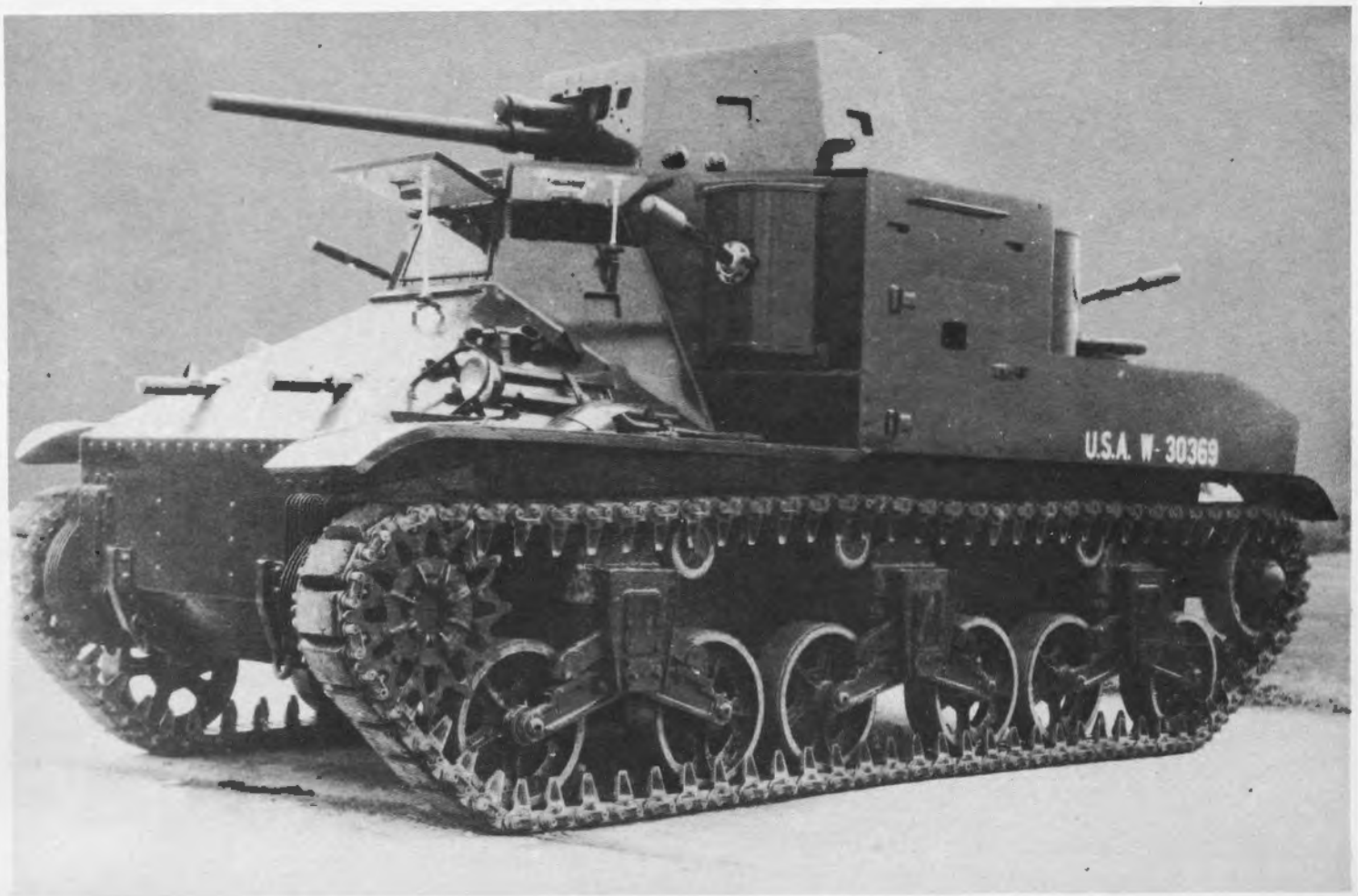
Suspension and Tracks: Volute suspension, rubber block, rubber bushed track. Synchromesh transmission

Remarks: Similar to M2A2 but with longer wheel base and bogie spacing. Used by Infantry. Hexagonol cupola on left turret.

M2A3E1 — Same as M2A3 but with Guiberson 1020 Diesel engine.

M2A3E2 — Transmission and differential of M2A3 type replaced by electrogear units.

M2A2E3 — Has General Motors Diesel 4-cylinder engine, other characteristics same as M2A2.


U.S.A. W-30369

Item No. 40

VEHICLE NOMENCLATURE: **MEDIUM TANK, T5, PHASE I**

Date Produced: 1938

Total Production: ?

Armament: Two 37-mm guns, six cal .30 MGs

Armor: 1"

Moximum Speed: 30.6 MPH; 20.8 MPH cross country

Weight: 30,050 lbs loaded

Engine: Continental 7-cylinder

Suspension and Tracks: Volute track suspension, rubber block, rubber bushed tracks

Remarks: Employed many parts of M3 light tank. Phase II designed but not built. 92-octane gasoline.

USA-W-30443

Item No. 41

VEHICLE NOMENCLATURE: **MEDIUM TANK, T5 PHASE III**

Date Produced: 1938

Total Production: ?

Armament: One 37-mm gun, eight cal .30 MGs

Armor: 1" to 1 1/16", top 3/8"

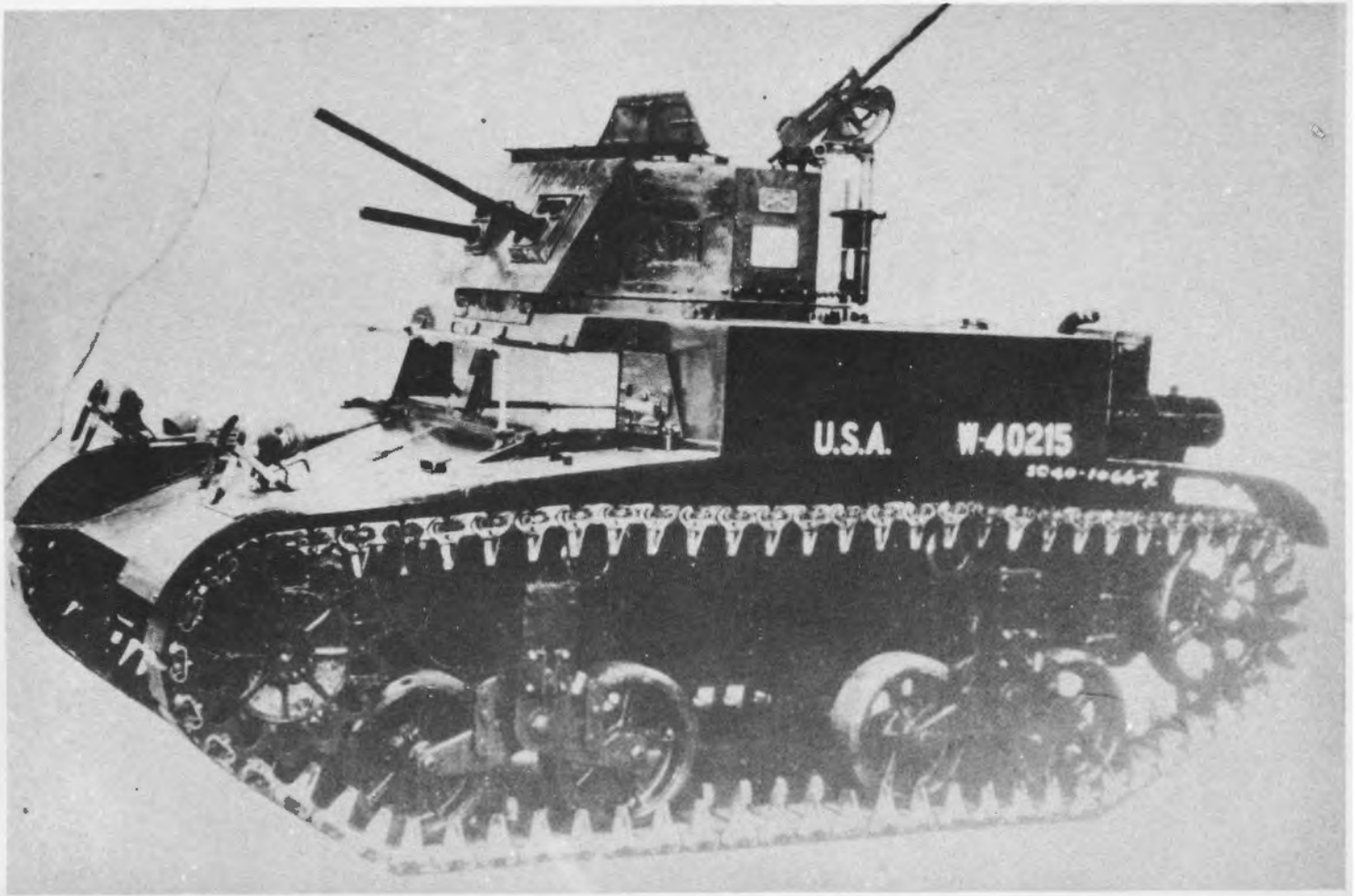
Maximum Speed: 32 MPH

Weight: 42,652 lbs loaded

Engine: Wright 9-cylinder R-975

Suspension and Tracks: Volute suspension, rubber blocked, rubber bushed tracks

Remarks: Similar to Phase I but wider tracks and larger engine.


U.S.A. W-40215

Item No. 42

VEHICLE NOMENCLATURE: **COMBAT CAR, M1A1**

Date Produced: 1939

Total Production: ?

Armament: One cal .50 MG, three cal .30 MGs, one SMG

Armor: 1/4" to 5/8"

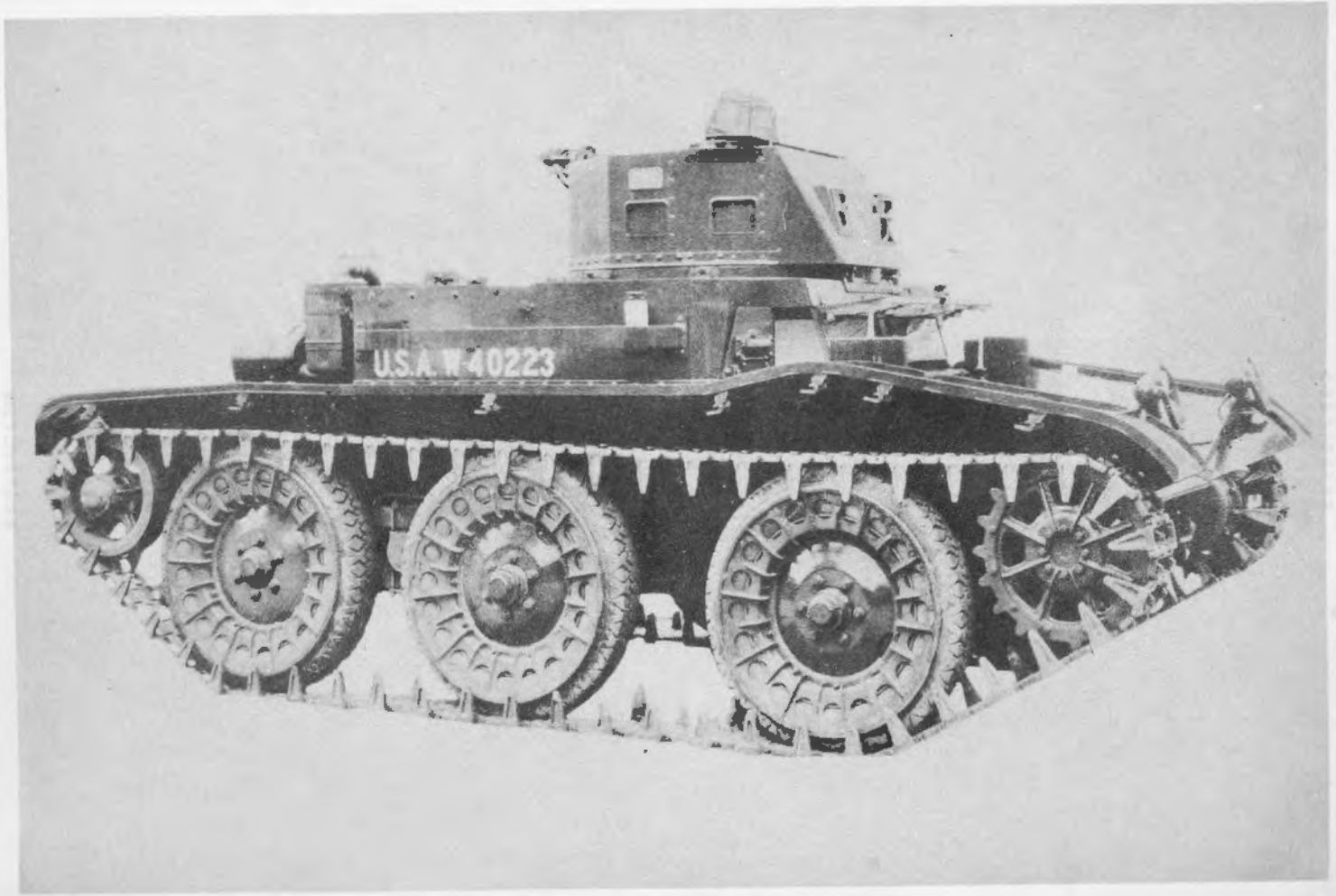
Maximum Speed: 45 MPH

Weight: 19,300 lbs

Engine: Continental 7-cylinder

Suspension and Tracks: Volute steering

Remarks: Similar to M1; addition of one cal .30 MG.


U.S.A. W 40223

Item No. 43

VEHICLE NOMENCLATURE: **CAR, CONVERTIBLE COMBAT, T7**

Date Produced: 1939

Total Production: ?

Armament: Three cal .30 MGs, one cal .50 MG

Armor: 1/4" to 5/8"

Maximum Speed: 35 MPH (tracks), 53 MPH (wheels)

Weight: 21,956 lbs gross

Engine: Continental 7-cylinder radial

Suspension and Tracks: Coil and leaf spring suspension


U.S.A. W 30462

Item No. 44

VEHICLE NOMENCLATURE: **LIGHT TANK, T6**

Date Produced: 1939

Total Production: ?

Armament: None — Chassis only

Armor: 3/8" to 1"

Maximum Speed: 30 MPH

Weight: 19,500 lbs loaded

Engine: Two Buick 8-cylinder engines vertical-overhead valve type

Suspension and Tracks: Volute suspension; rubber bushed track


U.S.A. W-30444
SC 40 1074-X

[redacted]

Item No. 45

VEHICLE NOMENCLATURE: **MEDIUM TANK, M2**

Date Produced: 1939

Total Production: ?

Armament: One 37-mm gun, 8 cal .30 MGs

Armor: 1", top 3/8"

Maximum Speed: 30 MPH; 17.2 MPH cross country

Weight: 38,020 lbs loaded

Engine: Wright 9-cylinder radial

Suspension and Tracks: Constant mesh transmission, volute suspension, rubber blocked, rubber bushed tracks

Remarks: Designed to employ many parts of M3 light tank. Early model had fenders arranged so that bullets fired at them would be deflected into foxhole and trenches after crossing.

[redacted]

Item No. 46

VEHICLE NOMENCLATURE: **LIGHT TANK, M2A4**

Date Produced: 1940

Total Production: 373

Armament: One 37-mm gun and one cal .30 MG comb; one cal .30 MG, flex bow; two cal .30 MGs, fixed sponson

Armor: 3/8" to 1"

Maximum Speed: 34 MPH; 25 MPH cross country

Weight: 24,125 lbs loaded

Engine: Continental 7-cylinder

Suspension and Tracks: Volute spring suspension, rubber block track. Sychromesh transmission

Remarks: Appearance similar to M3. Differences are flat rear end, less protected gun mount, and M2A4 idler wheel is not in contact with ground. Had thinner armor than M3.

Item No. 47

VEHICLE NOMENCLATURE: **LIGHT TANK, M3**

Date Produced: 1940

Total Production: 3827

Armament: One 37-mm gun, five cal .30 MGs

Armor: 1" to 1 1/2"

Maximum Speed: 34 MPH, 15-20 MPH cross country

Weight: 28,114 lbs loaded, 24,900 lbs unloaded

Engine: Continental 7-cylinder W670-9A

Suspension and Tracks: Vertical volute spring suspension, rubber block or steel tracks

Remarks: Pistol ports, rear overhang. Turret originally of riveted construction with small cupola, later type welded and cupola eliminated. Steering was through Cletrac controlled differential.


ORO
14450

Item No. 48

VEHICLE NOMENCLATURE: **MEDIUM TANK, M2A1**

Date Produced: 1940

Total Production: ?

Armament: One 37-mm gun, eight cal .30 MGs

Armor: ?

Maximum Speed: 30 MPH; 17.2 MPH cross country

Weight: 41,315 lbs unloaded

Engine: Wright 9-cylinder

Suspension and Tracks: Volute suspension, rubber block, rubber bushed tracks

Remarks: Redesigned turret on M2 model and thicker armor. Bullet deflector plate on outside to protect driver's eyes. Horsepower of engine raised from 350 to 400.

[redacted]

Item No. 49

VEHICLE NOMENCLATURE: **MEDIUM TANK, M3**

Date Produced: 1940

Total Production: 5018

Armament: One 75-mm gun, one 37-mm gun, four cal .30 MGs

Armor: 1 1/2" to 2", top 1/2"

Maximum Speed: 22 MPH

Weight: 62,280 lbs loaded

Engine: Wright R975-EC2

Suspension and Tracks: Vertical volute spring suspension

Remarks: Riveted hull. First attempt since 1918 to mount weapon larger than 47-mm in tank. Major weapon all medium tanks of M3 series seriously handicapped by limited traverse. Cal .30 MGs reduced to three in standard models.

[redacted]

Item No. 50

VEHICLE NOMENCLATURE: **LIGHT TANK, M3A1**

Date Produced: 1941

Total Production: 4499

Armament: One 37-mm gun, M6; three cal .30 MGs; one cal .45 SMG

Armor: 1" to 1 1/2", 1/2" top

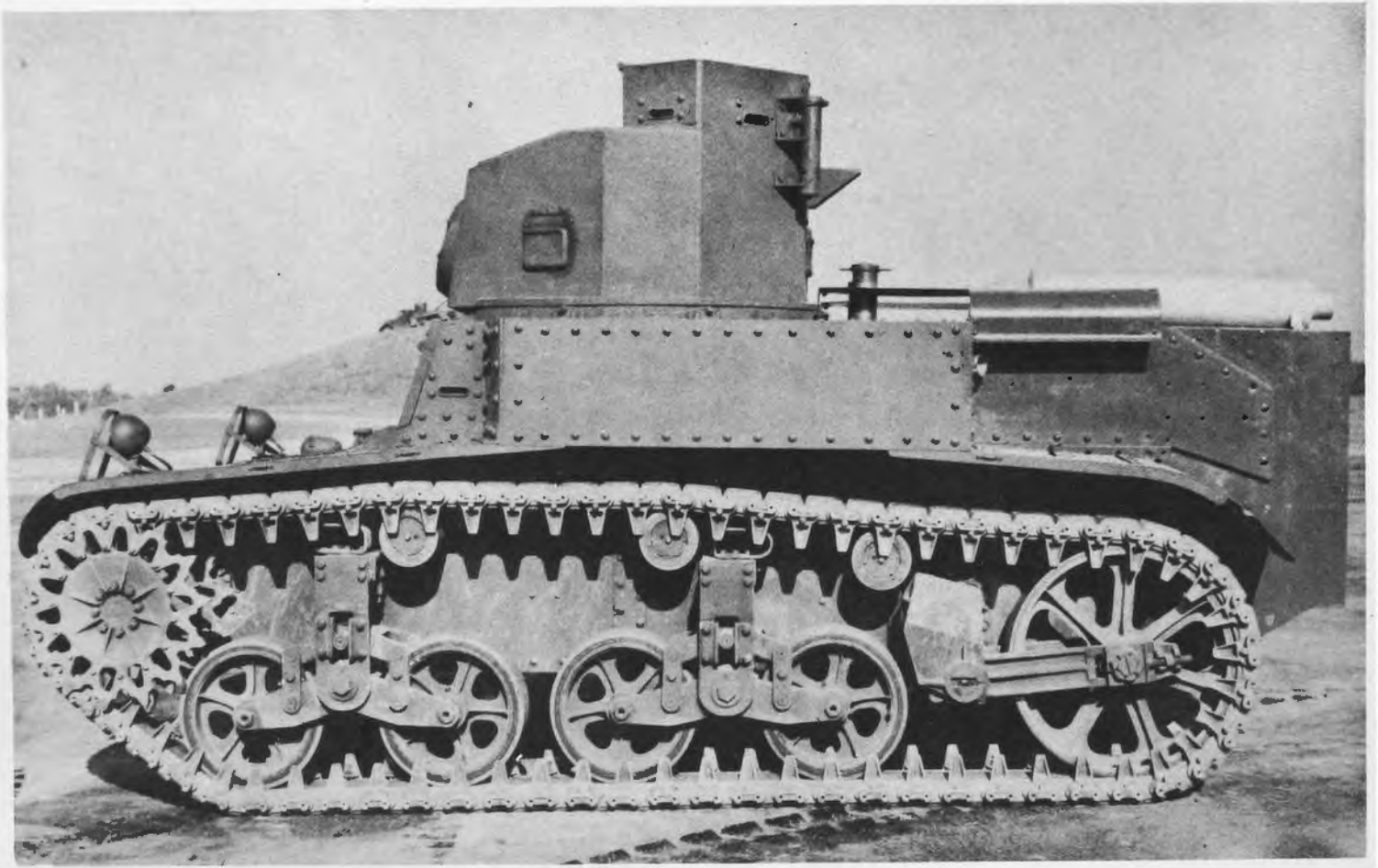
Maximum Speed: 34 MPH, 15-20 MPH cross country

Weight: 28,514 lbs looded, 25,300 lbs unloaded

Engine: Continental 7-cylinder W670-9A

Suspension and Tracks: Vertical valute spring suspension, rubber block and steel tracks

Remarks: M3 with integrated fighting compartment and round welded turret.



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Item No. 51

VEHICLE NOMENCLATURE: **LIGHT TANK, M3E1**

Date Produced: 1941

Total Production: 1986

Armament: One 37-mm gun, four cal .30 MGs

Armor: 1" to 1 1/2"

Maximum Speed: 42 MPH

Weight: 27,300 lbs unloaded

Engine: Cummins Diesel 6-cylinder

Suspension and Tracks: Volute suspension, rubber bushed tracks

Remarks: Not adopted due to Diesel policy during war. Generally satisfactory.

Item No. 52

VEHICLE NOMENCLATURE: **LIGHT TANK, M3E2**

Date Produced: 1941

Total Production: 1 pilot model, production model was M3E3 (later M5)

Armament: One 37-mm gun, five cal .30 MGs

Armor: 3/8" to 1"

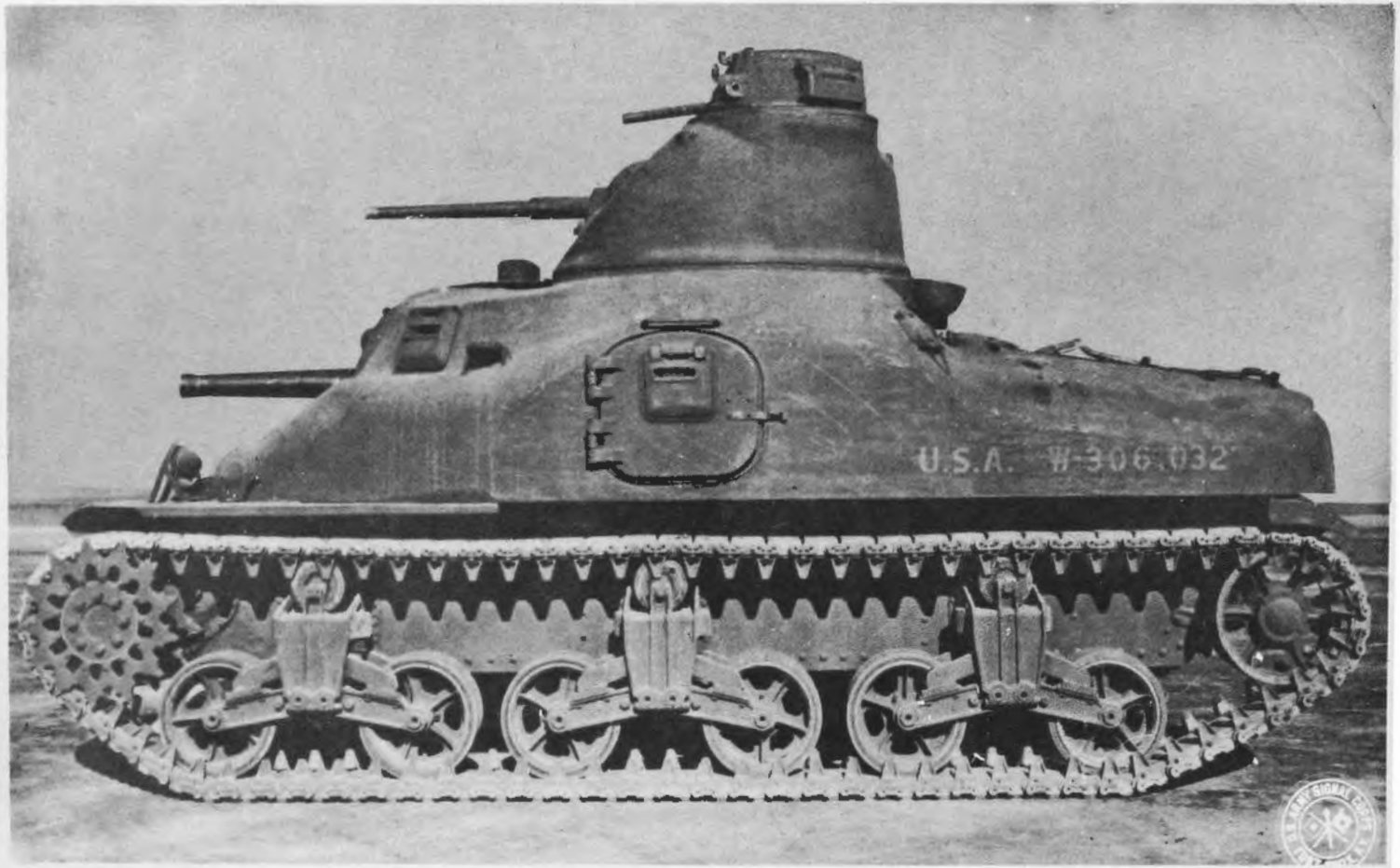
Maximum Speed: 50 MPH

Weight: 29,760 lbs loaded, 27,260 lbs unloaded

Engine: Cadillac dual

Suspension and Tracks: Volute spring suspension, rubber block, rubber bushed tracks

Remarks: Riveted hull and turret. Same as M3 but with twin Cadillac engine and hydra-matic transmission.


U.S.A. W-306.032

Item No. 53

VEHICLE NOMENCLATURE: **MEDIUM TANK, M3A1**

Date Produced: 1941

Total Production: 300

Armament: One 75-mm gun, one 37-mm gun, four cal .30 MGs

Armor: 1 1/2" to 2"

Maximum Speed: 22 MPH

Weight: 63,880 lbs loaded, 56,210 unloaded

Engine: Guiberson T1400

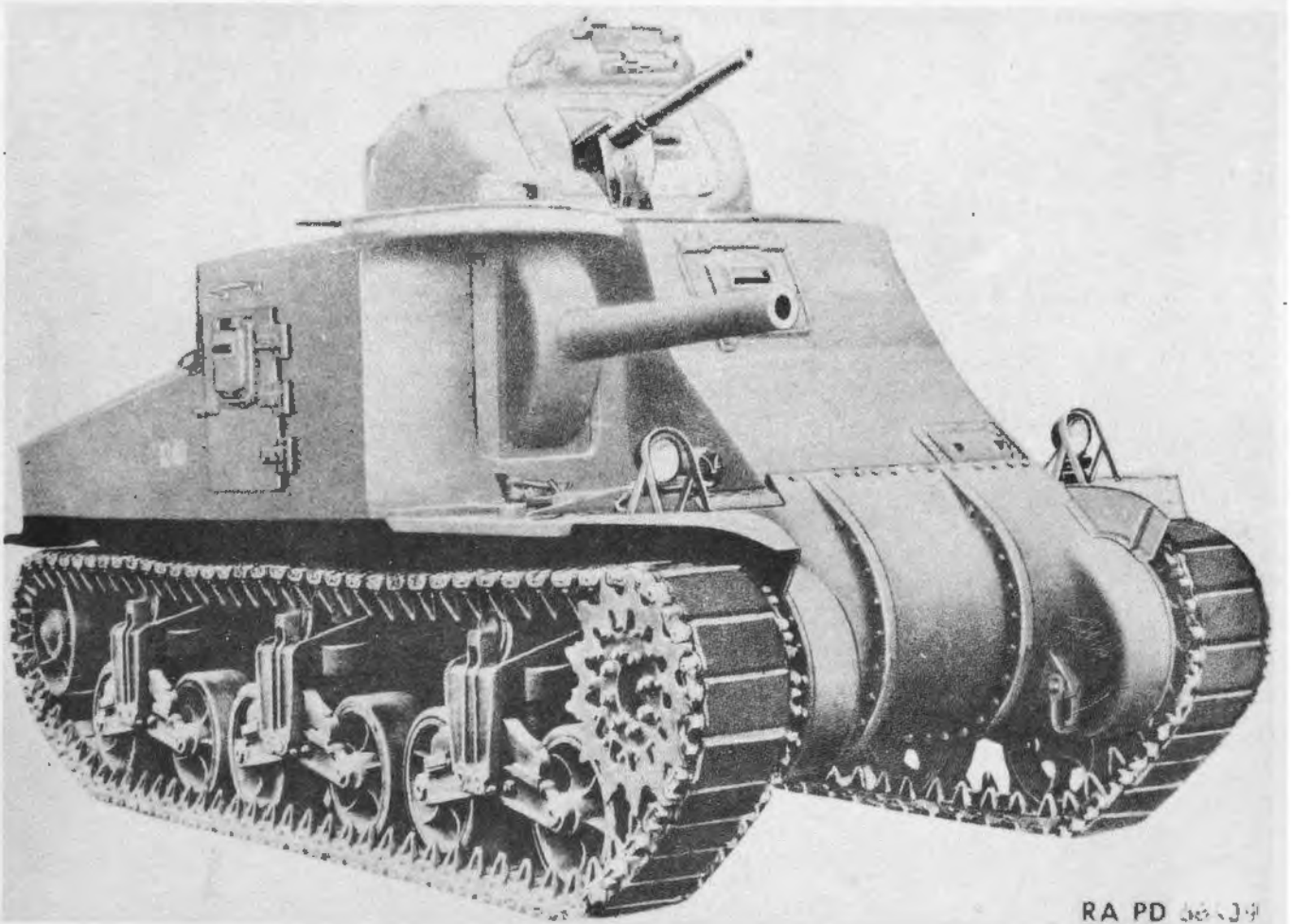
Suspension and Tracks: Vertical volute spring suspension

Remarks: This is the first appearance of the cast hull in US tanks.

M3A1E1 — Same characteristics but with three Lycoming engines as power plant.

M3A2 — With welded hull and Wright, R-975-EC2, engine.

Cal .30 MGs reduced to three in standard models.



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Item No. 54

VEHICLE NOMENCLATURE: **MEDIUM TANK, M3A3**

Date Produced: 1941

Total Production: 2

Armament: One 75-mm gun, one 37-mm gun, four cal .30 MGs

Armor: 1 1/2" to 2"; top 1/2"

Maximum Speed: 26 MPH

Weight: 66,480 lbs loaded

Engine: General Motors Twin Diesel 6046

Suspension and Tracks: Vertical volute spring suspension, rubber blocked, rubber bushed

Remarks: Welded hull. War Department policy during World War II in regard to use of Diesel engines precluded adaption of this tank. Cal .30 MGs reduced to three in standard models.

Item No. 55

VEHICLE NOMENCLATURE: **MEDIUM TANK, M7 (FORMERLY LIGHT TANK, T7E2)**

Date Produced: 1941

Total Production: 28

Armament: One 57-mm gun; one cal .30 MG, turret; one cal .30 MG bow; one cal .30 MG, AA mt

Armor: Front 1 1/2", sides 1 1/4", rear 1", turret 2", 1 1/2", 3/4", top 1/2"

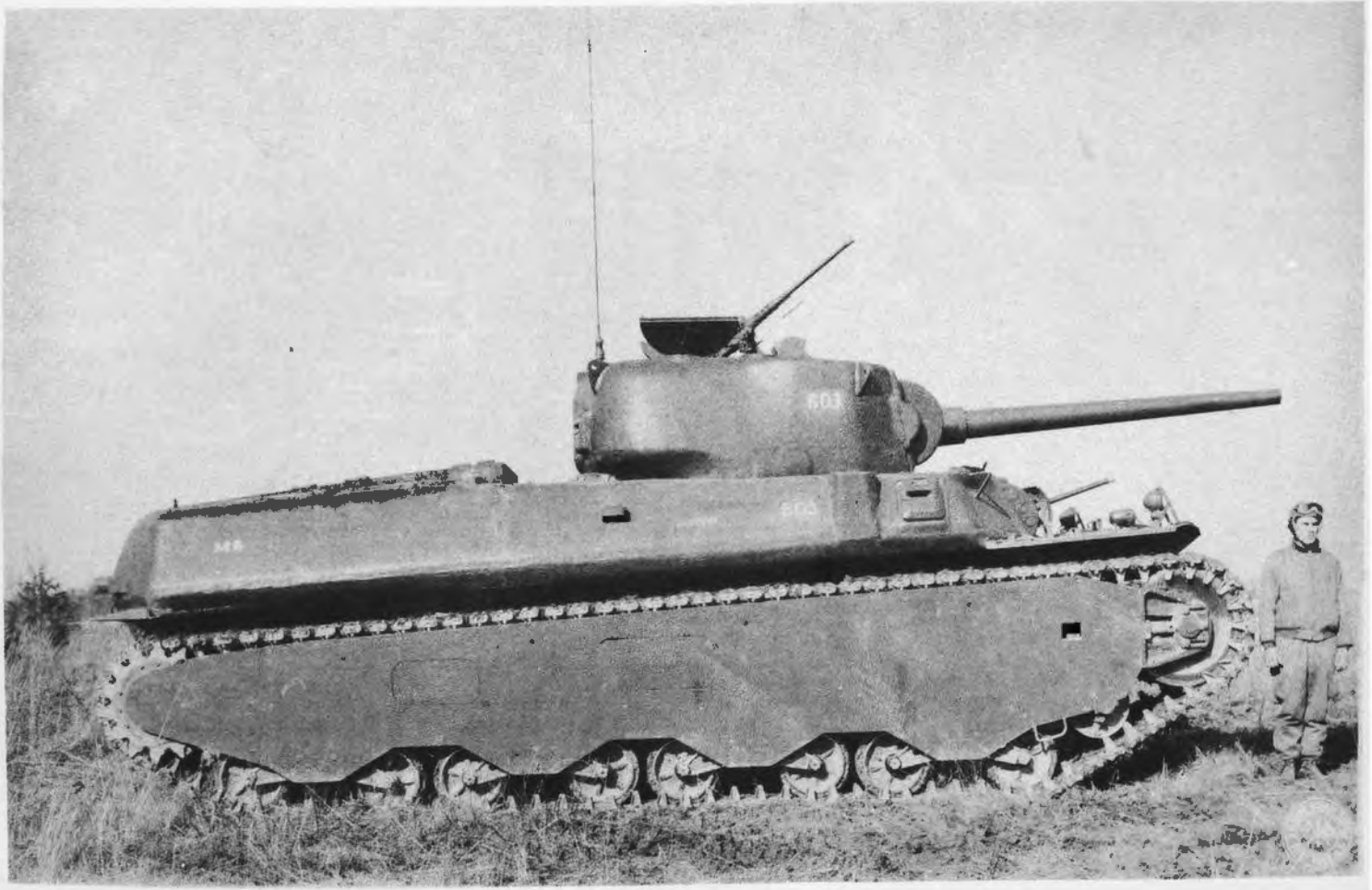
Maximum Speed: 35 MPH, 18-20 MPH cross country

Weight: 51,000 lbs loaded

Engine: Continental 9-cylinder R975-C1

Suspension and Tracks: Independent volute spring suspension, rubber block tracks, automatic transmission

Remarks: Defects — Insufficient power in subconverter gear train ratios, inadequate braking, gun mount off center.


603
M4

Item No. 56

VEHICLE NOMENCLATURE: **HEAVY TANK, T1E2 (M6)**

Date Produced: 1941

Total Production: 8

Armament: One 3" gun, T2, one 37-mm gun; three cal .50 MGs, one cal .30 MG

Armor: 2" to 5"

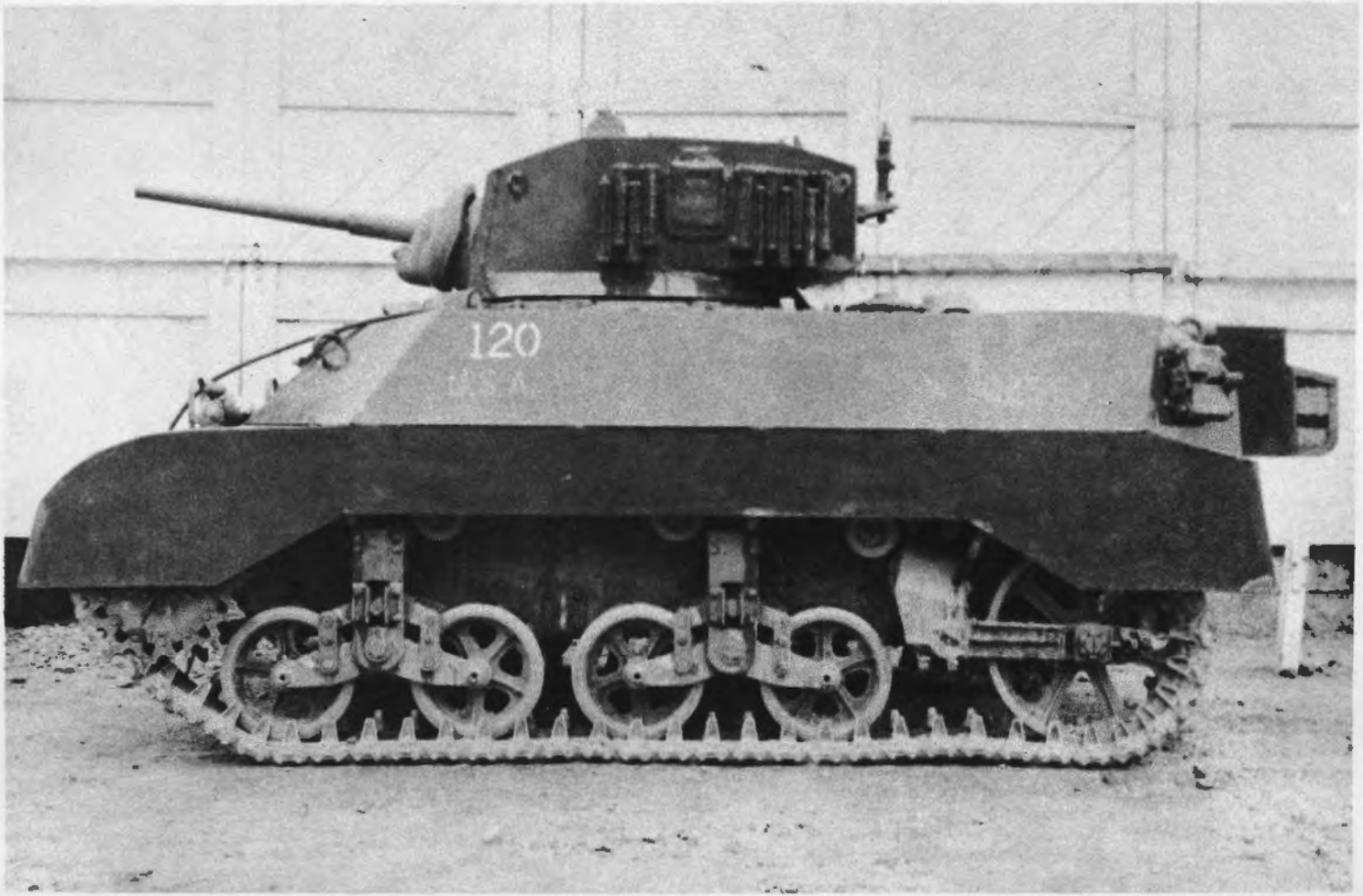
Maximum Speed: 27 MPH

Weight: 120,000 lbs loaded

Engine: Wright G-200

Suspension and Tracks: 2-speed transmission, horizontal volute spring, double rubber block, rubber bushed tracks

Remarks: M6A1 version has welded instead of cast armor hull. This tank equipped with twin disc torque converter.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[redacted]

Item No. 57

VEHICLE NOMENCLATURE: **LIGHT TANK, M3A3**

Date Produced: 1942

Total Production: 3427

Armament: Same as M3A1

Armor: Same as M3A1

Maximum Speed: 34 MPH

Weight: 29,700 lbs loaded, 26,500 lbs unloaded

Engine: Controlled 250-hp radial

Suspension and Tracks: Vertical volute suspension, rubber blocked track

Remarks: Turret with rear extension. Defects — Oil consumption excessive, clutch operating linkage unsatisfactory, clutches not durable enough.

M3 — Light, with hull and turret similar to M5. Dust shields added. Sponson or side plates slope inward.

M3A3E1-M3A3 with installation of automatic torque converter transmission with W-670 engine.

M3A3E2-M3A3 with automatic torque converter transmission and R-950 engine.

[redacted]


U.S.A.
W-3043438

[redacted]

Item No. 58

VEHICLE NOMENCLATURE: **LIGHT TANK, M5**

Date Produced: 1942

Total Production: 2341 (775 remonufactured to M5A1)

Armament: One 37-mm gun, three cal .30 MGs

Armor: 1" to 1 1/2"

Maximum Speed: 40 MPH

Weight: 31,749 lbs loaded

Engine: Twin Cadillac 16-cylinder V-8

Suspension and Tracks: Vertical volute spring suspension, rubber or steel tracks; 2 automatic transmissions

Remarks: M5 light tank preferred over M3 due to better protection provided by homogeneous armor, less maintenance of Cadillac engine, and decreased training time for drivers when operating tank with hydra-matic transmission. Faulty design of turret hatches, defective combination gun mount caused redesign of turret and change over to M5A1.

[redacted]

Item No. 59

VEHICLE NOMENCLATURE: **LIGHT TANK, M5A1**

Date Produced: 1942

Total Production: 5813

Armament: One 37-mm gun, three cal .30 MGs

Armor: 1/2" to 1 1/2"

Maximum Speed: 40 MPH

Weight: Same as M5

Engine: Same as M5

Suspension and Tracks: Same as M5

Remarks: Rear extension of turret to accommodate radio and larger turret hatch openings. M5A1 supplonted in production by the greatly superior Light Tank, M24.

[redacted]

Item No. 60

VEHICLE NOMENCLATURE: **LIGHT TANK, M3E4**

Date Produced: 1942

Total Production: Experimental model only

Armament: Same as M3

Armor: Same as M3

Maximum Speed: 4 MPH in water

Weight: M3 weight plus 2500 pound flotation device

Engine: Continental W-670 series 9A

Suspension and Tracks: Same as M3

Remarks: Equipped with Straussler Flotation Device. Rubber processed canvas float manufactured by Studebaker Corporation was fitted to the hull and the hull below the fenders waterproofed before testing for flotation. Device unsatisfactory due to extensive modifications required and could be used only in smooth water.

[redacted]

Item No. 61

VEHICLE NOMENCLATURE: **LIGHT TANK, T9**

Date Produced: 1942 by Marmon-Herrington

Total Production: Pilot only

Armament: One 37-mm gun, three cal .30 MGs

Armor: 1/2" to 6" (front only)

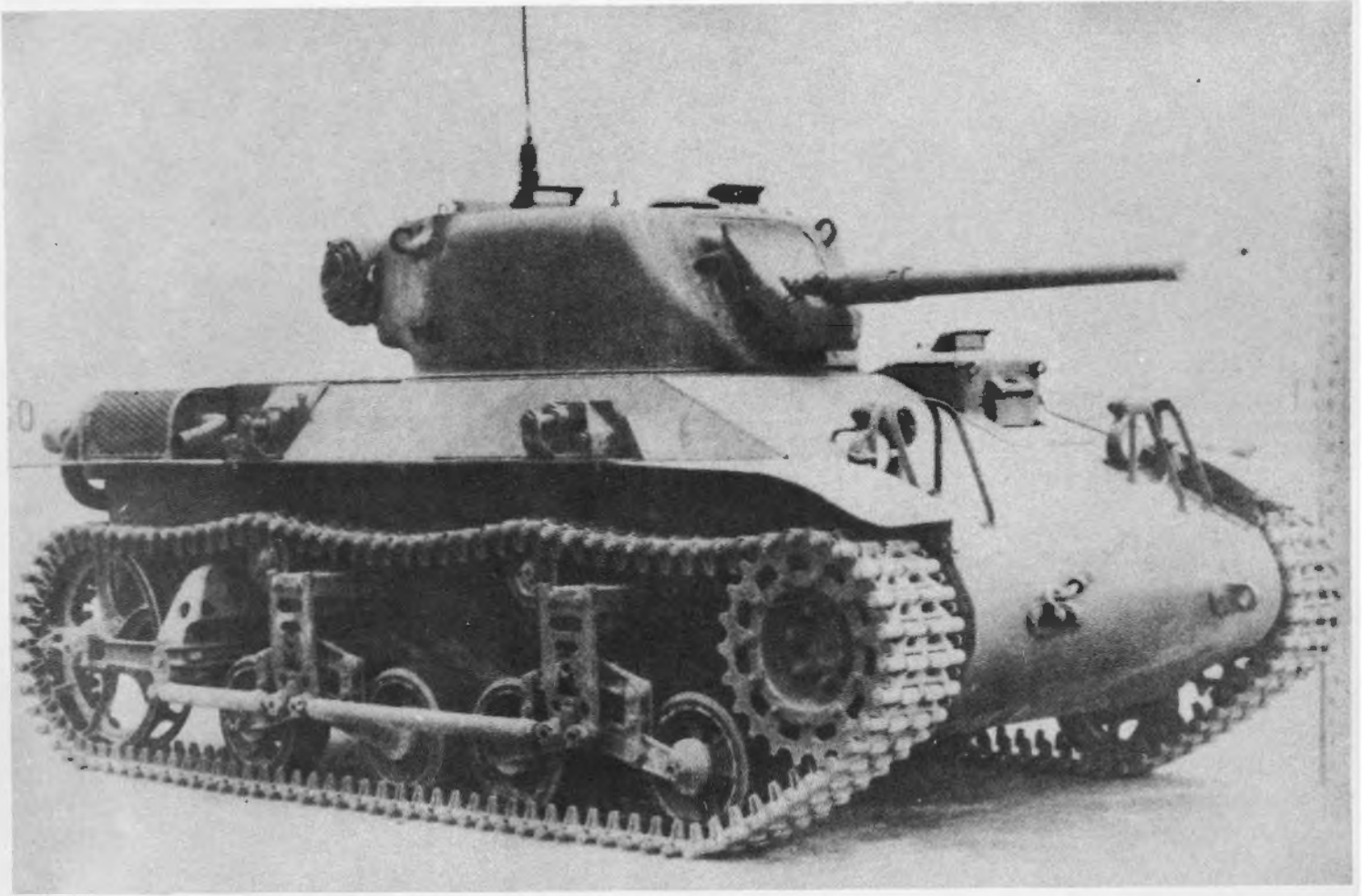
Maximum Speed: 28.5 MPH

Weight: 15,600 lbs loaded

Engine: Lycoming, 6-cylinder

Suspension and Tracks: Individual volute suspension, steel pins and shoes

Remarks: To be used in airborne operations. Military characteristics revised under OCM 24935 and vehicle designated T9E1.



Item No. 62

VEHICLE NOMENCLATURE: **LIGHT TANK, T9E1 (M22)**

Date Produced: 1942

Total Production: 830

Armament: One 37-mm gun, M6; one cal .30 MG

Armor: 3/8" to 1"

Maximum Speed: 40 MPH

Weight: 16,000 lbs loaded

Engine: Lycoming 6-cylinder horizontal

Suspension and Tracks: Volute suspension, steel tracks

Remarks: Changeover from T9 model to synchromesh transmission. Classified as M22 limited standard but later obsoleted. New 25-ton light tank, currently in design stage, has in military characteristics a requirement: "capability of being transported by air."

Item No. 63

VEHICLE NOMENCLATURE: **MEDIUM TANK, M3A4**

Date Produced: 1942

Total Production: 109

Armament: One 75-mm gun, one 37-mm gun, four cal .30 MGs

Armor: 1 1/2" to 2", top 1/2"

Maximum Speed: 25 MPH

Weight: 67,280 lbs loaded

Engine: Chrysler 30-cylinder 5 engines

Suspension and Tracks: Vertical volute spring suspension, rubber blocked, rubber bushed tracks

Remarks: Cal .30 MGs reduced to three in standard models.

Item No. 64

VEHICLE NOMENCLATURE: **MEDIUM TANK, M3A5**

Date Produced: 1942

Total Production: 450

Armoment: One 75-mm gun, one 37-mm gun, four cal .30 MGs

Armor: 1 1/2" to 2", top 1/2"

Maximum Speed: 26 MPH

Weight: 65,000 lbs loaded

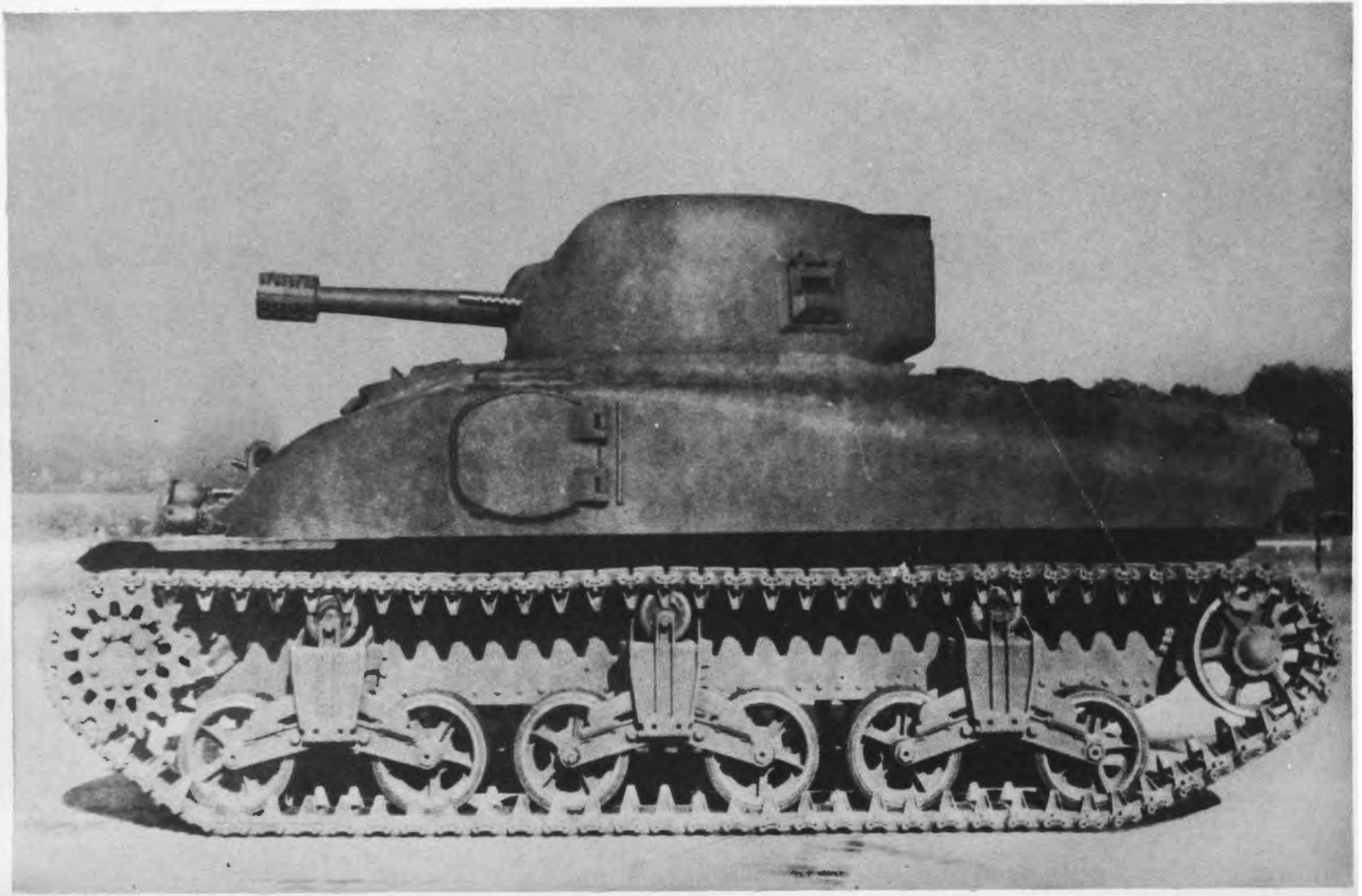
Engine: General Motors 12-cylinder 6046 6-71

Suspension and Tracks: Synchromesh transmission, vertical volute spring suspension, rubber blocked, rubber bushed tracks

Remarks: Riveted hull.

M3A5E1 — Similar with dual hydra-matic transmission.

M3A522 — With single hydra-matic transmission. Cal .30 MGs reduced to three in standard models.



Item No. 65

VEHICLE NOMENCLATURE: **MEDIUM TANK, T6 (M4)**

Date Produced: 1942

Total Production: 6797 (see A1, A2, A3, A4 types)

Armament: One 75-mm gun, five cal .30 MGs, one cal .50 MG

Armor: 1 1/2" to 3", top 1"

Maximum Speed: 26.1 MPH

Weight: 62,763 lbs loaded

Engine: Wright R975-EC2 radial

Suspension and Tracks: Full continuous reversible tracks, double vertical volute spring suspension


U.S.A.
W-3014765

Item No. 66

VEHICLE NOMENCLATURE: **MEDIUM TANK, M4A1**

Date Produced: 1942

Total Production: 6231, 3426 with 76-mm gun

Armament: One 75-mm gun, two cal .30 MGs, one cal .50 MG

Armor: 1" to 3.2", top 1"

Maximum Speed: 22 MPH

Weight: 63,645 lbs loaded

Engine: Wright radial

Suspension and Tracks: Verticol volute spring suspension, rubber blocked, rubber bushed tracks

Remorks: Cast hull.

M4A1E1 — With air conditioning equipment and heat installation.

M4A1E2 — With odograph and infrared equipment.

M4A1 series of tanks recommended for elimination by Robinett Board because cast hull ballistically inferior to welded hull, Continental engine inferior to Ford V-8 used in M4A3 type.

Item No. 67

VEHICLE NOMENCLATURE: **MEDIUM TANK, M4A2**

Date Produced: 1942

Total Production: 8041, 2915 with 76-mm gun

Armament: One 75-mm gun, two cal .30 MGs, one cal .50 MG

Armor: 1" to 3.2"

Maximum Speed: 30 MPH

Weight: 65,593 lbs loaded

Engine: General Motors 12-cylinder 6046 dual 6-71

Suspension and Tracks: Synchromesh transmission, vertical volute suspension, rubber blocked, rubber bushed

Remarks: Welded hull and Diesel engines. GM Diesel engine characterized by susceptibility to dust and dirt.

Item No. 68

VEHICLE NOMENCLATURE: **MEDIUM TANK, M4A3**

Date Produced: 1942

Total Production: 4741 (excluding production with 76-mm gun and 105-mm howitzer)

Armament: One 75-mm gun, two cal .30 MGs, one cal .50 MG

Armor: 1" to 3.2"

Maximum Speed: 27 MPH

Weight: 63,893 lbs loaded

Engine: Ford V-8 GAA

Suspension and Tracks: Verticol volute

Remarks: This was the preferred version of the M4 series. Crankshafts, connecting rods, and cylinder head assemblies not sufficiently durable in early model; improved suspension desired. M4A3E8 was changeover of this basic vehicle to horizontal volute suspension and 23" tracks.

Item No. 69

VEHICLE NOMENCLATURE: **MEDIUM TANK, M4A4**

Date Produced: 1942

Total Production: 7499

Armament: One 75-mm gun, one cal .50 MG, two cal .30 MGs

Armor: 1" to 3.2"

Maximum Speed: 25 MPH

Weight: 68,465 lbs loaded

Engine: Chrysler 30-cylinder 5 engines

Suspension and Tracks: Vertical volute suspension with rubber blocked, rubber bushed tracks

Remarks: Welded hull. Engine too complex for general tank use.

Item No. 70

VEHICLE NOMENCLATURE: **HEAVY TANK, T1E1 (M6A2)**

Date Produced: 1942

Total Production: 20

Armament: One 3" gun, T12; 37-mm gun; three cal .50 MGs, one cal .30 MG

Armor: 2" to 5"

Maximum Speed: 20 MPH

Weight: 124,000 lbs loaded

Engine: Wright 9-cylinder G-200

Suspension and Tracks: Elec transmission, horizontal volute springs, double rubber block tracks, rubber bushed

Remarks: Generally unsatisfactory as heavy tank.

Item No. 71

VEHICLE NOMENCLATURE: **LIGHT TANK, T24 (M24)**

Date Produced: 1943

Total Production: 4731

Armament: One 75-mm gun, cal .50 AA MG; cal .30 MG, flex mt; one cal .30 MG, coaxial

Armor: 3/4" to 1"

Maximum Speed: 35 MPH

Weight: 38,000 lbs loaded, 34,000 lbs unloaded

Engine: Cadillac Dual V-8

Suspension and Tracks: Torsion bar individual wheel tension compensating suspension

Remarks: Standard light tank by OCM 24395. Defects — Excessive ground pressure in mud or soft ground; insufficient horsepower in adverse cross country conditions; excessive maintenance on tracks and suspension.

Most satisfactory light tank to date.

[redacted]

Item No. 72

VEHICLE NOMENCLATURE: **LIGHT TANK, T24E1**

Date Produced: 1943

Total Production: Pilot only

Armament: Same as T24

Armor: Same as T24

Maximum Speed: 48 MPH

Weight: Same as T24

Engine: Continental 9-cylinder R975-C4 static radial

Suspension and Tracks: Torsion bar suspension, center guide tracks

Remarks: Same as T24 but with Wright R-975 engine and torque converter transmission.

[redacted]

ARMORED BOARD
TEST OPERATION
732
732

Item No. 73

VEHICLE NOMENCLATURE: **MEDIUM TANK, M4A6**

Date Produced: 1943

Total Production: 75

Armament: One 75-mm gun, One 2" mortar, two cal .30 MGs, one cal .50 MG

Armor: 1 1/2" to 4 1/2"

Maximum Speed: 30 MPH

Weight: 70,494 lbs loaded

Engine: Caterpillar RD-1820

Suspension and Tracks: Volute spring and lever; 16 9/16" double pin tracks


570
570
MARGUERITE
ARMORED BOARD
TEST OPERATION

Item No. 74

VEHICLE NOMENCLATURE: **MEDIUM TANK, M4 (105-mm how)**

Date Produced: 1943

Total Production: 1641

Armament: One 105-mm howitzer, T8; one cal .30 MG, one cal .50 MG

Armor: 1" to 3"

Maximum Speed: 25 MPH

Weight: 68,147 lbs loaded

Engine: Continental radial

Suspension and Tracks: Synchromesh transmission, vertical volute spring suspension

T20E3
303

Item No. 75

VEHICLE NOMENCLATURE: **MEDIUM TANK, T20E3**

Date Produced: 1943

Total Production: 1 pilot model

Armament: One 3" gun, M7; three cal .30 MGs; one cal .50 MG

Armor: 1 1/2" to 3", turret 2 1/2" to 3 1/2"

Maximum Speed: 35 MPH

Weight: 63,000 lbs loaded

Engine: Ford 8-cylinder

Suspension and Tracks: Hydra-matic transmission, torsion bar suspension

Item No. 76

VEHICLE NOMENCLATURE: **MEDIUM TANK, T22E1**

Date Produced: 1943

Total Production: 1 pilot model

Armament: One 75-mm automatic gun

Armor: 1 1/2" to 2 5/8", turret 3 1/2" to 2 1/2"

Maximum Speed: 30 MPH

Weight: 69,300 lbs loaded

Engine: Ford 8-cylinder GAN

Suspension and Tracks: Horizontal volute suspension, T48 chevron rubber block track

Item No. 77

VEHICLE NOMENCLATURE: **MEDIUM TANK, T23**

Date Produced: 1943

Total Production: 250

Armament: One 76-mm gun, one col .50 MG, two cal .30 MGs

Armor: 1 1/2" to 3 1/2"

Maximum Speed: 35 MPH

Weight: 73,900 lbs loaded

Engine: Ford V-8

Suspension ond Tracks: Electric drive transmission, volute suspension

Remarks: Hull design radically different from M4 series of tanks. First time gas-electric drive tried since 1918. Defects — Requires excessive maintenance; if engine fails, steering and braking control is lost.


T23E3 ARMORED BOARD TEST OPERATION

[redacted]

Item No. 78

VEHICLE NOMENCLATURE: **MEDIUM TANK, T23E3**

Date Produced: 1943

Total Production: 1 pilot model only

Armament: One 76-mm gun, M1A1

Armor: 1 1/2" to 3 1/2"

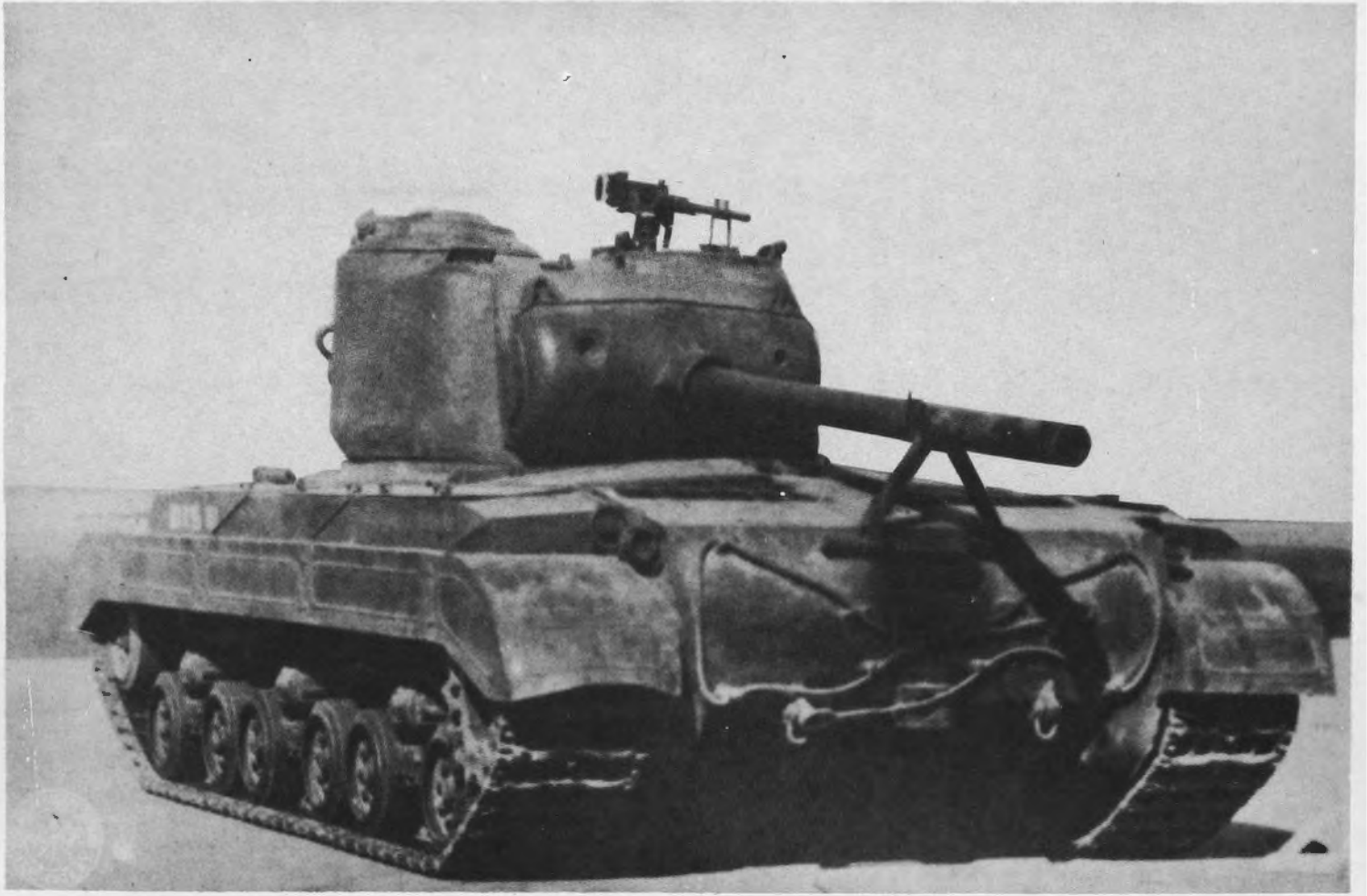
Maximum Speed: 35 MPH

Weight: 73,900 lbs

Engine: Ford GAN V-8

Suspension and Tracks: Torsion bar, center guide tracks

Remarks: Defects — Tracks have short life, considerable maintenance on suspension but improved performance.



Item No. 79

VEHICLE NOMENCLATURE: **MEDIUM TANK, T25**

Date Produced: 1943

Total Production: Pilot only

Armament: One 90-mm gun, T17; one cal .50 MG; two cal .30 MGs

Armor: 1 1/2" to 3 1/2"

Maximum Speed: 30 MPH

Weight: 77,000 lbs loaded

Engine: Ford GAN

Suspension and Tracks: Horizontal volute, steel tracks, electric drive transmission


ARMORED BOARD TEST OPERATION

Item No. 80

VEHICLE NOMENCLATURE: **MEDIUM TANK, T25E1**

Date Produced: 1943

Total Production: 40

Armament: One 90-mm gun, T7; one cal .50 MG; two cal .30 MGs

Armor: 1.5" to 3.5"

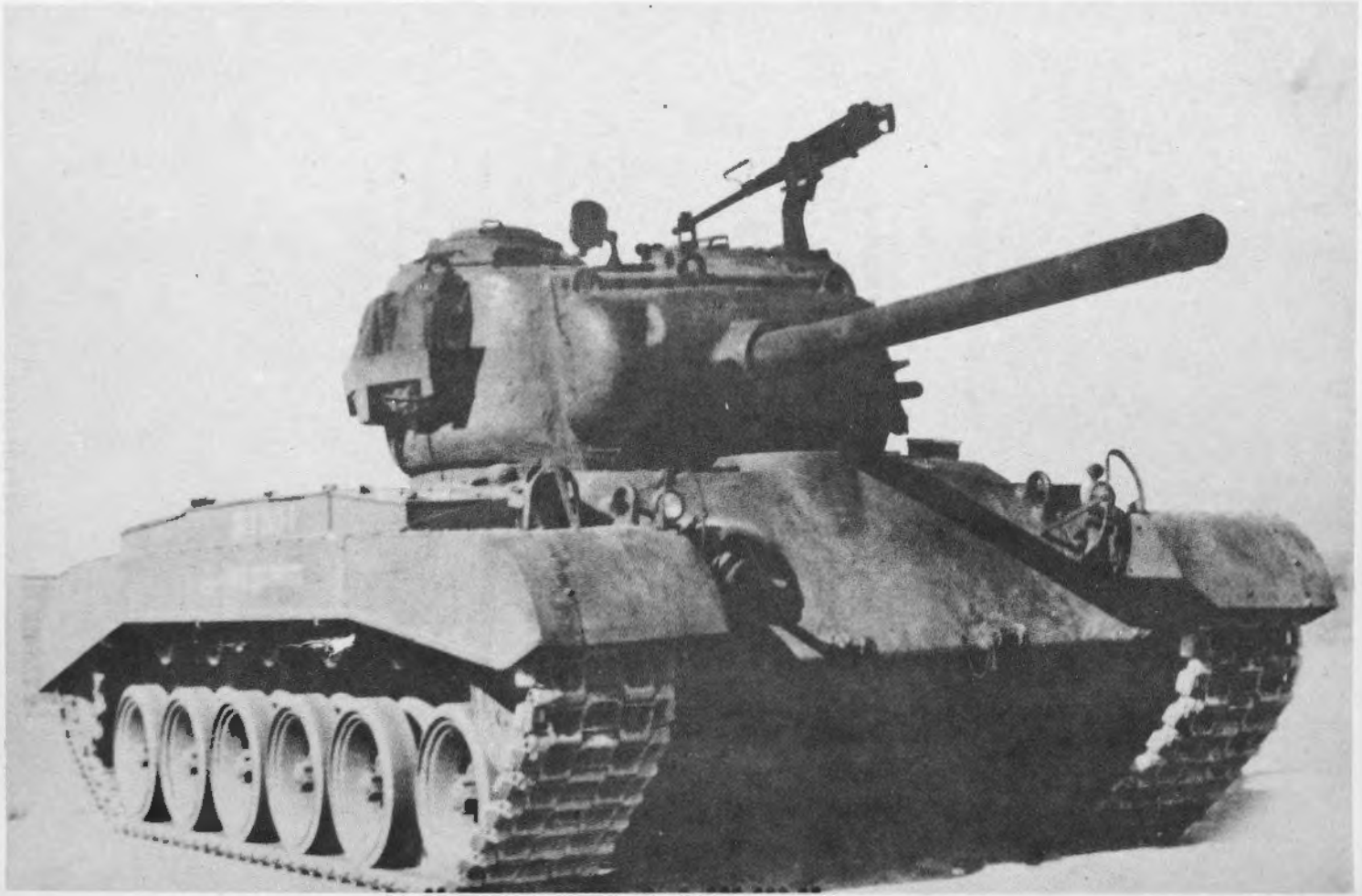
Maximum Speed: 30 MPH

Weight: 76,600 lbs loaded

Engine: Ford GAF

Suspension and Tracks: Independent torsion bar, combination torque converter and gear transmission

Remarks: This vehicle of same type as M26 which has heavier armor and increased performance. Defects — Early failure of rubber bushing for tracks, cracking of manifolds on engine, no features which are not as good or better in M26 series.



Item No. 81

VEHICLE NOMENCLATURE: **MEDIUM TANK, T26E1**

Date Produced: 1943

Total Production: 10

Armament: One 90-mm gun, T7; one cal .50 MG; two cal .30 MGs

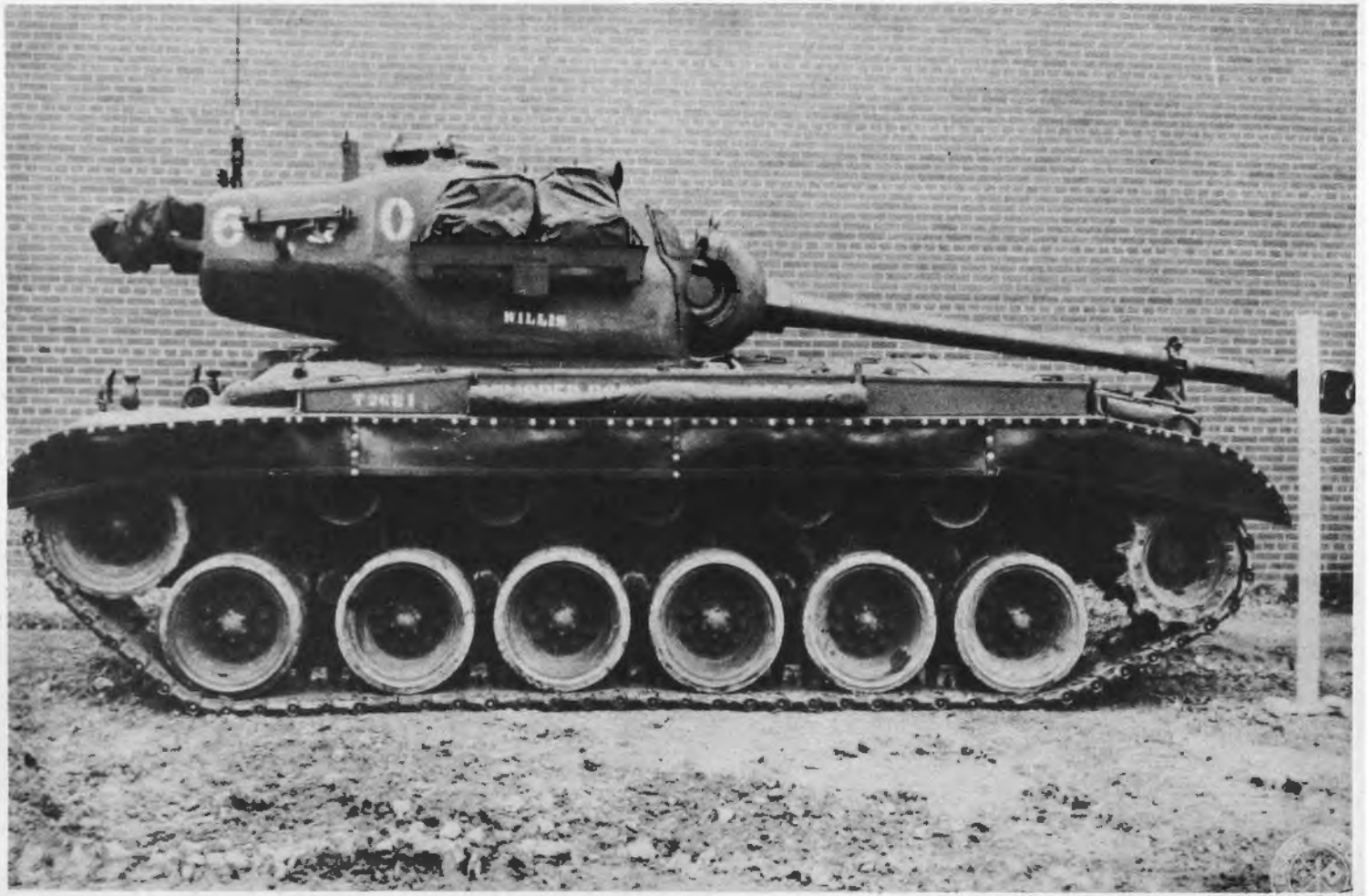
Armor: 2" to 4"

Maximum Speed: 25 MPH

Weight: 85,700 lbs loaded

Engine: Ford GAF

Suspension and Tracks: Individual torsion bar suspension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Item No. 82

VEHICLE NOMENCLATURE: **MEDIUM TANK, M26 (T26E3)**

Date Produced: 1943

Total Production: 2713 (to October 1945)

Armament: One 90-mm gun, two cal .30 MGs, one cal .50 MG

Armor: 2" to 4"

Maximum Speed: 27 MPH

Weight: 95,000 lbs

Engine: Ford GAN

Suspension and Tracks: Torsion bar; electric drive transmission

Remarks: Long low streamline silhouette. First classed as heavy tank. Vehicle above is the result of effort to build tank with firepower and protection sufficient to successfully engage German Panther and Tiger tanks.


450
450 BABY

Item No. 83

VEHICLE NOMENCLATURE: **ASSAULT TANK, T14**

Date Produced: 1943

Total Production: Two pilots

Armament: One 75-mm gun, three cal .30 MGs

Armor: 2" to 3"

Maximum Speed: 24 MPH

Weight: 93,930 lbs loaded

Engine: Ford GAZ V-8

Suspension and Tracks: Horizontal volute; steel grouser, rubber back 25-3/4" track

Remarks: Standard components of M4 for most part. Bogie tires had short life. Effort to develop heavily armored vehicle with comparatively low ground pressure and moderate speed.

U.S.A.

Item No. 84

VEHICLE NOMENCLATURE: **"Q" MODEL FLAME THROWER (E7-M5A1)**

Date Produced: 1944

Total Production: 4 pilots

Armament: E7 flame gun replacing 37-mm gun

Armor: 1/2" to 1 1/2"

Maximum Speed: 40 MPH

Weight: 34,920 lbs

Engine: Twin Cadillac

Suspension and Tracks: Vertical volute

Remarks: Experimental only. Highly specialized equipment, the need for which can ordinarily be met by tank cannon. Complicated system of supply and inferiority of M5A1 chassis in comparison to M24 have removed this vehicle from consideration for future use.


420
ARMORED BOARD
TEST OPERATION
420

Item No. 85

VEHICLE NOMENCLATURE: **MEDIUM TANK, M4A3E2**

Date Produced: 1944

Total Production: 254

Armament: One 75-mm gun, one 2" mortar, one cal .50 MG, two cal .30 MGs

Armor: 1 1/2" to 5 1/2", top 3/4"

Maximum Speed: 22 MPH

Weight: 84,000 lbs stowed

Engine: Ford 8-cylinder 60-degree "V"

Suspension and Tracks: Volute spring suspension; rubber track with extended end connectors

Remarks: Heavily armored tank. Designed as wartime expedient to quickly provide a heavily armored assault tank for use with infantry.


458
TOM THUMB
ARMORED BOARD
TEST OPERATION 458
M4E8

Item No. 86

VEHICLE NOMENCLATURE: **MEDIUM TANK, M4A3E8**

Date Produced: 1944

Total Production: 1466 (part of M4A3 production figures)

Armament: One 76-mm gun, one cal .50 MG, two cal .30 MGs

Armor: 1/2" floor; 2 1/2" to 3 1/2" sides and turret

Maximum Speed: 20 MPH

Weight: 75,590 lbs loaded

Engine: Ford GAA

Suspension and Tracks: Horizontal volute suspension and 23" center guided track

Remarks: Vibration from suspension affects fire control equipment; numerous defects in track and suspension of early model. Later vehicles show improved performance over earlier type suspensions of medium tanks.

[redacted]

Item No. 87

VEHICLE NOMENCLATURE: **MEDIUM TANK, M4A3 (76-mm)**

Date Produced: 1944

Total Production: 4542

Armament: One 76-mm gun, one cal .30 MG, one cal .50 MG, one 2" mortar

Armor: 1" to 2 1/2"

Maximum Speed: 26 MPH

Weight: 71,100 lbs loaded

Engine: Ford GAA-III

Suspension and Tracks: Volute spring and lever; foot actuated steering lever lock; T48 rubber chevron track

Remarks: Water protected ammunition racks; traveling lock on gun.

[redacted]

Item No. 88

VEHICLE NOMENCLATURE: **FLAME THROWER COMBAT VEHICLE, MAIN ARMAMENT, M5-4**

Date Produced: 1945

Total Production: ?

Armament: E12-7R1 flame gun (in lieu of 75-mm gun)

Armor: 1" to 3.2"

Maximum Speed: 27 MPH

Weight: Approximately same as M4A3

Engine: Ford V-8 GAA

Suspension and Tracks: Vertical volute

Remarks: Basically this is the M4A3 tank with 75-mm gun removed and the flame thrower installed in turret together with necessary piping and auxiliary equipment for flame thrower system. Service Unit, Flame Thrower Combat Vehicle, M4 is accompanying vehicle. It can completely service two M5-4 flame throwers per hour.

313
313
313

Item No. 89

VEHICLE NOMENCLATURE: **FLAME THROWER MECHANIZED, M3-4-E12R3**

Date Produced: 1945

Total Production: ?

Armament: One 75-mm gun plus E12R3 flame gun in modified periscope mounting

Armor: Same as M4 series tanks

Maximum Speed: Same as above

Weight: M4 tank plus 998 lbs

Engine: Same as M4 series tanks

Suspension and Tracks: Vertical volute

Remarks: Superior periscope-type flame gun. Study continuing on various types of tank-mounted flame throwers.

Item No. 90

VEHICLE NOMENCLATURE: **MEDIUM TANK, T26E4**

Date Produced: 1945

Total Production: 25

Armament: One 90-mm gun, T15E2; one cal .50 MG; two cal .30 MGs

Armor: 2" to 4"

Maximum Speed: 20 MPH

Weight: 94,600 lbs

Engine: Ford GAF V-8

Suspension and Tracks: Torsion bar, individually sprung wheels

Remarks: Higher velocity gun; equilibrator system.


U.S.A.
A.F. BOARD NO.2 TEST OPERATION

Item No. 91

VEHICLE NOMENCLATURE: **MEDIUM TANK, T26E5**

Date Produced: 1945

Total Production: 27

Armament: One 90-mm gun, two cal .30 MGs, one cal .50 MG

Armor: 3 1/2" to 11"

Maximum Speed: 22.3 MPH

Weight: 51 tons

Engine: Ford V-8

Suspension and Tracks: 28" track

Remarks: Version of M26 with increased frontal armor.

[redacted]

Item No. 92

VEHICLE NOMENCLATURE: **SUPERHEAVY TANK, T28**

Date Produced: 1945

Total Production: Two pilots authorized to date

Armament: One 105-mm gun, T5E1; one cal .50 MG

Armor: 2" to 12"

Maximum Speed: 8 MPH

Weight: 190,000 lbs loaded

Engine: Ford GAF 8-cylinder

Suspension and Trocks: Horizontal volute springs

Remarks: Increased fire power and greater armor protection. This vehicle formerly designated 105-mm Gun Motor Carriage, T95.

[redacted]

Item No. 93

VEHICLE NOMENCLATURE: **HEAVY TANK, T29**

Date Produced: 1945

Total Production: Two pilots built in 1945

Armament: One 105-mm gun, T5E1; two cal .50 MGs; one cal .30 MG

Armor: 2" to 4"

Maximum Speed: 22 MPH

Weight: 128,000 lbs

Engine: V-12 750 HP

Suspension and Tracks: Torsion bar suspension with center guide tracks, cross drive power train

Remarks: Currently undergoing test at Aberdeen Proving Ground.

[redacted]

Item No. 94

VEHICLE NOMENCLATURE: **HEAVY TANK, T30**

Date Produced: 1945

Total Production: Ten to be built, two diverted to T34

Armament: One 105-mm gun and one cal .30 MG in combination mount, one cal .50 MG

Armor: Frontal opprox 9", rest in accordance with weight limitations

Maximum Speed: Undetermined

Weight: 60 tons

Engine: Ford 750 HP

Suspension and Tracks: Torsion bar suspension with center guide tracks

[redacted]

Item No. 95

VEHICLE NOMENCLATURE: **HEAVY TANK, T32**

Date Produced: 1945

Total Production: Only pilots to date

Armament: One 90-mm gun, T15E2; two cal .30 MGs; one cal .50 MG

Armor: 6" to 11 3/4"

Maximum Speed: 22 MPH

Weight: 120,000 lbs

Engine: Ford or Allison V-12

Suspension and Tracks: Torsion bar, individually sprung wheels; rubber-backed steel 28" tracks

Remarks: This is a modification of M26 to provide increased armor protection and more fire power.